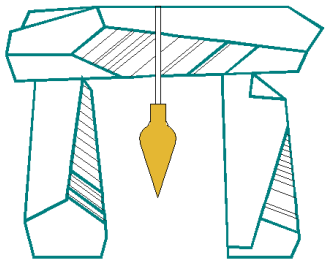
DeCelle-Burke-Sala



& Associates, Inc.

Engineering Report

for a

Multi-Unit Residential Development
91 Beatrice Circle
Belmont, Massachusetts

Prepared by:

DeCelle-Burke-Sala & Associates, Inc.
1266 Furnace Brook Parkway
Suite 401
Quincy, MA 02169

Prepared for:

91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Pl., #603
Wakefield, MA 01880

November 4, 2020

Table of Contents

SECTION 1 - PROJECT NARRATIVE

Existing Conditions

The project site is one parcel of land totaling 23,496 square feet of land designated as Map 51 Lot 36 with the Town of Belmont Assessors. The site is currently improved with a one and one-half story single-family home with driveway access off Frontage Road and is zoned Single Residence A. The residential building is approximately a 2,730 square foot (s.f.) footprint with a 456 s.f. single story detached garage. The driveway extends from Frontage Road to the garage and provides for additional on-site parking.

The Subject Property is bounded by single-family homes to the east, west and south. Frontage Road, also known as Hinckley Way, is located to the north of the Subject Property. Frontage Road abuts Massachusetts' Route 2/Concord Turnpike. The Concord Turnpike is an eight-lane main thoroughfare providing service for commuter traffic for the City of Boston and the west and northwest communities of the Metro Boston region. Frontage Road is a one-way two lane road that travels east and provides access to the Concord Turnpike further east of the Subject Property. Frontage Road also delineates the municipal boundary between Arlington and Belmont and is part of the MBTA bus routes #62, 76, 78, and 84, providing service to the MBTA's Red Line in Cambridge, Massachusetts.

The Subject Property has mature landscaping around the home and along Frontage Road. The site has topography ranging in elevation from 236 on the west of the lot to elevation 218 on the east side of the lot. The majority of the lot surface topography rolls to the east and toward Frontage Road. Soils are mapped by the Natural Resources Conservation Service (NRCS) as a Charlton-Hollis Rock Complex consisting of shallow well-drained gravel and sand with ledge. Test pits were performed by this office confirming the mapping.

Public water and sewer with connections out to Frontage Road service the single-family home. Underground power and communications also service the home. There are no existing stormwater controls for the property. All existing stormwater flows over-ground to Frontage Road.

Proposed Conditions

The proposed project includes constructing a new multi-unit affordable residential development subject to the Massachusetts Chapter 40B Housing regulations. The project consists of five new residential buildings, one four-story townhouse style building with eight units and the other four buildings each a two-story single-family home. Each of the twelve residential units contain three bedrooms each. Each building is a slab-on-grade building. No basements are proposed.

Each residential unit has a single car garage with access off a shared driveway that is centered between the buildings. The driveway is accessed from Frontage Road in a similar location to the existing drive. The drive also provides access to an eight (8) space surface parking lot providing a total of twenty (20) spaces for a parking ratio of 1.67. A four-foot wide pedestrian walkway extends up the driveway from Frontage Road and connects to a walkway for the townhouse building and to the main driveway to the development.

The project includes razing the existing single-family home and garage, cutting and capping all service utilities and removing the paved driveway. The site grade will be lowered to the driveway elevation of 227 to 225. The slab-on-grade construction will minimize the disturbance to any pockets of subsurface ledge that may exist. Two retaining walls on either end of the site stabilize the site at a more level elevation for vehicular traffic and parking.

New utilities will be brought on-site in the vicinity of the driveway from Frontage Road. New water supply, fire protection, sewage disposal, power, communications and gas shall be brought on the site underground. A 6" water supply pipe shall extend from the water main and provide individual domestic services for each townhouse unit and fire protection for each building. A new 6" PVC sewer pipe shall extend from the sewer main and connect to the proposed southerly buildings providing a separate service for each unit. The northerly building shall use an existing sewer manhole that serviced the old home and extend to each unit connecting separate service. The existing sewer connection from this manhole to the sewer main shall remain in service.

Currently no stormwater controls exist on the site. The proposed stormwater control system consists of a surface collection system that includes two deep sump catch basins, one deep sump manhole and a single underground Cultec recharge system with 51 chambers and an overflow to the city system located at Frontage Road. The system provides local flood control, groundwater recharge capabilities and stormwater quality treatment. The system as proposed meets MassDEP Stormwater Management Standards and buffers flow off the property for the 2, 10, 25, and 100-year storm event.

Stormwater Management

It is the intent of this report to show compliance with the Massachusetts Stormwater Management Standards (the "Standards"). This office generated hydrographs for both existing and proposed conditions to compare overall storm water offsite flows for various storms. Despite the soil mapping calling for "A" soils (Charlton) DBS calculated land coverage numbers (CN) using Hydrologic Group "C" soils based upon soil evaluations performed within the vicinity of the project. Soil testing will be performed before the construction of the underground infiltration

system to better determine the quality of the soils on site. Minimums for Times of Concentration for both existing and proposed conditions for hydrograph generation were used. A Rawl's Rate of 0.27 inches per hour was used for exfiltration. Impervious land coverage increases but the majority of runoff will now be treated in the underground stormwater recharge chambers. The runoff for the 2, 10, 25 and 100-year storm events are reduced and the project as proposed exceeds the recharge volume requirement.

The results of the calculations are tabulated below for comparison with the existing and proposed condition values. The project also complies with the other stormwater management standards outlined in the Standards. The project complies with the following Standards:

Standard 1	-	No New stormwater conveyances discharge untreated stormwater directly to the waters of the Commonwealth;
Standard 2	-	Post Development peak discharge rates are less than pre-development;
Standard 3	-	The recharge volume required for this project is exceeded.
Standard 4-		The project meets the water quality standards.
Standard 5	-	N/A
Standard 6	-	N/A
Standard 7-		The project is re-development but the project complies with standards.
Standard 8-		A demolition and erosion control plan has been prepared for the short term prevention of erosion, sedimentation and the off-site transport of suspended solids.
Standard 9	-	A Long Term Operation and Maintenance Plan is attached.
Standard 10-		Per Standard No. 10 of the MassDEP Stormwater Management Standards, there shall be no illicit discharges to the stormwater management system. The Property Manager is responsible for implementing the Operation and Maintenance Plan and overseeing activities at the facility to prevent illicit discharges to the drainage system from occurring. It is strictly prohibited to discharge any products or substances onto the ground surface or into any drainage structures, such as catch basin inlets, manholes, or drainage outlets that would be a detriment to the environment.

It is DBS's belief that the project complies with the Stormwater Management Standards to the maximum extent practicable . The project as proposed will protect the abutter in the short term through proper construction and erosion protection techniques. It will also protect the environment from long term impacts due to the improved stormwater controls.

Stormwater Runoff Comparison Chart for Pre- and Post-Construction Flow Runoff to Frontage Road

2-Year Storm (3.27")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.82	Flow off-site	0.31

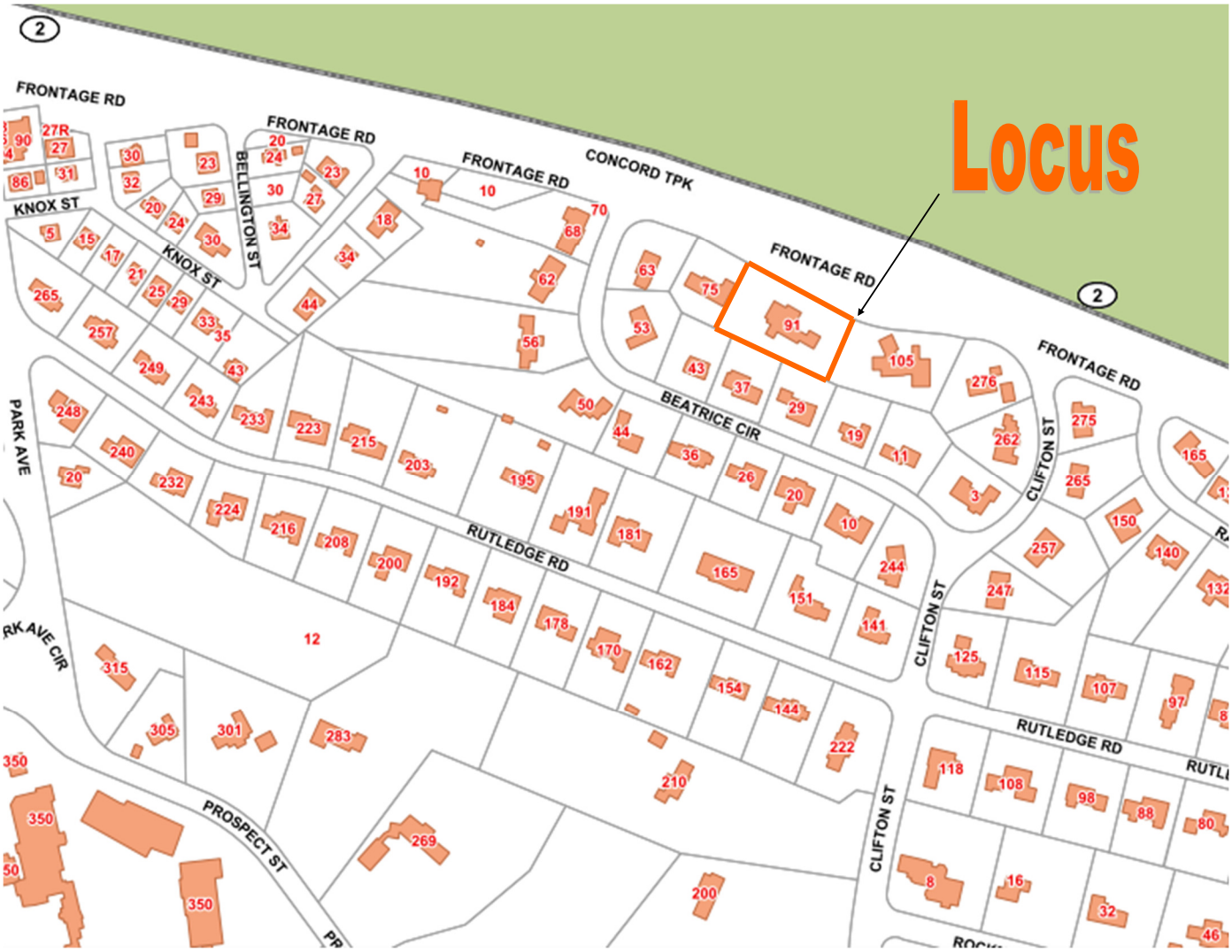
10-Year Storm (5.16")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	1.80	Flow off-site	0.77

25-Year Storm (6.34")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	2.45	Flow off-site	1.46

100-Year Storm (8.15")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	3.46	Flow off-site	3.46

SECTION 2 – SUPPORTING MAPS

Assessors Map
USGS Map
FEMA Panel
Soils Map
NHESP Map



Map 51 Plot 36

DATE:	TITLE:	SCALE:
November 4, 2020	***Assessors Map***	***NOT TO SCALE***

PREPARED FOR:

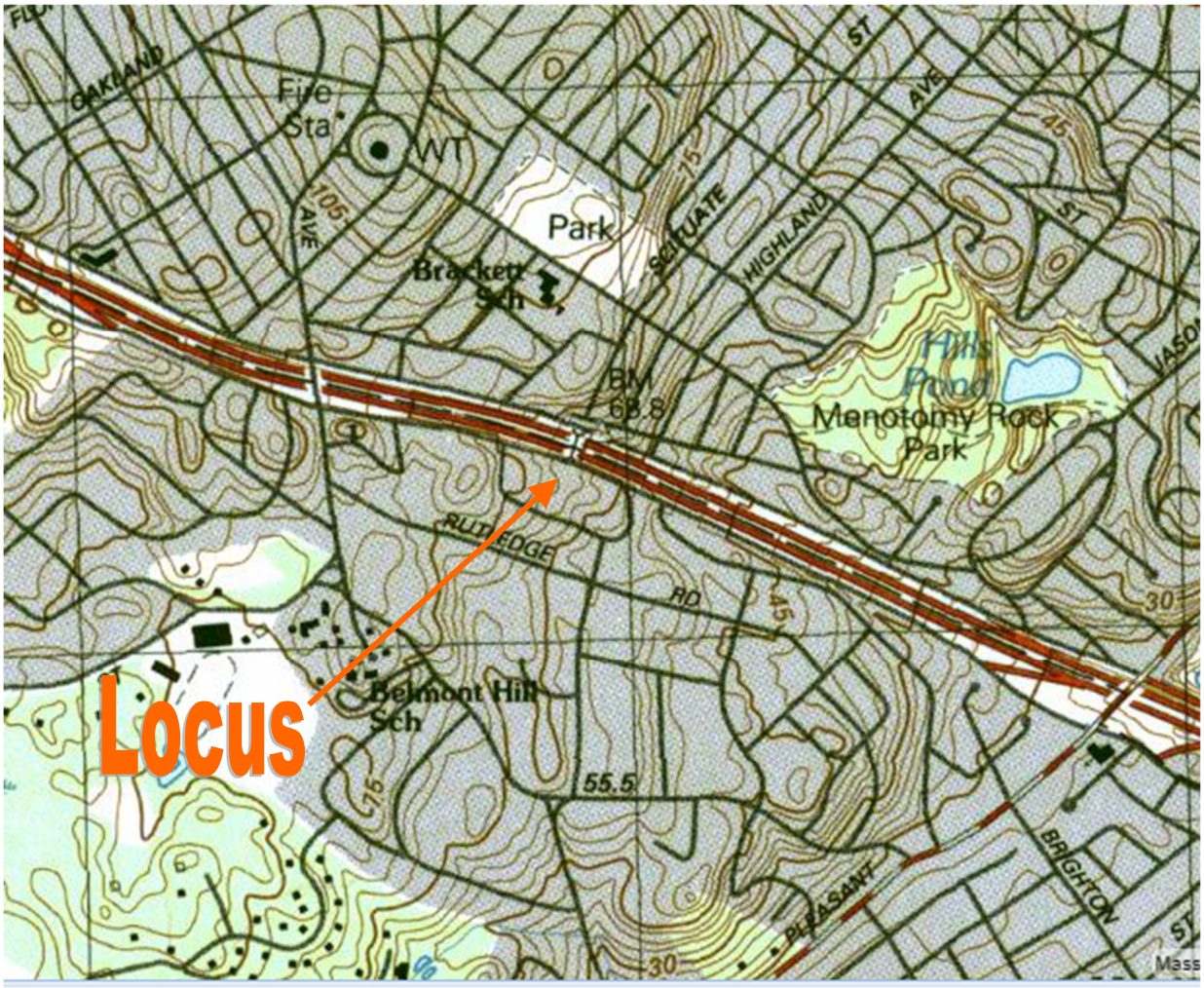
91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Place, Suite 630
Wakefield, MA 01880

DeCelle-Burke-Sala & Associates, Inc.

1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

PROJECT TITLE:

Proposed Residential Development
91 Beatrice Circle
Belmont, MA 02478



DATE:	TITLE:	SCALE:
November 4, 2020	***USGS Map***	***NOT TO SCALE***

PREPARED FOR:

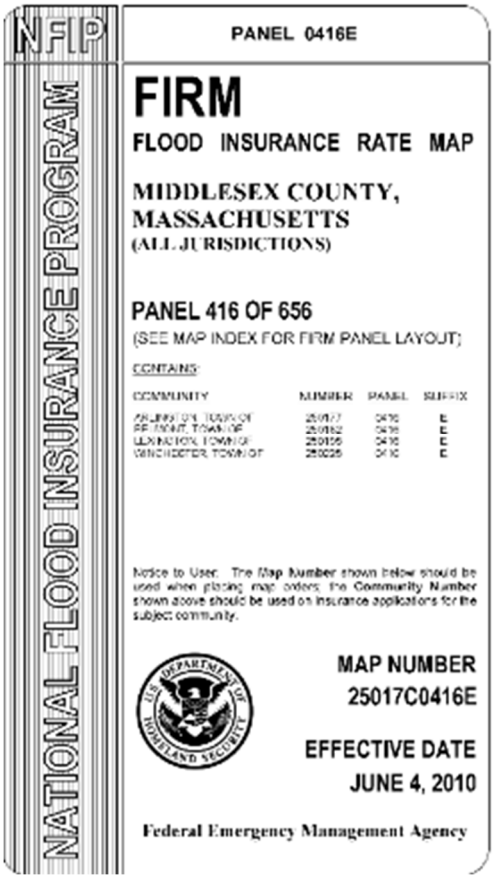
91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Place, Suite 630
Wakefield, MA 01880

DeCelle-Burke-Sala & Associates, Inc.

1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

PROJECT TITLE:

Proposed Residential Development
91 Beatrice Circle
Belmont, MA 02478



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0416E

FIRM

FLOOD INSURANCE RATE MAP

MIDDLESEX COUNTY, MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 416 OF 656
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BELMONT, TOWN OF	250177	0416	E
BRIGHAM, TOWN OF	250182	0416	E
LEXINGTON, TOWN OF	250186	0416	E
WINCHESTER, TOWN OF	250229	0416	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
25017C0416E

EFFECTIVE DATE
JUNE 4, 2010

Federal Emergency Management Agency

DATE:	TITLE:	SCALE:
November 4, 2020	***FEMA Flood Map***	NTS

PREPARED FOR:

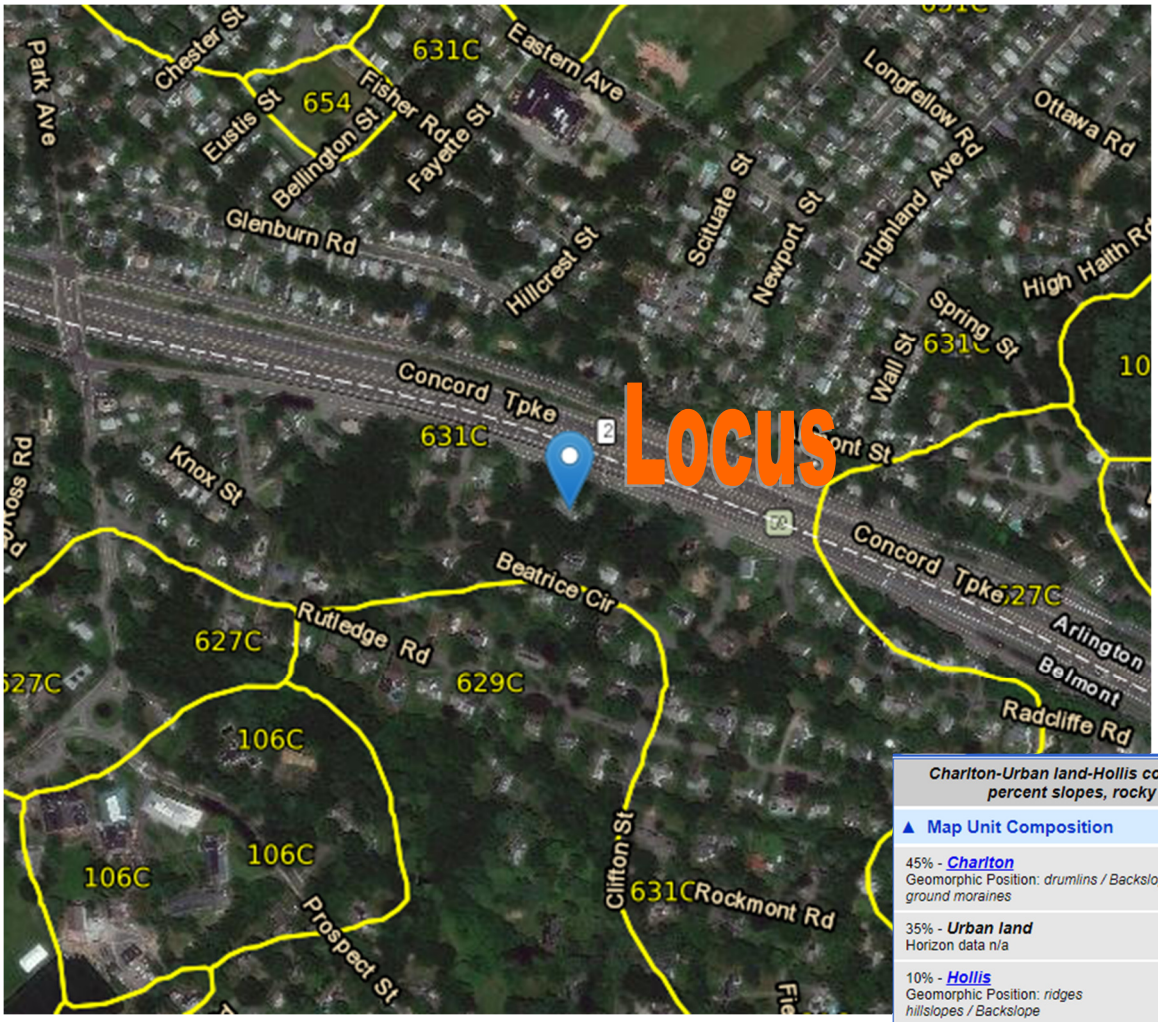
91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Place, Suite 630
Wakefield, MA 01880

DeCelle-Burke-Sala & Associates, Inc.

1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

PROJECT TITLE:

Proposed Residential Development
91 Beatrice Circle
Belmont, MA 02478



Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky (631C)

▲ Map Unit Composition

45% - ***Charlton***
Geomorphic Position: *drumlins / Backslope ground moraines*

35% - ***Urban land***
Horizon data n/a

10% - ***Hollis***
Geomorphic Position: *ridges hillslopes / Backslope*

4% - ***Canton***
Geomorphic Position: *hills / Backslope hills / Toeslope*

2% - ***Udorthents***
Horizon data n/a | View Similar Data

2% - ***Rock outcrop***
Horizon data n/a

1% - ***Scituate***
Geomorphic Position: *depressions / Toeslope depressions / Summit hillslopes*

1% - ***Montauk***
Geomorphic Position: *hillslopes / Shoulder hillslopes / Summit*

▼ Map Unit Data

▼ Survey Metadata

DATE:	TITLE:	SCALE:
November 4, 2020	***Soils Map***	***NOT TO SCALE***

PREPARED FOR:

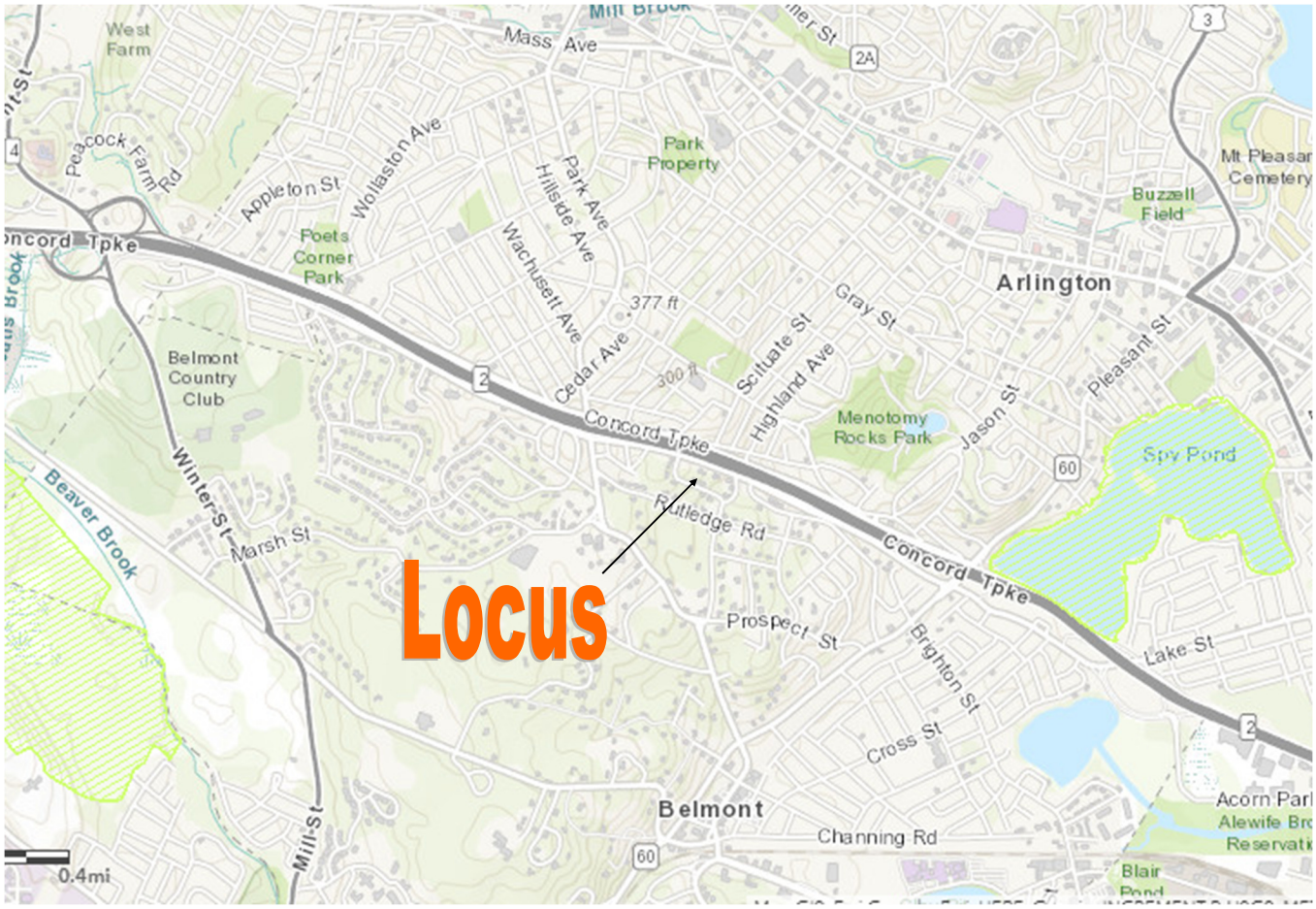
91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Place, Suite 630
Wakefield, MA 01880

DeCelle-Burke-Sala & Associates, Inc.

1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

PROJECT TITLE:

Proposed Residential Development
91 Beatrice Circle
Belmont, MA 02478



DATE:	TITLE:	SCALE:
November 4, 2020	***NHESP Map***	

PREPARED FOR:

91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Place, Suite 630
Wakefield, MA 01880

DeCelle-Burke-Sala & Associates, Inc.

1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

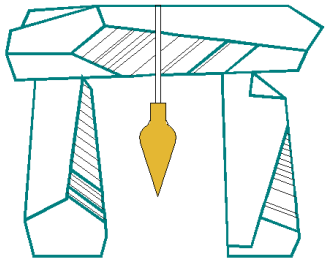
PROJECT TITLE:

Proposed Residential Development
91 Beatrice Circle
Belmont, MA 02478

SECTION 3 - MANAGEMENT PLANS

Stormwater Operation & Maintenance Plan
Erosion and Sedimentation Control Plan

DeCelle-Burke-Sala



& Associates, Inc.

Stormwater Operation & Site Maintenance Plan
for
91 Beatrice Circle
Belmont, Massachusetts

Prepared by:

DeCelle-Burke-Sala & Associates, Inc.
1266 Furnace Brook Parkway
Suite 401
Quincy, MA 02169

Prepared for:

91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Pl., #603
Wakefield, MA 01880

November 4, 2020

Introduction

This Stormwater Operation & Maintenance Plan (SOMP) is for the residential development and property located at 91 Beatrice Circle in Belmont, Massachusetts. The SOMP is outlined below to provide long term operation and maintenance procedures of the stormwater controls installed to manage the stormwater flow generated on the site. The landowners are required to implement the procedures and ensure the long term benefits of the stormwater controls approved and installed for this project. The SOMP provides simple operational and maintenance procedures for the stormwater control structures as well as perform various tasks to remove pollutants from areas that would have potential to be picked up on site and moved via stormwater offsite.

The landowners, also known as the condominium association, shall be responsible to inspect, maintain and operate the stormwater management system as well as inspect the grounds for eroded areas and collected pollutants. The stormwater recharge structure is located under the driveway between the buildings and can be observed through inspection ports.

Appointing a responsible person in charge to implement this SOMP on behalf of the landowner is preferred but the landowners shall be responsible at all times for implementing this SOMP. The purpose of the SOMP is to maintain the long term benefits from the Stormwater Management features constructed that support groundwater recharge and pollution prevention.

Responsible Party - 91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Pl., #603
Wakefield, MA 01880

The responsible party listed above is responsible for inspecting, maintaining and keeping copies of maintenance records for the following plan and will be referred to as the Site Manager for the remainder of this report. If another individual/company is responsible for the every day management of the property the name and contact information shall be made available to the Town of Belmont. The responsible party can expect a yearly budget of $2,000 to $2,500 per year to maintain this site.

Upon any future transfer of ownership all future owners will be obligated to use, maintain, and continue to adhere to this SOMP in accordance with the manufacturers recommendations and all inspection records will be maintained and made available to the Town of Belmont upon request.

Non-Structural Operations

Pavement Sweeping

Pavement sweeping will be performed by hand twice during the year, in April-May and in September-October. The Site Manager shall contract with a property management company that provides pavement sweeping services. The company shall be in good standing in the Commonwealth of Massachusetts and experienced in performing these services. All sweepings shall be disposed of by the hired company off-site in a legal manner.

Snow Management

Proper snow management practices will be implemented to minimize runoff and pollutant loading impacts. Plowed or shoveled snow will be placed in pervious areas at the edges of the pavement where it can slowly infiltrate. Snow will be placed on to pervious areas that are not subject to excessive shade from buildings or vegetation. All accumulated sediment from snowmelt shall be removed each spring. If excessive snow inhibits movement around the

properties or the stormwater management facilities The Site Manager will be responsible to remove the snow from the site and dispose of it in a legal manner.

Structural Operations

Catch Basins and Deep Sump Drain Manholes

The catch basins and drain manholes were installed to capture stormwater runoff and provide pretreatment for TSS and oils. The catch basins and deep sump manholes were fitted with a proprietary water quality outlet control assembly called a SNOUT® to assist in the efficiency of capturing TSS and oils. To ensure maximum capacity and efficiency, the deep sump catch basins and manhole sumps will be cleaned when half of the available capacity of the sump has been used or at a minimum of once per year. The Manager shall inspect the sumps at least four times per year. The Site Manager shall hire a contractor in good standing in the Commonwealth of Massachusetts with experience in cleaning stormwater sumps with a vacuum truck. All sediment and water retrieved from the sumps shall be disposed of by the hired company off-site in a legal manner. The Manager shall provide a written inspection report of which an example form is attached.

SNOUT®

The SNOUT® is a locally manufactured stormwater treatment product that is a vented fiberglass water quality hood that is installed over the outlet pipe in a storm water structure with a sump that skims oils, floatables and trash off of the surface water while letting settleable solids sink to the bottom. The cleaner water exits from beneath the SNOUT, which is lower than the bottom of the pipe, but above the bottom of the structure allowing both floatable material and solids that sink to stay in the structure. Each catch basin and deep sump manhole structure is fitted with the SNOUT®. The Manager shall inspect the SNOUT® at least four times per year, the same time as the sumps are inspected. The Site Manager shall hire a contractor in good standing in the Commonwealth of Massachusetts with experience in inspecting the SNOUT® and make sure it is operating as intended. If damaged the SNOUT® shall be repaired or replaced entirely. The Manager shall provide a written inspection report of each SNOUT® which an example form is attached.

Underground Cultec Chambers

The underground Cultec chambers were installed to recharge stormwater runoff from the proposed parking lots. With two levels of treatment for the roadway runoff, the infiltration chambers shall remain effective for a long period of time, Inspection ports are brought to grade to allow The Site Manager to observe if the chambers are ponding or accumulating sediment. The Site Manager shall inspect the chambers twice per year. If the chambers require service then The Site Manager shall hire a contractor in good standing in the Commonwealth of Massachusetts with experience in cleaning underground chambers with a vacuum truck. All sediment and water retrieved from the chambers shall be disposed of by the hired company off-site in a legal manner. The Site Manager shall provide a written inspection report of which an example form is attached.

Site Management

The site shall be inspected on a quarterly basis for rutting, potholes, broken curbs, depressions, eroded areas and any other site damage caused by vehicular or human activity. Landscaped areas shall be raked as necessary to maintain their grade. Grassed areas shall be raked out and seeded as needed to maintain an even vegetated surface. The Site Manager shall hire a contractor in good standing in the Commonwealth of Massachusetts with experience in site management to

repair any potholes, broken curbs, or other damaged exterior areas. The Site Manager shall hire a contractor in good standing in the Commonwealth of Massachusetts with experience in re-vegetating eroded areas and repairing vehicular surfaces and edges.

Record Keeping

Records of the inspections and maintenance for the Non-Structural and Structural Operations performed or organized by Manager for the property shall be up to date and available for review and inspection. Records shall be kept for a period of three years before being disposed of. An example record keeping sheet is attached.

Illicit Discharge Statement

Per Standard No. 10 of the MassDEP Stormwater Management Standards, there shall be no illicit discharges to the stormwater management system. The Property Manager is responsible for implementing the Operation and Maintenance Plan and overseeing activities at the facility to prevent illicit discharges to the drainage system from occurring. It is strictly prohibited to discharge any products or substances onto the ground surface or into any drainage structures, such as catch basin inlets, manholes, water quality units, forebays, basin or drainage outlets that would be a detriment to the environment.

Property Manager: _____ **Date** _____

Proposed Multi-Unit Residential Development

91 Beatrice Circle, Massachusetts

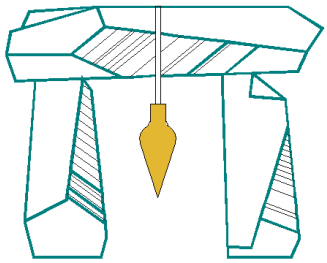
Stormwater Operation & Site Maintenance Plan

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

Best Management Practice	Inspection Frequency	Date Inspected	Contractor	Current Conditions and Minimum Maintenance / Repairs, if necessary	Completed Maintenance / Repair (i.e. date, contractor, tasks complete, etc...)
Pavement Sweeping	Biannual				
Catch Basin/Manhole Sumps	Biannual				
Cultec Chambers	Biannual				
Retaining Walls	Biannual				
Parking Lot / Pavement	Quarterly				
Walkways	Biannual				
Vegetated Areas	Quarterly				
Overall Site Condition	Quarterly				

Property Manager: _____ **Date** _____

DeCelle-Burke-Sala



& Associates, Inc.

Erosion & Sedimentation Control Plan

for

91 Beatrice Circle

A Proposed Multi-Unit Residential Development in Belmont, Massachusetts

Prepared by:

DeCelle-Burke-Sala & Associates, Inc.
1266 Furnace Brook Parkway
Suite 401
Quincy, MA 02169

Prepared for:

91 Beatrice Circle LLC
c/o Regnante Sterio
401 Edgewater Pl., #603
Wakefield, MA 01880

November 4, 2020

Table of Contents

1.0 - Plan Objectives

- To protect abutting properties, public ways and drainage infrastructure from construction related pollutant impacts generated from land disturbance and construction activities;

- Control existing, and potential erosion, sediment transport and pollutant impact events by installing and maintaining construction related Best Management Practices (BMP's) to reduce and/or prevent the discharge of stormwater pollutants into wetland resources of the Commonwealth of Massachusetts;

- To protect surface stormwater quality, ground water quality, and minimize off-site sediment transport offsite during construction;

- To prevent local and off-site flooding by controlling peak rates and volumes of stormwater runoff during construction; and

- To eliminate illicit discharges to stormwater drainage systems that causes pollution during construction.

2.0 - Introduction

This Erosion and Sedimentation Control Plan (The "Plan") has been devised for the construction of a new multi-unit residential development located at 91 Beatrice Circle in Belmont, Massachusetts. The purpose of the Plan is to protect the surrounding environment from contaminated stormwater during construction of the development. The stormwater will be treated before release and surfaces stabilized to minimize erosive events by implementing, installing and maintaining construction related Best Management Practices (BMP's) to reduce and/or prevent the discharge of stormwater pollutants into wetland resources of the Commonwealth of Massachusetts. The BMP's are described in the Stormwater Management Standards developed by the Massachusetts Department for Environmental Protection and it is our belief that short term construction related pollution prevention generated from this site can be achieved.

3.0 - Current Site Conditions

The project site is one parcel of land totaling 23,496 square feet of land designated as Map 51 Lot 36 with the Town of Belmont Assessors. The site is currently improved with a one and one-half story single-family home with driveway access off Frontage Road and is zoned Single Residence A. The residential building is approximately a 2,730 square foot (s.f.) footprint with a 456 s.f. single story detached garage. The driveway extends from Frontage Road to the garage and provides for additional on-site parking.

The Subject Property is bounded by single-family homes to the east, west and south. Frontage Road, also known as Hinckley Way, is located to the north of the Subject Property. Frontage Road abuts Massachusetts' Route 2/Concord Turnpike. The Concord Turnpike is an eight-lane main thoroughfare providing service for commuter traffic for the City of Boston and the west and northwest communities of the Metro Boston region. Frontage Road is a one-way two lane road that travels east and provides access to the Concord Turnpike further east of the Subject Property. Frontage Road also delineates the municipal boundary between Arlington and Belmont and is part of the MBTA bus routes #62, 76, 78, and 84, providing service to the MBTA's Red Line in Cambridge, Massachusetts.

The Subject Property has mature landscaping around the home and along Frontage Road. The site has topography ranging in elevation from 236 on the west of the lot to elevation 218 on the east side of the lot. The majority of the lot surface topography rolls to the east and toward Frontage Road. Soils are mapped by the Natural Resources Conservation Service (NRCS) as a Charlton-Hollis Rock Complex consisting of shallow well-drained gravel and sand with ledge. Test pits were performed by this office confirming the mapping.

Public water and sewer with connections out to Frontage Road service the single-family home. Underground power and communications also service the home. There are no existing stormwater controls for the property. All existing stormwater flows over-ground to Frontage Road.

4.0 - Project Description

4.1 - Proposed Project

The proposed project includes constructing a new multi-unit affordable residential development subject to the Massachusetts Chapter 40B Housing regulations. The project consists of five new residential buildings, one four-story townhouse style building with eight units and the other four buildings each a two-story single-family home. Each of the twelve residential units contain three bedrooms each. Each building is a slab-on-grade building. No basements are proposed.

Each residential unit has a single car garage with access off a shared driveway that is centered between the buildings. The driveway is accessed from Frontage Road in a similar location to the existing drive. The drive also provides access to an eight (8) space surface parking lot providing a total of twenty (20) spaces for a parking ratio of 1.67. A four-foot wide pedestrian walkway extends up the driveway from Frontage Road

and connects to a walkway for the townhouse building and to the main driveway to the development.

The project includes razing the existing single-family home and garage, cutting and capping all service utilities and removing the paved driveway. The site grade will be lowered to the driveway elevation of 227 to 225. The slab-on-grade construction will minimize the disturbance to any pockets of subsurface ledge that may exist. Two retaining walls on either end of the site stabilize the site at a more level elevation for vehicular traffic and parking.

New utilities will be brought on-site in the vicinity of the driveway from Frontage Road. New water supply, fire protection, sewage disposal, power, communications and gas shall be brought on the site underground. A 6" water supply pipe shall extend from the water main and provide individual domestic services for each townhouse unit and fire protection for each building. A new 6" PVC sewer pipe shall extend from the sewer main and connect to the proposed southerly buildings providing a separate service for each unit. The northerly building shall use an existing sewer manhole that serviced the old home and extend to each unit connecting separate service. The existing sewer connection from this manhole to the sewer main shall remain in service.

Currently no stormwater controls exist on the site. The proposed stormwater control system consists of a surface collection system that includes two deep sump catch basins, one deep sump manhole and a single underground Cultec recharge system with 51 chambers and an overflow to the city system located at Frontage Road. The system provides local flood control, groundwater recharge capabilities and stormwater quality treatment. The system as proposed meets MassDEP Stormwater Management Standards and buffers flow off the property for the 2, 10, 25, and 100-year storm event.

5.0 - Erosion & Sedimentation Control Plan

The contractor shall implement an Erosion and Sedimentation Control Plan that protects the surrounding environment from sediment laden stormwater runoff generated during construction activities and from other pollutants generated from construction activities such as litter and dust. Construction sequencing is part of managing a site as is implementing many BMP's that assist in controlling construction related pollutants.

5.1 - Major Construction Sequence for Site

The sequence is developed to contain all potential sedimentation and erosion incidents that could occur during the construction of the project. The contractor however is responsible to manage the site effectively to control offsite sediment transport which may not be included in this plan. The sequence will coordinate the work within the erosion barrier and coordinate other sedimentation control features to reduce the stress upon a silt fence as well as limit off-site sediment transport. The sequencing is as follows:

- Place safety fence around property to limit access and protect the public.
- Place erosion control barrier at limit of work where possible.
- Disconnect existing utility services and cut and cap the services at the main or source
- Place stone apron at construction exit for site.
- Raze existing buildings on-site.
- Remove pavement and dispose of material off-site
- Have a water truck on-site to minimize fugitive dust during the demolition process.
- Clear trees and grub site
- Remove and stockpile loam on site.
- Rough grade site. Remove excess material from the site
- Excavate for foundations. Remove excess soil material from excavation. If space becomes limited on-site, excess material shall be trucked off-site.
- Backfill and compact excavation as needed to construct foundation in accordance with the approved plans. Place excavated soils as backfill for foundation if possible to minimize stockpiled soils or have the unusable soils removed from the site.
- Begin vertical structural construction.
- Install catch basins, water quality manhole and underground recharge structures for stormwater collection. Install silt sack once catch basins are installed.
- Tap existing sewer for sewer service and tap water service. Backfill excavation as soon as possible to minimize stockpiled soils.
- Install electrical and communication services. Backfill excavation as soon as possible to minimize stockpiled soils.
- Begin fine grade parking lot area and site.

- Place pavement binder for driveways.
- Place curbing around site.
- Pour concrete parking slab.
- Install final landscaping, including hydroseed, plantings, walkways and concrete pads.
- Final pave driveways.
- Clean up site.

The contractor has several procedures to perform to maintain the site. They include but are not limited to:

- Clean pavement of sediment as needed.
- Replace erosion control barrier at limit of work as needed. Barrier to be inspected on a weekly basis and after every storm event.
- Empty silt sacks after each rain event. Catch basins and manholes to be cleaned once sediment occupies 1/2 the sump available. Structures to be inspected on a weekly basis.
- Any stockpiled soils to be covered to minimize fugitive dust.
- Maintain a covered dumpster on site to minimize wind blown debris from littering neighborhood and resource areas.
- Have a water truck onsite during the excavation for the project and during rough grading to minimize fugitive dust.

5.2 - Best Management Practices

The contractor shall use various types of structural and non-structural methodologies to minimize offsite polluting from construction activities. The following is a list of some BMP's that can be utilized; however, it is the contractor's responsibility to implement his strategies to minimize offsite sediment transport and fugitive dust and trash.

5.2.1 - Dumpster

The contractor shall have a dumpster on-site for the disposal of construction debris. The contractor shall cover the dumpster as needed to prevent wind blown debris from becoming litter in the environment.

5.2.2 - Silt Collection and Filter Bags

The contractor shall install filter sacks in all catch basins which may collect construction site stormwater runoff. The filter sacks will be inspected periodically for effectiveness and serviceability.

5.2.3 - Mechanical or Hand Sweeper

The contractor shall sweep the site by mechanical means or by hand to reduce the sediment build-up on-site. This will reduce the surrounding area becoming impacted from construction related offsite sediment pollution.

5.2.4 - Crushed Stone Construction Apron

A crushed stone apron shall be installed at the entrance to the site to assist in removing caked soil on construction vehicle tires. The apron shall be twenty five by twenty five foot wide. The contractor shall inspect the apron on a daily basis and supplement new stone as needed.

5.2.5 - Erosion Control Barrier

An erosion control barrier shall be installed at the downgradient Limit of Work and used around the site as needed. A barrier shall also be used around soil stockpiles and localized excavations on site. The barrier needs to be effective in controlling sediment transport and not becoming strained as the project moves forward. The contractor shall inspect the barrier weekly or after a large storm event to identify any stressed areas and replace the barrier as needed. The barrier can be one or many of several types. Staked haybales, a geotextile fabric or a geotextile erosion control sock are typical types of barriers.

5.2.6 - Dust Control

The use of a water truck or other method to spray water over the site during the dry season to minimize blown dust shall be implemented. The water shall not be excessively spread so erosive forces occur. The contractor shall sweep the pavement once installed and cover stockpiled soils as needed to minimize dust.

5.2.7 - Disturbed Surface Maintenance

The contractor shall stabilize the ground surface as needed to prevent erosion. Stabilization of surfaces includes the placement of pavement, rip rap, wood bark mulch and the establishment of vegetated surfaces. Upon the completion of construction of a particular phase, all surfaces should be stabilized even though it is apparent that future construction efforts will cause their disturbance. Vegetated cover should be established during the proper growing season and should be enhanced by soil adjustment for proper pH, nutrients and moisture content. Surfaces that are disturbed by erosion processes or vandalism should be stabilized as soon as possible. Areas where construction activities have permanently or temporarily ceased should be stabilized within 14 days from the date of last construction activity, except when construction activity will resume within 21 days (e.g., the total time period that construction activity is temporarily ceased is less than 21 days). Hydro-mulching of grass surfaces is recommended, especially if seeding of the surfaces is required outside the normal growing season.

Mulching may be used for temporary stabilization. Haybale dikes or silt fences should be set where required to trap products of erosion and should be maintained on a continuing basis during the construction process. Wheel ruts should be filled in and graded to prevent concentration of stormwater runoff. Vehicle tracks leading downhill should be blocked during periods of intense precipitation by haybales, dikes or silt fences which should be constructed to entrap the sediment.

5.2.8 - Temporary Stormwater Controls

The contractor shall rough grade the site as to not concentrate the stormwater runoff and cause erosive forces. The contractor shall use a level spreader or other temporary stormwater control device to treat construction site runoff for suspended solids. The catch basins and manholes can be installed to assist in capturing the construction site runoff once installed but the tanks will need to be cleaned out of all sediment before connecting the tanks to the recharge system and final paving. The use of silt sacks on the catch basin will help minimize the cleaning of the sumps. The contractor shall sweep the pavement once installed as needed to minimize suspended solids in the stormwater.

SECTION 4 - STORMWATER MANAGEMENT DATA

Checklist for Stormwater Report
Standard 3 Compliance
Standard 4 Compliance (TSS Removal)
HydroCAD calculations
2-Year
10-Year
25-Year
100-Year

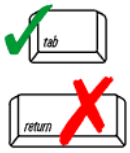
Checklist for Stormwater Report

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- 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.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.

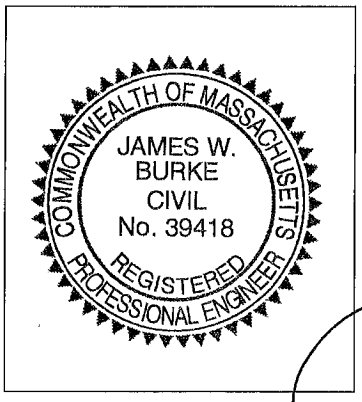
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



11/4/20

Signature and Date

Checklist

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

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☒ Other (describe): Recharge Basin

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 Field[1]

☐ 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.

Calculation Sheet

DeCelle-Burke-Sala & Associates, Inc.

Project: Proposed Multi-Unit Residential Developmer
91 Beatrice Circle
Belmont, MA

Client: 91 Beatrice Circle LLC
401 Edgewater Pl. #603 Wakefield, MA 018

Date: November 4, 2020

Standard 3 Compliance

Find: Recharge Volume Requirement

Given: Rv = (AF)

Rv = (impervious area x depth factor)

A = 16,506 s.f. impervious area F= 0.6 " for A-soils

Solve: Rv = 16,506 s.f. x 0.6 "/12'= 825.30 c.f.

Rv = 825.30 c.f./43,560 s.f= 0.019 acre/ft

Find: Recharge System Infiltration Rate; i

Given: i= A x RR

Rawls Rate for in-situ-soils = RR = 0.27 in/hr

Recharge System Size 17 x 123.5 = 2099.5 s.f.

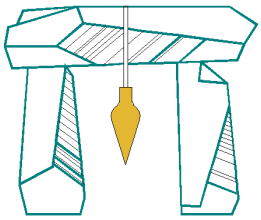
Solve: i=2099.5s.f. x 0.27in/hr)/(12in/ft X 60min/hr X 60sec/mir

i= 0.0131 cfs

DeCelle-Burke Asscociates, Inc.
1266 Furnace Brook Pkwy., #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Calculation Sheet

DeCelle-Burke-Sala



& Associates, Inc.

Project: Proposed Multi-Unit Residential Developmer
91 Beatrice Circle
Belmont, MA

Client: 91 Beatrice Circle LLC
401 Edgewater Pl. #603 Wakefield, MA 018

Date: November 4, 2020

Standard 3 Compliance continued…

Determine if Recharge System can handle Required Recharge Volume; Rv

Given: Rv = 0.019 acre/ft

Recharge Field Height = 3.54 ft

Find: Depth of Rv within Recharge Field

Solve: **See HydroCAD Calculations Attached**

Rainfall Depth generating 0.019 ac/ft is 1.47 in

Corresponding Field Depth is 219.76 - 219.00 = 0.76 ft.

OK

Drawdown Time, T

Find: T= Rv / (A x RR)

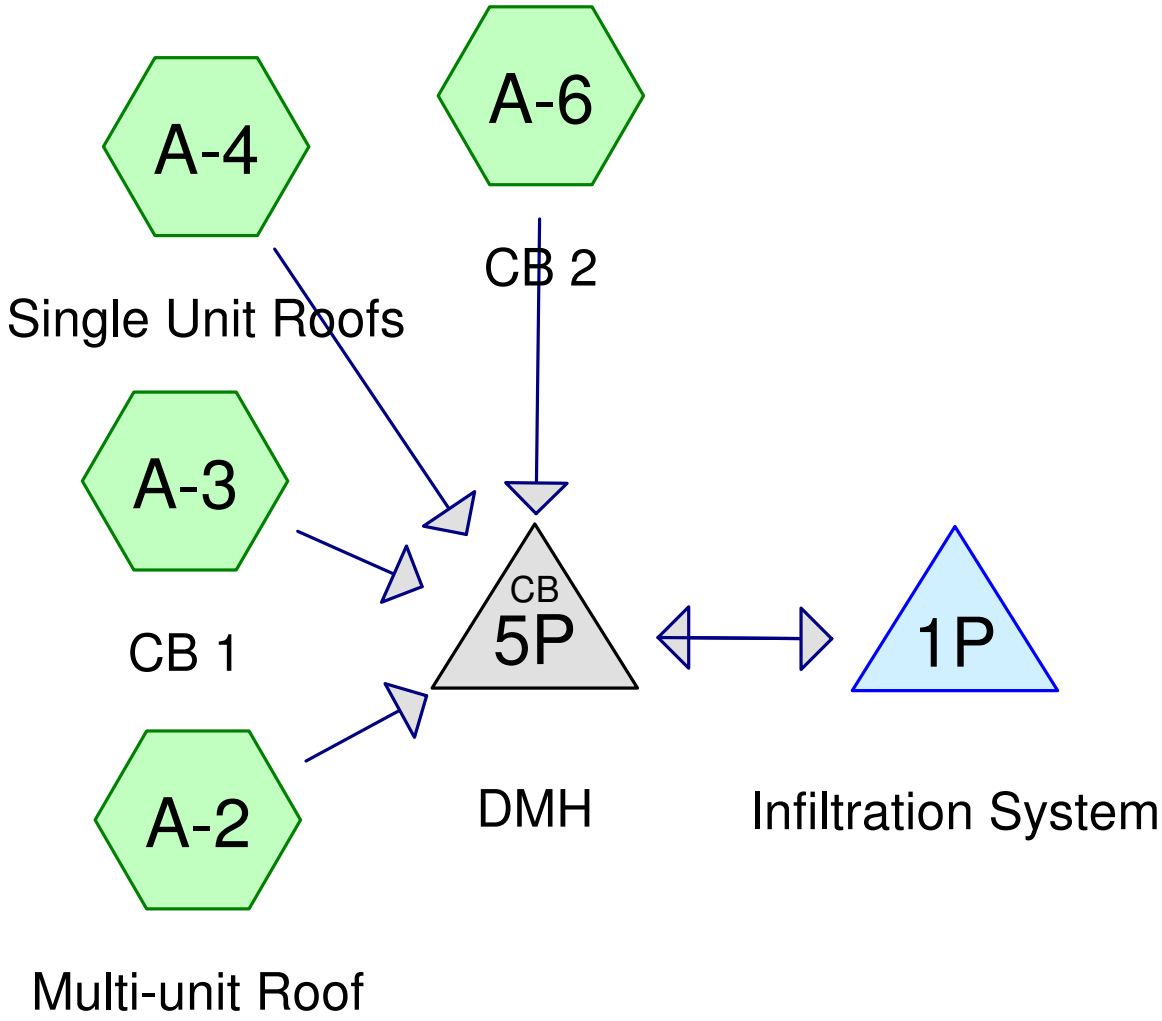
Given: Recharge System= 2099.5 s.f. RR= 0.27 in/hr

Rv= 825.30 c.f.

825.3 c.f./(2099.5 s.f. x 0.27 in/hr)12in/ft

= 17.47 hrs < 72 hrs **CHECKS OK**

DeCelle-Burke Asscociates, Inc.
1266 Furnace Brook Pkwy., #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)



Subcat Reach Pond Link

Routing Diagram for Standard 3 - 91 Beatrice
Prepared by DeCelle-Burke-Sala & Associates, Inc., Printed 11/4/2020
HydroCAD® 10.00-25 s/n 07920 © 2019 HydroCAD Software Solutions LLC

Summary for Subcatchment A-2: Multi-unit Roof

Runoff = 0.14 cfs @ 12.08 hrs, Volume= 248 cf, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs
Type III 24-hr Custom Rainfall=1.47"

Area (sf)	CN	Description
4,321	98	Roofs, HSG C
4,321		100.00% Impervious Area

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

Summary for Subcatchment A-3: CB 1

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 300 cf, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs
Type III 24-hr Custom Rainfall=1.47"

Area (sf)	CN	Description
5,418	98	Paved parking, HSG C
533	74	>75% Grass cover, Good, HSG C
5,951	96	Weighted Average
533		8.96% Pervious Area
5,418		91.04% Impervious Area

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

Summary for Subcatchment A-4: Single Unit Roofs

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 197 cf, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs
Type III 24-hr Custom Rainfall=1.47"

Area (sf)	CN	Description
3,438	98	Roofs, HSG C
3,438		100.00% Impervious Area

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

Summary for Subcatchment A-6: CB 2

Runoff = 0.05 cfs @ 12.08 hrs, Volume= 88 cf, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs
Type III 24-hr Custom Rainfall=1.47"

Area (sf)	CN	Description
1,569	98	Paved parking, HSG C
51	74	>75% Grass cover, Good, HSG C
1,620	97	Weighted Average
51		3.15% Pervious Area
1,569		96.85% Impervious Area

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

Summary for Pond 1P: Infiltration System

Inflow	=	0.46 cfs @	12.09 hrs, Volume=	830 cf	
Outflow	=	0.01 cfs @	13.00 hrs, Volume=	93 cf,	Atten= 97%, Lag= 54.3 min
Discarded	=	0.01 cfs @	13.00 hrs, Volume=	93 cf	
Primary	=	0.00 cfs @	11.00 hrs, Volume=	0 cf	

Routing by Sim-Route method, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs
Peak Elev= 219.76' @ 13.00 hrs Surf.Area= 2,100 sf Storage= 738 cf

Plug-Flow detention time= 39.2 min calculated for 93 cf (11% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	1,423 cf	**17.00'W x 123.50'L x 3.54'H Field A** 7,436 cf Overall - 2,694 cf Embedded = 4,742 cf x 30.0% Voids
#2A	219.50'	2,694 cf	**Cultec R-330XLHD** x 51 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 3 rows
		4,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 1.00' Phase-In= 0.01'
#2	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.40' / 220.70' S= -0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.01 cfs @ 13.00 hrs HW=219.76' (Free Discharge)
└**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 11.00 hrs HW=219.00' TW=220.70' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 5P: DMH

Inflow	=	0.46 cfs @	12.08 hrs, Volume=	831 cf	
Outflow	=	0.46 cfs @	12.09 hrs, Volume=	831 cf,	Atten= 0%, Lag= 0.6 min
Primary	=	0.46 cfs @	12.09 hrs, Volume=	831 cf	
Secondary	=	0.00 cfs @	11.00 hrs, Volume=	0 cf	

Routing by Sim-Route method, Time Span= 11.00-13.00 hrs, dt= 0.01 hrs
Peak Elev= 221.11' @ 12.09 hrs
Flood Elev= 224.80'

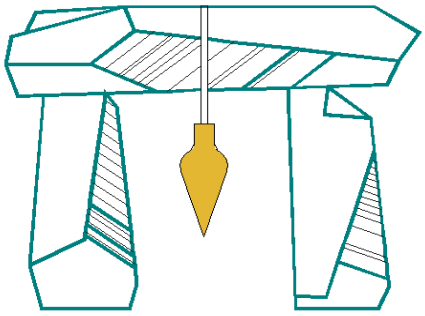
Device	Routing	Invert	Outlet Devices
#1	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.70' / 220.40' S= 0.0125 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf
#2	Secondary	218.94'	**10.0" Round Culvert** L= 103.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 218.94' / 210.70' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#3	Device 2	221.70'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height

Primary OutFlow Max=0.46 cfs @ 12.09 hrs HW=221.11' TW=219.52' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.46 cfs @ 1.72 fps)

Secondary OutFlow Max=0.00 cfs @ 11.00 hrs HW=220.70' (Free Discharge)
└**2=Culvert** (Passes 0.00 cfs of 2.40 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Standard 4 Compliance (TSS Removal)

DeCelle-Burke-Sala



& Associates, Inc.

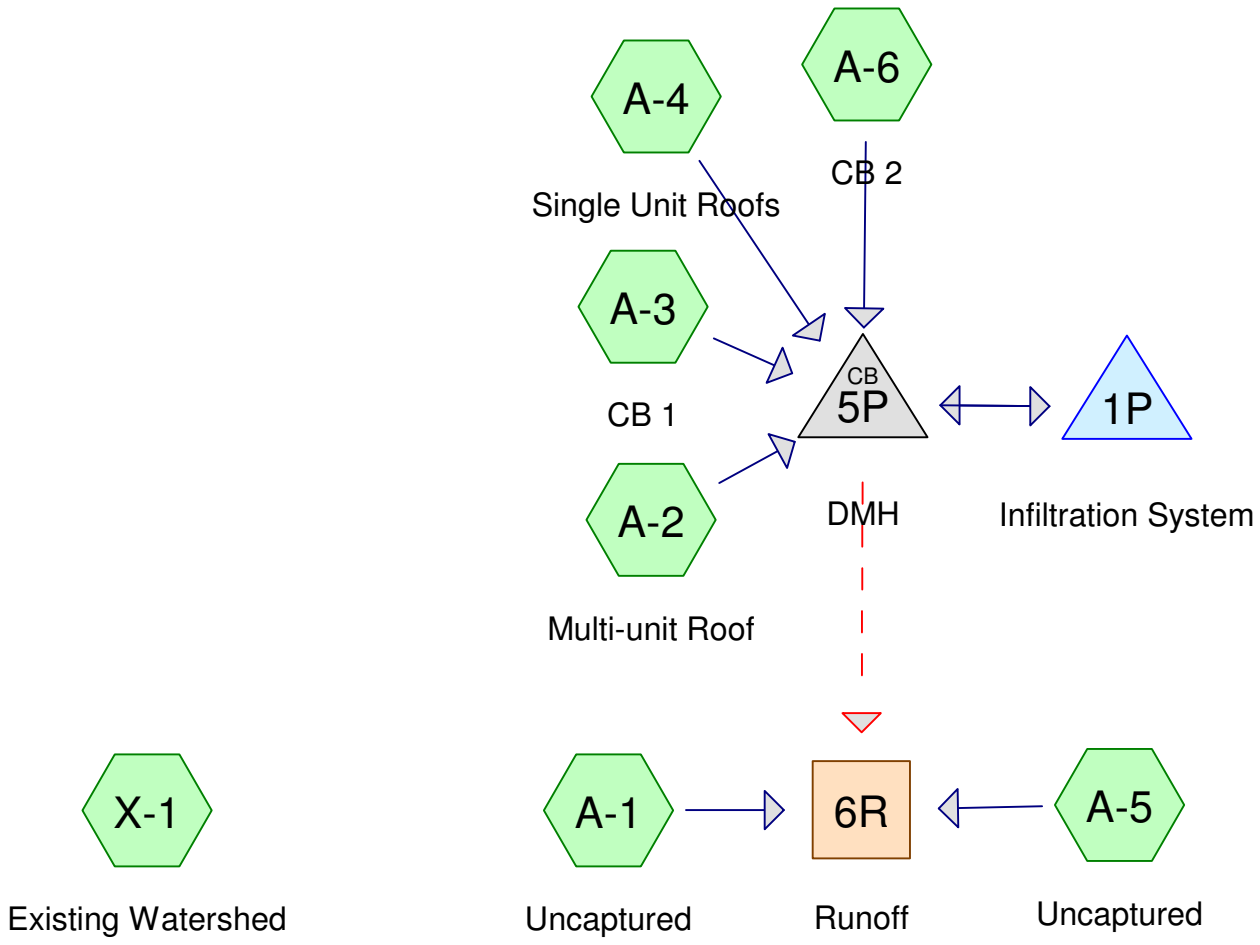
Project: **Proposed Multi-Unit Residential Developmemet**
Location: **91 Beatrice Circle Belmont, MA**
Date: **11/4/2020**

Subject: **Total Suspended Solids Removal Calculations**

BMP	TSS Removal	Start Load	Amount Removed	Remaining Load
4' Deep Sump Catch Basins	25%	100%	25%	75%
4' Deep Sump Water Quality Manhole	25%	75%	19%	56%
Underground Recharge Chambers	80%	56%	45%	11%
Remaining Load		11%	0%	11%

FgEgnng/Dwtmg/Ucnc"Cuuqekcvgu."Kpe0
"3488"Hwtpceg"Dtqqm"Rmy{0."%623""Swkpe{."OC""2438;
RJ<*839+/627/7322""HZ<*839+/627/7323

HydroCAD Calculations
2-Year
10-Year
25-Year
100-Year
Watershed Maps



Subcat Reach Pond Link

Routing Diagram for Drainage 8-7-2020

Prepared by DeCelle-Burke-Sala & Associates, Inc., Printed 11/5/2020

Summary for Subcatchment A-1: Uncaptured

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 486 cf, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
1,760	98	Paved parking, HSG C
750	74	>75% Grass cover, Good, HSG C
2,510	91	Weighted Average
750		29.88% Pervious Area
1,760		70.12% Impervious Area

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

Summary for Subcatchment A-2: Multi-unit Roof

Runoff = 0.32 cfs @ 12.08 hrs, Volume= 1,094 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
4,321	98	Roofs, HSG C
4,321		100.00% Impervious Area

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

Summary for Subcatchment A-3: CB 1

Runoff = 0.42 cfs @ 12.08 hrs, Volume= 1,398 cf, Depth= 2.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
5,418	98	Paved parking, HSG C
533	74	>75% Grass cover, Good, HSG C
5,951	96	Weighted Average
533		8.96% Pervious Area
5,418		91.04% Impervious Area

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

Summary for Subcatchment A-4: Single Unit Roofs

Runoff = 0.25 cfs @ 12.08 hrs, Volume= 870 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
3,438	98	Roofs, HSG C
3,438		100.00% Impervious Area

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

Summary for Subcatchment A-5: Uncaptured

Runoff = 0.16 cfs @ 12.10 hrs, Volume= 511 cf, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
5,077	74	>75% Grass cover, Good, HSG C
579	70	Woods, Good, HSG C
5,656	74	Weighted Average
5,656		100.00% Pervious Area

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

Summary for Subcatchment A-6: CB 2

Runoff = 0.12 cfs @ 12.08 hrs, Volume= 395 cf, Depth= 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Description
1,569	98	Paved parking, HSG C
51	74	>75% Grass cover, Good, HSG C
1,620	97	Weighted Average
51		3.15% Pervious Area
1,569		96.85% Impervious Area

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

Summary for Subcatchment X-1: Existing Watershed

Runoff = 0.82 cfs @ 12.09 hrs, Volume= 2,594 cf, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.27"

Area (sf)	CN	Adj	Description
1,855	98		Unconnected pavement, HSG C
3,552	98		Roofs, HSG C
16,426	74		>75% Grass cover, Good, HSG C
1,663	70		Woods, Good, HSG C
23,496	79	78	Weighted Average, UI Adjusted
18,089			76.99% Pervious Area
5,407			23.01% Impervious Area
1,855			34.31% Unconnected

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

Summary for Reach 6R: Runoff

Inflow = 0.31 cfs @ 12.09 hrs, Volume= 997 cf
Outflow = 0.31 cfs @ 12.10 hrs, Volume= 997 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Infiltration System

Inflow = 1.10 cfs @ 12.09 hrs, Volume= 3,756 cf
Outflow = 0.01 cfs @ 21.43 hrs, Volume= 982 cf, Atten= 99%, Lag= 560.2 min
Discarded = 0.01 cfs @ 21.43 hrs, Volume= 982 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 221.13' @ 21.43 hrs Surf.Area= 2,100 sf Storage= 2,834 cf

Plug-Flow detention time= 307.4 min calculated for 981 cf (26% of inflow)
Center-of-Mass det. time= 114.8 min (878.9 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	1,423 cf	**17.00'W x 123.50'L x 3.54'H Field A** 7,436 cf Overall - 2,694 cf Embedded = 4,742 cf x 30.0% Voids
#2A	219.50'	2,694 cf	**Cultec R-330XLHD** x 51 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 3 rows
		4,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 1.00' Phase-In= 0.01'
#2	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.40' / 220.70' S= -0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.01 cfs @ 21.43 hrs HW=221.13' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=219.00' TW=220.70' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 5P: DMH

Inflow	=	1.10 cfs @	12.08 hrs, Volume=	3,756 cf	
Outflow	=	1.10 cfs @	12.09 hrs, Volume=	3,756 cf,	Atten= 0%, Lag= 0.6 min
Primary	=	1.10 cfs @	12.09 hrs, Volume=	3,756 cf	
Secondary	=	0.00 cfs @	0.00 hrs, Volume=	0 cf	

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 221.40' @ 12.09 hrs
Flood Elev= 224.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.70' / 220.40' S= 0.0125 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf
#2	Secondary	218.94'	**10.0" Round Culvert** L= 103.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 218.94' / 210.70' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#3	Device 2	221.70'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height

Primary OutFlow Max=1.10 cfs @ 12.09 hrs HW=221.40' TW=220.10' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.10 cfs @ 2.25 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=220.70' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 0.00 cfs of 2.40 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment A-1: Uncaptured

Runoff = 0.27 cfs @ 12.08 hrs, Volume= 865 cf, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
1,760	98	Paved parking, HSG C
750	74	>75% Grass cover, Good, HSG C
2,510	91	Weighted Average
750		29.88% Pervious Area
1,760		70.12% Impervious Area

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

Summary for Subcatchment A-2: Multi-unit Roof

Runoff = 0.50 cfs @ 12.08 hrs, Volume= 1,773 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
4,321	98	Roofs, HSG C
4,321		100.00% Impervious Area

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

Summary for Subcatchment A-3: CB 1

Runoff = 0.68 cfs @ 12.08 hrs, Volume= 2,327 cf, Depth= 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
5,418	98	Paved parking, HSG C
533	74	>75% Grass cover, Good, HSG C
5,951	96	Weighted Average
533		8.96% Pervious Area
5,418		91.04% Impervious Area

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

Summary for Subcatchment A-4: Single Unit Roofs

Runoff = 0.40 cfs @ 12.08 hrs, Volume= 1,410 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
3,438	98	Roofs, HSG C
3,438		100.00% Impervious Area

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

Summary for Subcatchment A-5: Uncaptured

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 1,175 cf, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
5,077	74	>75% Grass cover, Good, HSG C
579	70	Woods, Good, HSG C
5,656	74	Weighted Average
5,656		100.00% Pervious Area

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

Summary for Subcatchment A-6: CB 2

Runoff = 0.19 cfs @ 12.08 hrs, Volume= 649 cf, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Description
1,569	98	Paved parking, HSG C
51	74	>75% Grass cover, Good, HSG C
1,620	97	Weighted Average
51		3.15% Pervious Area
1,569		96.85% Impervious Area

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

Summary for Subcatchment X-1: Existing Watershed

Runoff = 1.80 cfs @ 12.09 hrs, Volume= 5,576 cf, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.16"

Area (sf)	CN	Adj	Description
1,855	98		Unconnected pavement, HSG C
3,552	98		Roofs, HSG C
16,426	74		>75% Grass cover, Good, HSG C
1,663	70		Woods, Good, HSG C
23,496	79	78	Weighted Average, UI Adjusted
18,089			76.99% Pervious Area
5,407			23.01% Impervious Area
1,855			34.31% Unconnected

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

Summary for Reach 6R: Runoff

Inflow = 0.77 cfs @ 12.09 hrs, Volume= 3,644 cf
Outflow = 0.77 cfs @ 12.10 hrs, Volume= 3,644 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Infiltration System

Inflow = 1.64 cfs @ 12.09 hrs, Volume= 6,733 cf
Outflow = 0.20 cfs @ 12.56 hrs, Volume= 3,247 cf, Atten= 88%, Lag= 28.0 min
Discarded = 0.01 cfs @ 12.56 hrs, Volume= 1,069 cf
Primary = 0.18 cfs @ 12.56 hrs, Volume= 2,178 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 221.77' @ 12.56 hrs Surf.Area= 2,100 sf Storage= 3,595 cf

Plug-Flow detention time= 392.9 min calculated for 3,245 cf (48% of inflow)
Center-of-Mass det. time= 185.7 min (1,025.9 - 840.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	1,423 cf	**17.00'W x 123.50'L x 3.54'H Field A** 7,436 cf Overall - 2,694 cf Embedded = 4,742 cf x 30.0% Voids
#2A	219.50'	2,694 cf	**Cultec R-330XLHD** x 51 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 3 rows
		4,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 1.00' Phase-In= 0.01'
#2	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.40' / 220.70' S= -0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.01 cfs @ 12.56 hrs HW=221.77' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.09 cfs @ 12.56 hrs HW=221.77' TW=221.77' (Dynamic Tailwater)
↑—**2=Culvert** (Inlet Controls 0.09 cfs @ 0.17 fps)

Summary for Pond 5P: DMH

Inflow	=	1.77 cfs @	12.08 hrs, Volume=	8,337 cf	
Outflow	=	1.77 cfs @	12.09 hrs, Volume=	8,337 cf,	Atten= 0%, Lag= 0.6 min
Primary	=	1.64 cfs @	12.09 hrs, Volume=	6,733 cf	
Secondary	=	0.32 cfs @	12.57 hrs, Volume=	1,604 cf	

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 221.77' @ 12.57 hrs
Flood Elev= 224.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.70' / 220.40' S= 0.0125 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf
#2	Secondary	218.94'	**10.0" Round Culvert** L= 103.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 218.94' / 210.70' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#3	Device 2	221.70'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height

Primary OutFlow Max=1.64 cfs @ 12.09 hrs HW=221.74' TW=220.79' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.64 cfs @ 3.00 fps)

Secondary OutFlow Max=0.31 cfs @ 12.57 hrs HW=221.77' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 0.31 cfs of 3.22 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.31 cfs @ 0.88 fps)

Summary for Subcatchment A-1: Uncaptured

Runoff = 0.34 cfs @ 12.08 hrs, Volume= 1,107 cf, Depth= 5.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
1,760	98	Paved parking, HSG C
750	74	>75% Grass cover, Good, HSG C
2,510	91	Weighted Average
750		29.88% Pervious Area
1,760		70.12% Impervious Area

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

Summary for Subcatchment A-2: Multi-unit Roof

Runoff = 0.62 cfs @ 12.08 hrs, Volume= 2,197 cf, Depth= 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
4,321	98	Roofs, HSG C
4,321		100.00% Impervious Area

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

Summary for Subcatchment A-3: CB 1

Runoff = 0.84 cfs @ 12.08 hrs, Volume= 2,909 cf, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
5,418	98	Paved parking, HSG C
533	74	>75% Grass cover, Good, HSG C
5,951	96	Weighted Average
533		8.96% Pervious Area
5,418		91.04% Impervious Area

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

Summary for Subcatchment A-4: Single Unit Roofs

Runoff = 0.49 cfs @ 12.08 hrs, Volume= 1,748 cf, Depth= 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
3,438	98	Roofs, HSG C
3,438		100.00% Impervious Area

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

Summary for Subcatchment A-5: Uncaptured

Runoff = 0.53 cfs @ 12.09 hrs, Volume= 1,637 cf, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
5,077	74	>75% Grass cover, Good, HSG C
579	70	Woods, Good, HSG C
5,656	74	Weighted Average
5,656		100.00% Pervious Area

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

Summary for Subcatchment A-6: CB 2

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 808 cf, Depth= 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Description
1,569	98	Paved parking, HSG C
51	74	>75% Grass cover, Good, HSG C
1,620	97	Weighted Average
51		3.15% Pervious Area
1,569		96.85% Impervious Area

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

Summary for Subcatchment X-1: Existing Watershed

Runoff = 2.45 cfs @ 12.09 hrs, Volume= 7,599 cf, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.34"

Area (sf)	CN	Adj	Description
1,855	98		Unconnected pavement, HSG C
3,552	98		Roofs, HSG C
16,426	74		>75% Grass cover, Good, HSG C
1,663	70		Woods, Good, HSG C
23,496	79	78	Weighted Average, UI Adjusted
18,089			76.99% Pervious Area
5,407			23.01% Impervious Area
1,855			34.31% Unconnected

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

Summary for Reach 6R: Runoff

Inflow = 1.46 cfs @ 12.10 hrs, Volume= 5,820 cf
Outflow = 1.46 cfs @ 12.11 hrs, Volume= 5,820 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Infiltration System

Inflow = 1.69 cfs @ 12.07 hrs, Volume= 6,820 cf
Outflow = 0.23 cfs @ 12.58 hrs, Volume= 3,335 cf, Atten= 86%, Lag= 30.8 min
Discarded = 0.01 cfs @ 12.31 hrs, Volume= 1,097 cf
Primary = 0.22 cfs @ 12.58 hrs, Volume= 2,239 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 221.84' @ 12.31 hrs Surf.Area= 2,100 sf Storage= 3,656 cf

Plug-Flow detention time= 407.0 min calculated for 3,335 cf (49% of inflow)
Center-of-Mass det. time= 190.5 min (1,013.3 - 822.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	1,423 cf	**17.00'W x 123.50'L x 3.54'H Field A** 7,436 cf Overall - 2,694 cf Embedded = 4,742 cf x 30.0% Voids
#2A	219.50'	2,694 cf	**Cultec R-330XLHD** x 51 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 3 rows
		4,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 1.00' Phase-In= 0.01'
#2	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.40' / 220.70' S= -0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.01 cfs @ 12.31 hrs HW=221.84' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.18 cfs @ 12.58 hrs HW=221.78' TW=221.78' (Dynamic Tailwater)
↑—**2=Culvert** (Inlet Controls 0.18 cfs @ 0.33 fps)

Summary for Pond 5P: DMH

Inflow	=	2.18 cfs @	12.08 hrs, Volume=	9,901 cf
Outflow	=	2.18 cfs @	12.09 hrs, Volume=	9,901 cf, Atten= 0%, Lag= 0.6 min
Primary	=	1.69 cfs @	12.07 hrs, Volume=	6,824 cf
Secondary	=	0.87 cfs @	12.32 hrs, Volume=	3,076 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 221.84' @ 12.32 hrs
Flood Elev= 224.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.70' / 220.40' S= 0.0125 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf
#2	Secondary	218.94'	**10.0" Round Culvert** L= 103.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 218.94' / 210.70' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#3	Device 2	221.70'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height

Primary OutFlow Max=1.66 cfs @ 12.07 hrs HW=221.78' TW=221.14' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.66 cfs @ 3.05 fps)

Secondary OutFlow Max=0.86 cfs @ 12.32 hrs HW=221.84' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 0.86 cfs of 3.27 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.86 cfs @ 1.24 fps)

Summary for Subcatchment A-1: Uncaptured

Runoff = 0.44 cfs @ 12.08 hrs, Volume= 1,479 cf, Depth= 7.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
1,760	98	Paved parking, HSG C
750	74	>75% Grass cover, Good, HSG C
2,510	91	Weighted Average
750		29.88% Pervious Area
1,760		70.12% Impervious Area

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

Summary for Subcatchment A-2: Multi-unit Roof

Runoff = 0.79 cfs @ 12.08 hrs, Volume= 2,848 cf, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
4,321	98	Roofs, HSG C
4,321		100.00% Impervious Area

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

Summary for Subcatchment A-3: CB 1

Runoff = 1.09 cfs @ 12.08 hrs, Volume= 3,804 cf, Depth= 7.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
5,418	98	Paved parking, HSG C
533	74	>75% Grass cover, Good, HSG C
5,951	96	Weighted Average
533		8.96% Pervious Area
5,418		91.04% Impervious Area

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

Summary for Subcatchment A-4: Single Unit Roofs

Runoff = 0.63 cfs @ 12.08 hrs, Volume= 2,266 cf, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
3,438	98	Roofs, HSG C
3,438		100.00% Impervious Area

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

Summary for Subcatchment A-5: Uncaptured

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 2,385 cf, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
5,077	74	>75% Grass cover, Good, HSG C
579	70	Woods, Good, HSG C
5,656	74	Weighted Average
5,656		100.00% Pervious Area

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

Summary for Subcatchment A-6: CB 2

Runoff = 0.30 cfs @ 12.08 hrs, Volume= 1,052 cf, Depth= 7.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Description
1,569	98	Paved parking, HSG C
51	74	>75% Grass cover, Good, HSG C
1,620	97	Weighted Average
51		3.15% Pervious Area
1,569		96.85% Impervious Area

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

Summary for Subcatchment X-1: Existing Watershed

Runoff = 3.46 cfs @ 12.09 hrs, Volume= 10,827 cf, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.15"

Area (sf)	CN	Adj	Description
1,855	98		Unconnected pavement, HSG C
3,552	98		Roofs, HSG C
16,426	74		>75% Grass cover, Good, HSG C
1,663	70		Woods, Good, HSG C
23,496	79	78	Weighted Average, UI Adjusted
18,089			76.99% Pervious Area
5,407			23.01% Impervious Area
1,855			34.31% Unconnected

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

Summary for Reach 6R: Runoff

Inflow = 3.46 cfs @ 12.14 hrs, Volume= 9,219 cf
Outflow = 3.46 cfs @ 12.15 hrs, Volume= 9,219 cf, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Infiltration System

Inflow = 1.23 cfs @ 11.95 hrs, Volume= 6,927 cf
Outflow = 0.39 cfs @ 12.21 hrs, Volume= 3,436 cf, Atten= 69%, Lag= 15.6 min
Discarded = 0.01 cfs @ 12.14 hrs, Volume= 1,124 cf
Primary = 0.37 cfs @ 12.21 hrs, Volume= 2,312 cf

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 221.97' @ 12.14 hrs Surf.Area= 2,100 sf Storage= 3,759 cf

Plug-Flow detention time= 431.7 min calculated for 3,434 cf (50% of inflow)
Center-of-Mass det. time= 200.4 min (999.2 - 798.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	219.00'	1,423 cf	**17.00'W x 123.50'L x 3.54'H Field A** 7,436 cf Overall - 2,694 cf Embedded = 4,742 cf x 30.0% Voids
#2A	219.50'	2,694 cf	**Cultec R-330XLHD** x 51 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 3 rows
		4,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 1.00' Phase-In= 0.01'
#2	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.40' / 220.70' S= -0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.01 cfs @ 12.14 hrs HW=221.97' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.31 cfs @ 12.21 hrs HW=221.94' TW=221.91' (Dynamic Tailwater)
↑—**2=Culvert** (Inlet Controls 0.31 cfs @ 0.57 fps)

Summary for Pond 5P: DMH

Inflow	=	2.81 cfs @	12.08 hrs, Volume=	12,282 cf	
Outflow	=	2.81 cfs @	12.09 hrs, Volume=	12,282 cf,	Atten= 0%, Lag= 0.6 min
Primary	=	1.23 cfs @	11.95 hrs, Volume=	6,927 cf	
Secondary	=	2.46 cfs @	12.14 hrs, Volume=	5,355 cf	

Routing by Sim-Route method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 221.98' @ 12.14 hrs
Flood Elev= 224.80'

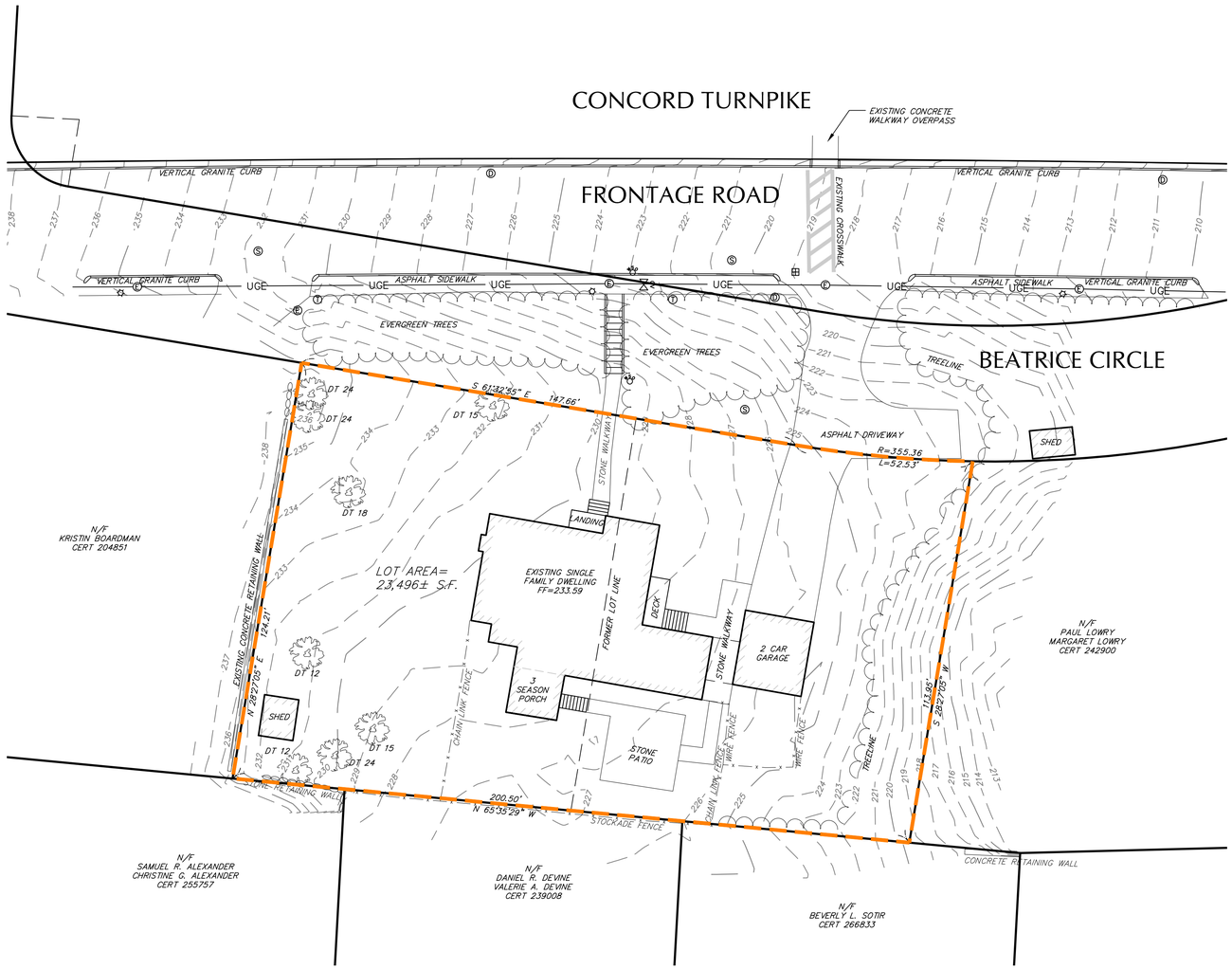
Device	Routing	Invert	Outlet Devices
#1	Primary	220.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.70' / 220.40' S= 0.0125 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.55 sf
#2	Secondary	218.94'	**10.0" Round Culvert** L= 103.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 218.94' / 210.70' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#3	Device 2	221.70'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height

Primary OutFlow Max=1.17 cfs @ 11.95 hrs HW=221.70' TW=221.38' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.17 cfs @ 2.14 fps)

Secondary OutFlow Max=2.44 cfs @ 12.14 hrs HW=221.98' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 2.44 cfs of 3.36 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 2.44 cfs @ 1.78 fps)

APPROX MASS GRID

DESCRIPTION	X-1
PAVEMENT	1,855 S.F.
ROOF	3,552 S.F.
LAWN	16,426 S.F.
WOODS	1,663 S.F.
TOTAL	23,496 S.F.



LEGEND:

EXISTING:

- LOCUS PROPERTY LINE
- TREE LINE
- SEWER MANHOLE (SMH)
- DRAIN MANHOLE (DMH)
- CATCH BASIN (CB)
- STONEWALL
- GAS VALVE
- WATER VALVE
- WATER SERVICE
- HYDRANT
- UTILITY POLE
- N/F — NOW OR FORMERLY
- D — DRAIN PIPE
- W — WATER MAIN
- G — GAS SERVICE
- UGE — UNDERGROUND POWER
- OHW — OVERHEAD WIRES
- S — SEWER MAIN
- LSA — LANDSCAPED AREA
- 25 — GRADE
- x25.7 — SPOT GRADE
- CHAIN LINK FENCE
- STOCKADE FENCE
- TEST PIT
- HAND HOLES FOR UTILITIES
- LIGHT POLE
- FF — FIRST FLOOR

DeCelle-Burke-Sala
& Associates, Inc.
1266 Furnace Brook Parkway #401
Quincy, MA 02169
617-405-5100(o) 617-405-5101(f)
www.decelle-burke-sala.com

COMMONWEALTH OF MASSACHUSETTS
JAMES W. BURKE
No. 30418
REGISTERED PROFESSIONAL ENGINEER

JAMES W BURKE, P.E.

GENERAL NOTES:

1. LOCUS: ASSESSORS MAP 51 BLOCK LOT 36
   RECORD OWNER: COMPREHENSIVE LAND HOLDINGS
   DEED REFERENCE: CERTIFICATE #271959
   PLAN REFERENCE: LC PLAN 2367-12
2. ELEVATIONS REFER TO NAVD-88.
3. EXISTING UTILITIES WHERE SHOWN IN THE DRAWINGS ARE FROM SURFACE OBSERVATION AND RECORD INFORMATION AND SHOULD BE CONSIDERED APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY LOCATING AND COORDINATING THE PROPOSED CONSTRUCTION ACTIVITY WITH DIG-SAFE AND THE APPLICABLE UTILITY COMPANIES AND MAINTAINING THE EXISTING UTILITY SYSTEM IN SERVICE.
   DIG-SAFE SHALL BE NOTIFIED PER THE STATE OF MASSACHUSETTS STATUTE CHAPTER 82, SECTION 409 AT TEL 1-888-344-7233. THE ENGINEER DOES NOT GUARANTEE THEIR ACCURACY OR THAT ALL UTILITIES AND SUBSURFACE STRUCTURES ARE SHOWN. LOCATIONS AND ELEVATIONS OF UNDERGROUND UTILITIES WERE TAKEN FROM RECORD PLANS. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION, AND INVERTS OF UTILITIES AND STRUCTURES AS REQUIRED PRIOR TO THE START OF CONSTRUCTION.
4. THE LOT SHOWN DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD ZONE AS DELINEATED ON FIRM 25017C-0416E, DATED JUNE 4, 2010.
5. PARCEL IS ZONED SR-A.

PROJECT TITLE & LOCATION:

SITE PLAN
91 BEATRICE CIRCLE
BELMONT, MASS.

PLAN TITLE:

EXISTING WATERSHED

PREPARED FOR:

91 BEATRICE CIRCLE LLC
c/o REGNANTE STERIO
401 EDGEWATER PL, SUITE 630
WAKEFIELD, MA 01880

DATE: NOVEMBER 4, 2020

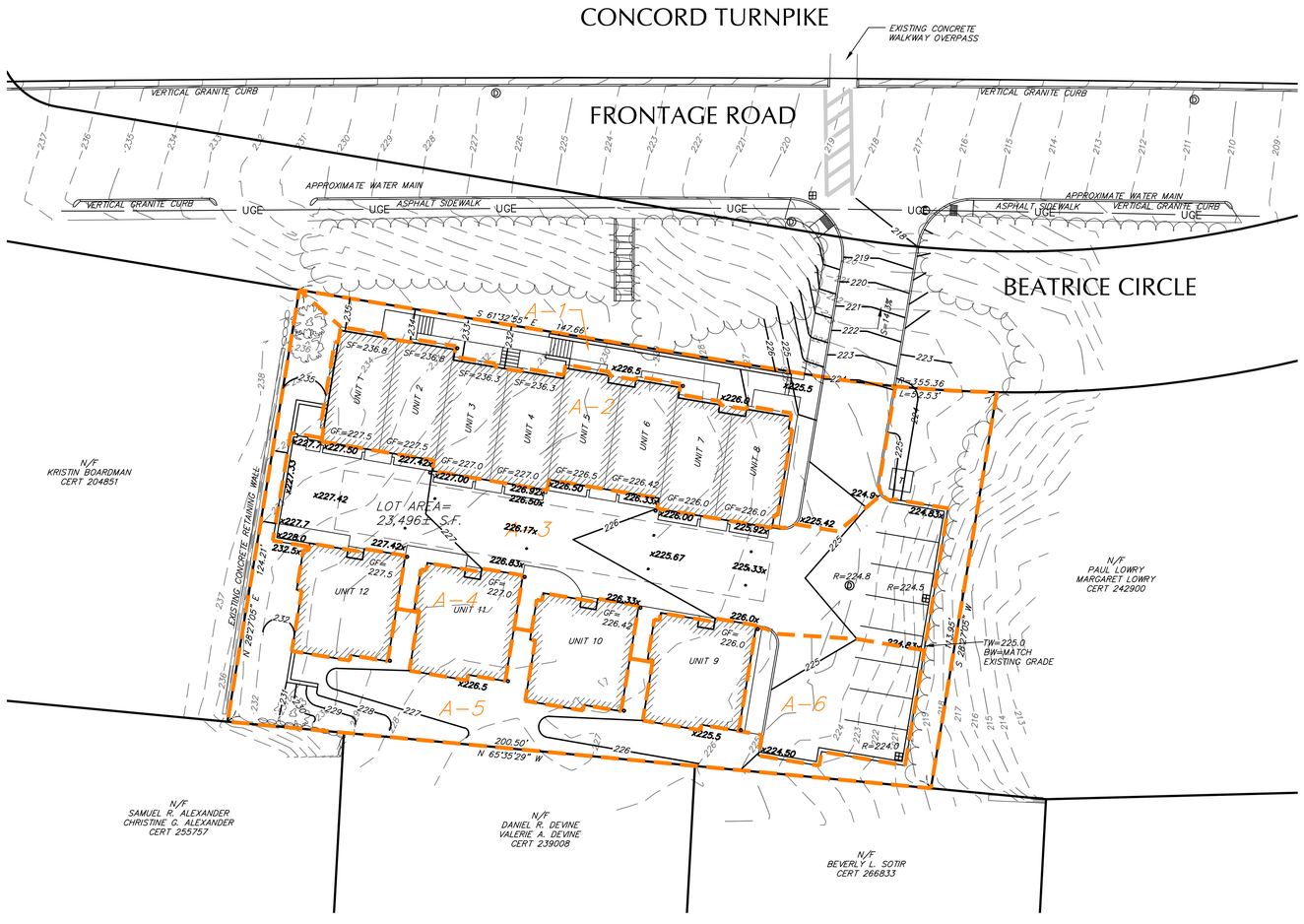
REVISED:

JOB NUMBER: 19.085 | SHEET 1 OF 2

20 10 0 20 40
SCALE: 1"=20'

DESCRIPTION	A–1	A–2	A–3	A–4	A–5	A–6	TOTAL
PAVEMENT	1,760 S.F.	0 S.F.	5,418 S.F.	0 S.F.	0 S.F.	1,569 S.F.	8,747 S.F.
ROOF	0 S.F.	4,321 S.F.	0 S.F.	3,438 S.F.	0 S.F.	0 S.F.	7,759 S.F.
LAWN	750 S.F.	0 S.F.	533 S.F.	0 S.F.	5,077 S.F.	51 S.F.	6,411 S.F.
WOODS	0 S.F.	0 S.F.	0 S.F.	0 S.F.	579 S.F.	0 S.F.	579 S.F.
TOTAL	2,510 S.F.	4,321 S.F.	5,951 S.F.	3,438 S.F.	5,656 S.F.	1,620 S.F.	23,496 S.F.

APPROX. MASS GRID



LEGEND:

EXISTING:		PROPOSED:
	– LOCUS PROPERTY LINE	
	– TREE LINE	
S	– SEWER MANHOLE (SMH)	S
D	– DRAIN MANHOLE (DMH)	D
	– CATCH BASIN (CB)	
	– STONEWALL	
GV	– GAS VALVE	GV
WV	– WATER VALVE	WV
	– WATER SERVICE	
	– HYDRANT	
	– UTILITY POLE	
N/F	– NOW OR FORMERLY	
D	– DRAIN PIPE	D
W	– WATER MAIN	W
G	– GAS SERVICE	G
UGE	– UNDERGROUND POWER	UGE
OHW	– OVERHEAD WIRES	OHW
S	– SEWER MAIN	S
LSA	– LANDSCAPED AREA	LSA
25	– GRADE	25
x25.7	– SPOT GRADE	x25.7
x x x x x	– CHAIN LINK FENCE	
	– CHAIN LINK FENCE	
	– TEST PIT	
	– HAND HOLES FOR UTILITIES	
	– LIGHT POLE	
FF	– FIRST FLOOR	FF
TOF	– TOP OF FOUNDATION	TOF
GF	– GARAGE FLOOR	GF
	– EROSION CONTROL	

DeCelle-Burke-Sala & Associates, Inc.
1266 Furnace Brook Parkway #401
Quincy, MA 02169
617-405-5100(o) 617-405-5101(f)
www.decelle-burke-sala.com

COMMONWEALTH OF MASSACHUSETTS
JAMES W. BURKE
No. 39418
REGISTERED PROFESSIONAL ENGINEER

JAMES W BURKE, P.E.

GENERAL NOTES:

1. LOCUS: ASSESSORS MAP 51 BLOCK LOT 36

   RECORD OWNER: COMPREHENSIVE LAND HOLDINGS
   DEED REFERENCE: CERTIFICATE #271959
   PLAN REFERENCE: LC PLAN 2367–12

2. ELEVATIONS REFER TO NAVD–88.

3. EXISTING UTILITIES WHERE SHOWN IN THE DRAWINGS ARE FROM SURFACE OBSERVATION AND RECORD INFORMATION AND SHOULD BE CONSIDERED APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY LOCATING AND COORDINATING THE PROPOSED CONSTRUCTION ACTIVITY WITH DIG–SAFE AND THE APPLICABLE UTILITY COMPANIES AND MAINTAINING THE EXISTING UTILITY SYSTEM IN SERVICE.

   DIG–SAFE SHALL BE NOTIFIED PER THE STATE OF MASSACHUSETTS STATUTE CHAPTER 82, SECTION 409 AT TEL 1–888–344–7233. THE ENGINEER DOES NOT GUARANTEE THEIR ACCURACY OR THAT ALL UTILITIES AND SUBSURFACE STRUCTURES ARE SHOWN. LOCATIONS AND ELEVATIONS OF UNDERGROUND UTILITIES WERE TAKEN FROM RECORD PLANS. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION, AND INVERTS OF UTILITIES AND STRUCTURES AS REQUIRED PRIOR TO THE START OF CONSTRUCTION.

4. THE LOT SHOWN DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD ZONE AS DELINEATED ON FIRM 25017C–0416E, DATED JUNE 4, 2010.

5. PARCEL IS ZONED SR–A.

PROJECT TITLE & LOCATION:

SITE PLAN
91 BEATRICE CIRCLE
BELMONT, MASS.

PLAN TITLE:

PROPOSED WATERSHED

PREPARED FOR:

91 BEATRICE CIRCLE LLC
c/o REGNANTE STERIO
401 EDGEWATER PL, SUITE 630
WAKEFIELD, MA 01880

DATE: NOVEMBER 4, 2020

REVISED:

JOB NUMBER: 19.085 | SHEET 2 OF 2

20 10 0 20 40
SCALE: 1"=20'