G-8488

Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING
www.gandhengineering.com
Est. 1972

Milford Office
333 West Street, P. O. Box 235
Milford, MA 01757-0235
(508) 473-6630/Fax (508) 473-8243

Franklin Office
55 West Central Street
Franklin, MA 02038-2101
(508) 528-3221/Fax (508) 528-7921

Whitinsville Office
1029 Providence Road
Whitinsville, MA 01588-2121
(508) 234-6834/Fax (508) 234-6723

Notice of Intent

For
Adult Entertainment
49 Milford Street

In

Mendon, MA

Date: March 16, 2020

Applicant:
Showtime Entertainment, LLC
297 Boston Road
Sutton, MA 01590

Prepared By:
Guerriere & Halnon, Inc.
P.O. Box 235
Milford, MA 01757

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

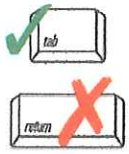
Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Mendon
City/Town

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



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

49 Milford Street	Mendon	01756
a. Street Address	b. City/Town	c. Zip Code

Latitude and Longitude:

42-06-54 N	71-32-41 W
d. Latitude	e. Longitude

9	49
f. Assessors Map/Plat Number	g. Parcel /Lot Number

2. Applicant:

George	Funari
a. First Name	b. Last Name

Showtime, LLC
c. Organization

297 Boston Road
d. Street Address

Sutton	MA	01590
e. City/Town	f. State	g. Zip Code

508-309-0980		
h. Phone Number	i. Fax Number	j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

George	Funari
a. First Name	b. Last Name

Landmark Realty Trust II
c. Organization

297 Boston Road
d. Street Address

Sutton	MA	01590
e. City/Town	f. State	g. Zip Code

508-309-0980		
h. Phone Number	i. Fax Number	j. Email address

4. Representative (if any):

Dale	MacKinnon, PE
a. First Name	b. Last Name

Guerriere & Halnon, Inc.
c. Company

PO Box 235
d. Street Address

Milford	MA	01757
e. City/Town	f. State	g. Zip Code

508-473-6630	508-473-8243	DMacKinnon@GandHEngineering.com
h. Phone Number	i. Fax Number	j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

$3,575.00	$1,775.00	$1,800.00
a. Total Fee Paid	b. State Fee Paid	c. City/Town Fee Paid

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

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Mendon
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A. General Information (continued)

6. General Project Description:

A 4,806 SF 1 story building along the Northwesterly side of lot with parking areas along 3 sides of the building and an additional parking area towards the west of the lot. There is an additonal 18,129 SF of pavement and 2,204 SF of the proposed building within the buffer.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☒ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

a. County	b. Certificate # (if registered land)
Worcester	
c. Book	d. Page Number
51988	252

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☒ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☐ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☐ Riverfront Area	1. Name of Waterway (if available) - **specify coastal or inland**	

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☐ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: _____ square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet _____ b. square feet within 100 ft. _____ c. square feet between 100 ft. and 200 ft. _____

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☐ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f.** above.

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Provided by MassDEP:
MassDEP File Number
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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment
	Size of Proposed Alteration	**Proposed Replacement (if any)**
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☐ Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW | b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings | b. number of replacement stream crossings

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Provided by MassDEP:
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C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

   a. ☐ Yes ☒ No

   If yes, include proof of mailing or hand delivery of NOI to:

   Natural Heritage and Endangered Species Program
   Division of Fisheries and Wildlife
   1 Rabbit Hill Road
   Westborough, MA 01581

   8/1/2017
   b. Date of map

   If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

   c. Submit Supplemental Information for Endangered Species Review*

      1. ☐ Percentage/acreage of property to be altered:

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

      2. ☐ Assessor's Map or right-of-way plan of site

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

   (a) ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

   (b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

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C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm). Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☐ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

Massachusetts Department of Environmental Protection
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Provided by MassDEP:
MassDEP File Number
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Mendon
City/Town

C. Other Applicable Standards and Requirements (cont'd)

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

b. ACEC

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

2. ☒ A portion of the site constitutes redevelopment

3. ☒ Proprietary BMPs are included in the Stormwater Management System.

b. ☐ No. Check why the project is exempt:

1. ☐ Single-family house

2. ☐ Emergency road repair

3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

Massachusetts Department of Environmental Protection
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WPA Form 3 – Notice of Intent
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Mendon
City/Town

D. Additional Information (cont'd)

3. ☐ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

Proposed Adult Entertainment Site at 49 Milford Street in Mendon, Massachusetts
a. Plan Title

Guerriere & Halnon, Inc.
b. Prepared By

Dale MacKinnon, PE
c. Signed and Stamped by

3/16/2020
d. Final Revision Date

1" = 30'
e. Scale

Stormwater Report
f. Additional Plan or Document Title

3/16/2020
g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☒ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Mendon
City/Town

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

George C Fucsai | 3/26/2020
1. Signature of Applicant | 2. Date

[signature] | 3/26/2020
3. ~~Signature of Property Owner (if different)~~ Signature of Representative (if any) | 4. Date

5. ~~Signature of Representative (if any)~~ Signature of Property Owner (if different) | 6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

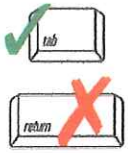
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Applicant Information

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



1. Location of Project:

49 Milford Street	Mendon
a. Street Address	b. City/Town
	$3,575.00
c. Check number	d. Fee amount

2. Applicant Mailing Address:

George		Funari	
a. First Name		b. Last Name	
Showtime, LLC			
c. Organization			
297 Boston Road			
d. Mailing Address			
Sutton		MA	01590
e. City/Town		f. State	g. Zip Code
508-309-0980			
h. Phone Number	i. Fax Number	j. Email Address	

3. Property Owner (if different):

George		Funari	
a. First Name		b. Last Name	
Landmark Realty Trust II			
c. Organization			
297 Boston Road			
d. Mailing Address			
Sutton		MA	01590
e. City/Town		f. State	g. Zip Code
508-309-0980			
h. Phone Number	i. Fax Number	j. Email Address	

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
3 b.	1	1050 x 1.5	1,575
2 b.	2	500 x 1.5	1,500
2 j.	1	500	500

Step 5/Total Project Fee: $3,575.00

Step 6/Fee Payments:

Total Project Fee:	$3,575.00 a. Total Fee from Step 5
State share of filing Fee:	$1,775.00 b. 1/2 Total Fee **less** $12.50
City/Town share of filling Fee:	$1,800.00 c. 1/2 Total Fee **plus** $12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

GEORGE C FUNARI 01/16
297 BOSTON ROAD
SUTTON, MA 01590

53-7237/2113 No. 2026

DATE 3/26/2020

Pay To The Order Of COMMONWEALTH OF MA $ 1,775.00

ONE THOUSAND SEVEN HUNDRED SEVENTY FIVE DOLLARS

Security Features Included Details on Back.

UNIBANK

APP FEE

MEMO 49 MILFORD ST LOT

GEORGE C FUNARI MP

⑆211372378⑆ 7710179305⑈ 2026

GEORGE C FUNARI 01/16
297 BOSTON ROAD
SUTTON, MA 01590

53-7237/2113 No. 2027

DATE 3/26/2020

Pay To The Order Of TOWN OF MENDON $ 1,800

ONE THOUSAND EIGHT HUNDRED DOLLARS

Security Features Included Details on Back.

UNIBANK

MEMO 49 MILFORD ST APP FEE

GEORGE C FUNARI MP

⑆211372378⑆ 7710179305⑈ 2027

GEORGE C FUNARI 01/16
297 BOSTON ROAD
SUTTON, MA 01590

53-7237/2113 No. 2028

DATE 3/26/2020

Pay To The Order Of TOWN OF MENDON $ 30.00

THIRTY DOLLARS

Security Features Included Details on Back.

UNIBANK

MEMO BY LAW FEE/MENDON

GEORGE C FUNARI MP

⑆211372378⑆ 7710179305⑈ 2028

Abutter Notification

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

(to be submitted to the Massachusetts Department of Environmental Protection and the Conservation Commission when filing a Notice of Intent)

I, **Dale MacKinnon, PE, Sr Project Engineer**, hereby certify under the pains and penalties of perjury that on **or before April 1, 2020** I gave notification to abutters in accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, and the DEP Guide to Abutter Notification dated April 8, 1994, in connection with the following matter:

A Notice of Intent filed under the Massachusetts Wetlands Protection Act by **Showtime, LLC**

with the **Mendon** Conservation Commission on **March 31, 2020** for property located at **49 Milford Street, Mendon, MA (Assessor Map 9 Parcel 49)**

The form of the notification, and a list of the abutter to whom it was given and their addresses, are attached to this Affidavit of Service.

Dale MacKinnon
Name

3/26/2020
Date

G-8488

TOWN OF MENDON
BOARD OF ASSESSORS
20 MAIN STREET
MENDON, MA 01756
508-473-2738
508-478-8241 (Fax)
e-mail: jberthold@mendonma.gov

March 16, 2020

PROPERTY LOCATION(S): *49 Milford Street*
Mendon, Massachusetts
Assessor's Map #9-177-49

PROPERTY OWNER(S): *George C. Funari Trustee*
Landmark Realty Trust II

OWNER(S) ADDRESS: *297 Boston Road*
Sutton, MA 01590

RECORDED: *Worcester Registry of Deeds*
January 29, 2014
Book #51988
Page #252

The attached 100' abutter's list is true and accurate to the best of our knowledge.

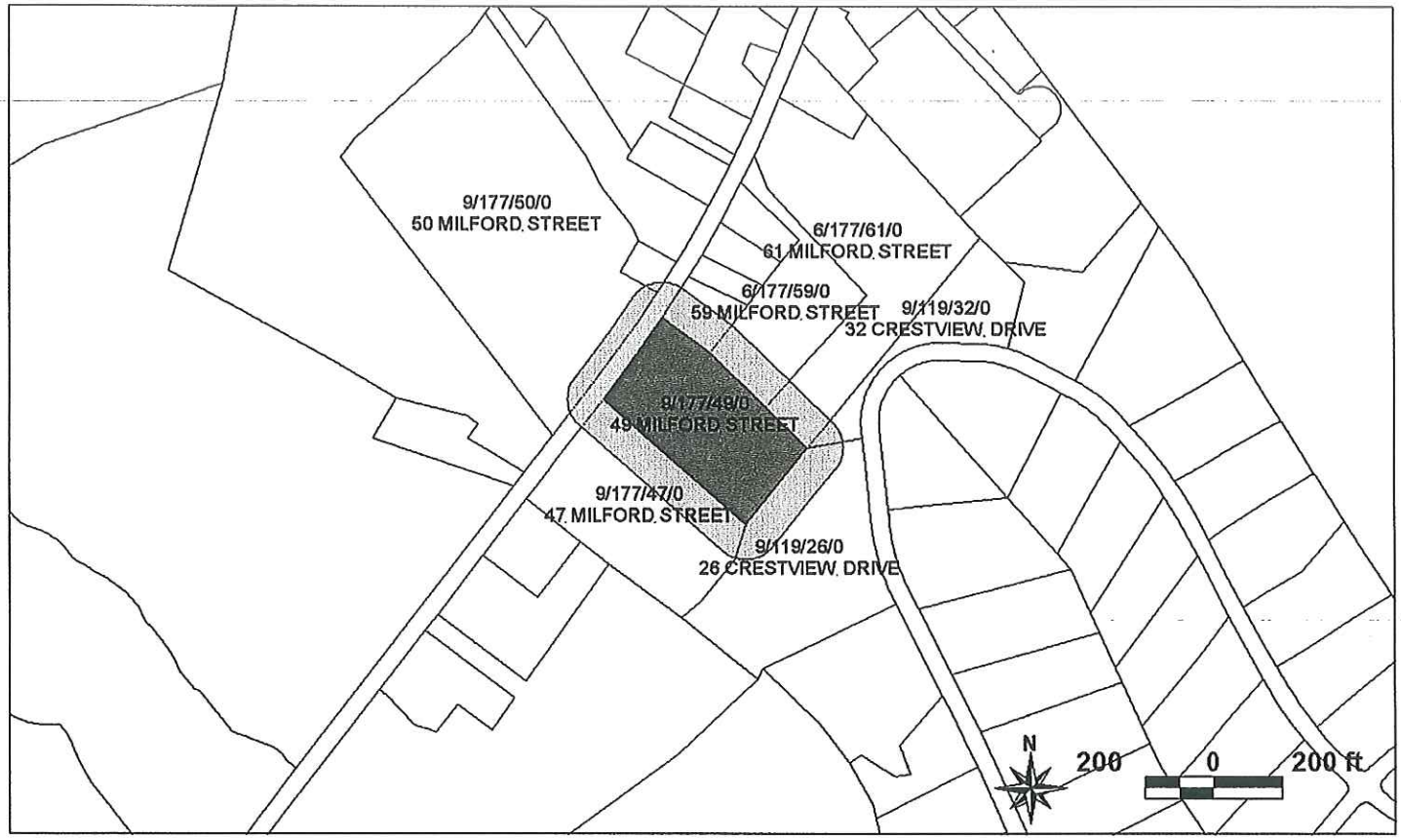
Sincerely,

Jean M. Berthold, MAA
Principal Assessor

Attachment

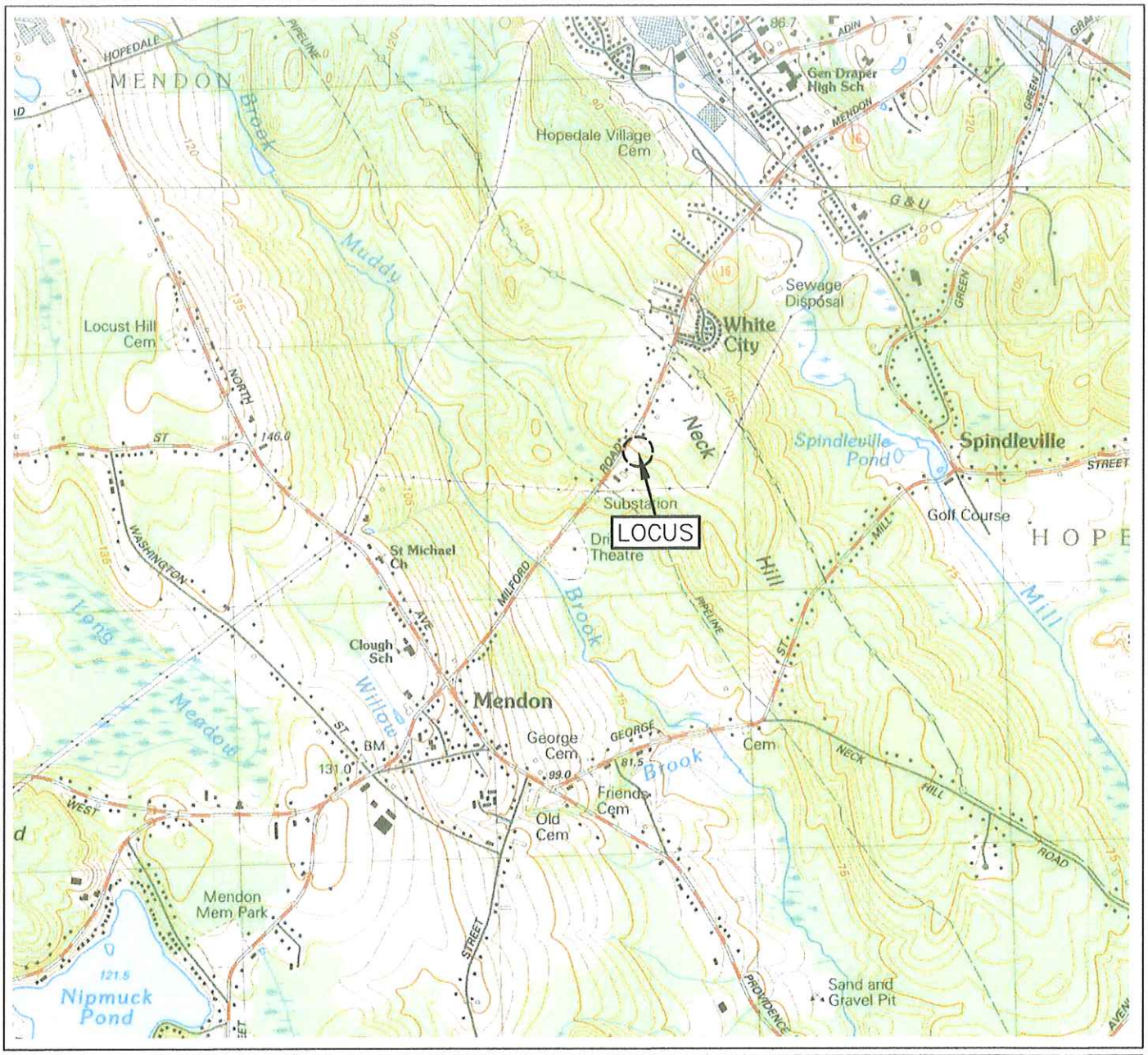
TOWN OF MENDON, MA
BOARD OF ASSESSORS
20 Main Street, Mendon, MA 01756

Abutters List Within 100 feet of Parcel 9/177/49/0



Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
3224	6-177-59-0-R	YATES SUSAN M (ESTATE) & RICHARD WHEELWRIGHT	59 MILFORD STREET	59 MILFORD STREET	MENDON	MA	01756
211	6-177-61-0-R	RUA ELAINE A	61 MILFORD STREET	61 MILFORD STREET	MENDON	MA	01756-0108
491	9-119-26-0-R	ALFIERI RUSSELL & ELLEN M TRST 26 CRESTVIEW DR REALTY TRUST	26 CRESTVIEW DRIVE	26 CRESTVIEW DRIVE	MENDON	MA	01756
493	9-119-32-0-R	VANSLETTE CYNTHIA K	32 CRESTVIEW DRIVE	32 CRESTVIEW DRIVE	MENDON	MA	01756
562	9-177-47-0-R	SPINNEY PROPERTIES LLC	47 MILFORD STREET	47 MILFORD STREET	MENDON	MA	01756
563	9-177-49-0-R	FUNARI GEORGE C TRUSTEE LANDMARK REALTY TRUST II	49 MILFORD STREET	297 BOSTON ROAD	SUTTON	MA	01590
566	9-177-50-0-R	SWEET ROBERT & LAURIE A TRSTES SWEET LIVING TRUST	50 MILFORD STREET	50 MILFORD STREET	MENDON	MA	01756
565	9-177-51-0-R	FUNARI GEORGE C TRUSTEE 51 MILFORD ST REALTY TRUST	51 MILFORD STREET	297 BOSTON ROAD	SUTTON	MA	01590
568	9-177-54-0-R	MAY LISA M	54 MILFORD STREET	264 SOUTH MAIN STREET	HOPEDALE	MA	01747

USGS Map



U.S.G.S. Quadrangle

Scale: 1"=2000'

0 2000' 4000' 6000' 8000'

LOCUS MAP

49 Milford Street
Mendon, Massachusetts

Date: February 06, 2020 | *Project No. G-7532*

Guerriere & Halnon, Inc.
Engineering & Land Surveying
333 WEST STREET, MILFORD, MA 01757
(508) 473-6630 FAX: (508) 473-8243
WWW.GUERRIEREANDHALNON.COM

Wetland Information

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 / Fax: 508-752-9494

Arthur Allen, CPSS, CWS, CESSWI
Vice President
Soil & Wetland Scientist

Arthur Allen is the Vice President of EcoTec, Inc. and has been a senior environmental scientist there since 1995. His work with EcoTec has involved wetland delineation, wildlife habitat evaluation, environmental permitting (federal, state and local), environmental monitoring, expert testimony and peer reviews for private landowners, developers, major corporations and regulatory agencies in addition to contaminated site assessment and the description, mapping and interpretation of soils. Prior to joining EcoTec, Mr. Allen mapped and interpreted soils in Franklin County, MA for the U.S.D.A. Natural Resources Conservation Service (formerly Soil Conservation Service) and was a research soil scientist at Harvard University's Harvard Forest. Since 1994, Mr. Allen has assisted the Massachusetts Department of Environmental Protection and the Massachusetts Association of Conservation Commissions as an instructor in the interpretation of soils for wetland delineation and for the Title V Soil Evaluator program.

Mr. Allen has a civil service rating as a soil scientist, an undergraduate degree in Natural Resource Studies and a graduate certificate in Soil Studies. His work on the Franklin County soil survey involved interpretation of landscape-soil-water relationships, classifying soils and drainage, and determining use and limitation of the soil units that he delineated. As a soil scientist at the Harvard Forest, Mr. Allen was involved in identifying the legacies of historical land-use in modern soil and vegetation at a number of study sites across southern New England. He has a working knowledge of the chemical and physical properties of soil and water and how these properties interact with the plants that grow on a given site. While at Harvard Forest he authored and presented several papers describing his research results which were later published. In addition to his aforementioned experience, Mr. Allen was previously employed by the Trustees of Reservations as a land manager and by the Town of North Andover, MA as a conservation commission intern.

Education:
1993-Graduate Certificate in Soil Studies, University of New Hampshire
1982-Bachelor of Science in Natural Resource Studies, University of Massachusetts

Professional Affiliations:
Certified Professional Soil Scientist (ARCPACS CPSS #22529)
New Hampshire Certified Wetland Scientist (#19)
Registered Professional Soil Scientist – Society of Soil Scientists of SNE [Board Member (2000-2006)]
Certified Erosion, Sediment & Stormwater Inspector (#965)
Massachusetts Arborists Association-Certified Arborist (1982 – 1998)
New England Hydric Soils Technical Committee member
Massachusetts Association of Conservation Commissions member
Society of Wetland Scientists member

Refereed Publications:
Soil Science and Survey at Harvard Forest. A.Allen. *In*: Soil Survey Horizons. Vol. 36, No. 4, 1995, pp. 133-142.
Controlling Site to Evaluate History: Vegetation Patterns of a New England Sand Plain. G.Motzkin, D.Foster, A.Allen, J.Harrod, & R.Boone. *In*: Ecological Monographs 66(3), 1996, pp. 345-365.
Vegetation Patterns in Heterogeneous Landscapes: The Importance of History and Environment. G.Motzkin, P.Wilson, D.R.Foster & A.Allen. In: Journal of Vegetation Science 10, 1999, pp. 903-920.

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 / Fax: 508-752-9494

September 24, 2010

Mendon Conservation Commission
Town Hall
20 Main Street
Mendon, MA 01756

Re: 49 Milford St., Mendon, MA

Subject: Hydric Soil Investigations

On September 17, 2010 I evaluated deep soil pits relative to potential buried/disturbed wetlands at the above-referenced site. Accompanying me during my evaluation were Peter Coffin (Mendon Conservation Commission), Judy Schmitz (owner's wetland scientist) and Chris Funari (owner and excavator operator).

Prior to my evaluation, five (5) soil pit locations had been identified and staked-out. These locations were provided to me on a plan by the project engineers (Guerriere & Halnon). At the time of my evaluation I discussed these locations with Peter Coffin. Peter told me that these were areas of concern but that I was not limited to these areas by the Conservation Commission. We discussed the primary concerns of the Conservation Commission regarding a potential intermittent stream and wetlands that may have flowed around the north and west sides of the site prior to disturbance. During the course of my investigations, I directed the excavation of nine (9) soil pits which were dug with a full-size, hydraulic excavator. The attached site plan sketch depicts the locations of the Guerriere & Halnon proposed test pits as well as the nine soil pits that I evaluated. Abbreviated soil profile descriptions for the nine test pits are presented below followed by a discussion of my findings and recommendations.

Pit #1
0-33" Mixed stony loam fill w/ potting soil and minimally decomposed logs
33-40" Ab (10YR 2/1 mucky loam with many woody roots)
40-71" Bg (10YR 6/1 with common 10YR 5/4 redox concentrations)

Pit #2
0-28" Mixed stony loam fill w/ landscape fabric and wire
28-40" Ab (10YR 2/2 loam with many woody roots)
40-56" Bw (10YR 5/3 with common 10YR 5/4 & 10YR 5/2 redox concentrations & depletions)

Pit #3
0-10" Mixed gravely loam fill
10-23" Ab (10YR 3/2 stony fine sandy loam with many woody roots)
23-31" Bw1 (10YR 4/6 stony sandy loam)
31-50" Bw2 (10YR 5/8 stony sandy loam with common 5YR 4/4 redox concentrations)

Notes: Free water @ 68"

Pit #4 (east end)
0-12" Mixed gravely loam fill
12-16" Ab (10YR 2/2 stony fine sandy loam with many woody roots)
16-26" BC (mixed loamy fill w/ plastic debris)
26-37" 2Ab (10YR 3/1 stony loam with many woody roots)
37-45" Bg (10YR 6/1 stony sandy loam w/ few 10YR 6/1 redox depletions)

Pit #4 (west end)
0-12" Mixed gravely loam fill
12-16" Ab (10YR 2/2 stony fine sandy loam with many woody roots)
16-25" BC (mixed loamy fill w/ plastic debris)
25-35" 2Ab (10YR 3/2 stony loam with many woody roots)
35-45" Bw (10YR 5/4 loamy fine sand)

Pit #5
0-9" Mixed gravely fill
9-13" Ab (10YR 3/2 gravely sandy loam with many, fine, woody roots)
13-18" 2Ab (loam with many, coarse, woody roots)
18-21" E (loamy fine sand)
21-28"Bg (10YR 6/1 loamy fine sand w/ 10YR 5/6 redox concentrations)

Pit #6
0-32" Mixed stony loam fill
32-48" Bw (10YR 5/6 stony loam)

Notes: Pocket of crushed stone under 4" perforated plastic pipe from 32-48"

Pit #7
0-24" Mixed stony loam fill
24-32" Ab (10YR 2/2 loam with many woody roots)
32-49" C (10YR 3/2 stony loam fill w/ black rotted tree roots)
49-56" 2C (10YR 5/3 w/ common 10YR 5/6 redox concentrations)

Pit #8
0-23" Mixed stony loam fill
23-31" Ab (10YR 2/1 stony fine sandy loam with many woody roots)
31-48" Bg (10YR 5/2 stony sandy loam w/ common 7.5YR 5/8 concentrations)

Pit #9
0-8" Mixed stony loam fill
8-17" Ab (10YR 3/3 fine sandy loam w/ many woody roots)
17-37" Bw (10YR 5/4 sandy loam)
37-48" C (10YR 5/1 w/ few 10YR 5/8 concentrations)

All nine soil pits display varying degrees and chronologies of disturbance. Photos of the soil pit profiles are attached. Pits no. 1, 2, part of 4, 5 & 8 all have evidence of buried wetlands with hydric soil indicators in the buried soil. Pits no. 3, part of 4, 6, 7 & 9 have evidence of buried uplands with non-hydric, buried soil. Pits no. 4, 5 & 7 have evidence of two, significantly different periods of fill with two buried A horizons and associated woody root development. This site appears to have had a long history of soil disturbance including wetland disturbance. Bordering Vegetated Wetland ("BVW") was clearly filled in the southeasterly part of the site. Based on the limited decomposition of buried woody debris and the presence of other buried debris (including potting soil, wire and plastic), it appears that wetlands were filled, in the vicinity of pits no. 1, 2, 4 & 5, within the last 10 years. We encountered evidence of a pre-existing, buried drain line in pit no. 6 including a 4 inch diameter, perforated plastic pipe and associated crushed stone bedding. Weeping of water was noted within the crushed stone bedding. This 4-inch pipe appears to pre-date the existing, 8 inch corrugated plastic culvert which presently connects the off-site stream culvert (located in the northerly corner of the site) to the on-site wetlands. It does not appear that there was a continuous, open intermittent stream or wetland connecting the off-site stream culvert to the on-site wetlands prior to installation of the existing, 8-inch plastic culvert. A pocket of buried wetland was noted in the vicinity of pit no. 8. This

wetland appears to have been a small, isolated area that would be non-jurisdictional under the MA Wetlands Protection Act.

Based on these results I directed the delineation of an area of disturbed BVW, most of which appears to have been buried within the last 10 years. This area was delineated with blue flags labeled X-1 to X-7. Pre-existing wetland flag JBS 109 connects to new flag X-1 and pre-existing flag JBS 105 connects to new flag X-7. I have included a photo overview of the delineated, buried wetland.

Please do not hesitate to contact me if you have any questions concerning this or other matters.

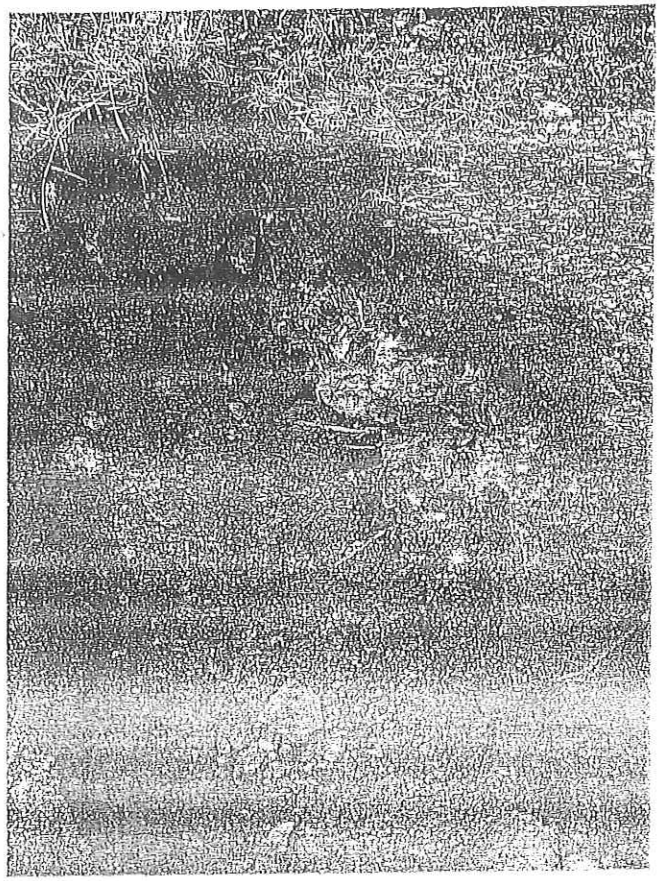
Sincerely,

Arthur Allen, CPSS, CWS, CESSWI
Vice President
Certified Professional Soil Scientist

attachment: 5 pages (1-Plan Section, 3-Photo pages, 1-qualifications statement)

10/mon/mendon.soil.report1.doc

49 MILFORD ST., MENDON SOIL INVESTIGATION PHOTOS
TAKEN ON 9.17.2010 BY A.ALLEN, ECOTEC, INC.



PIT NO. 6

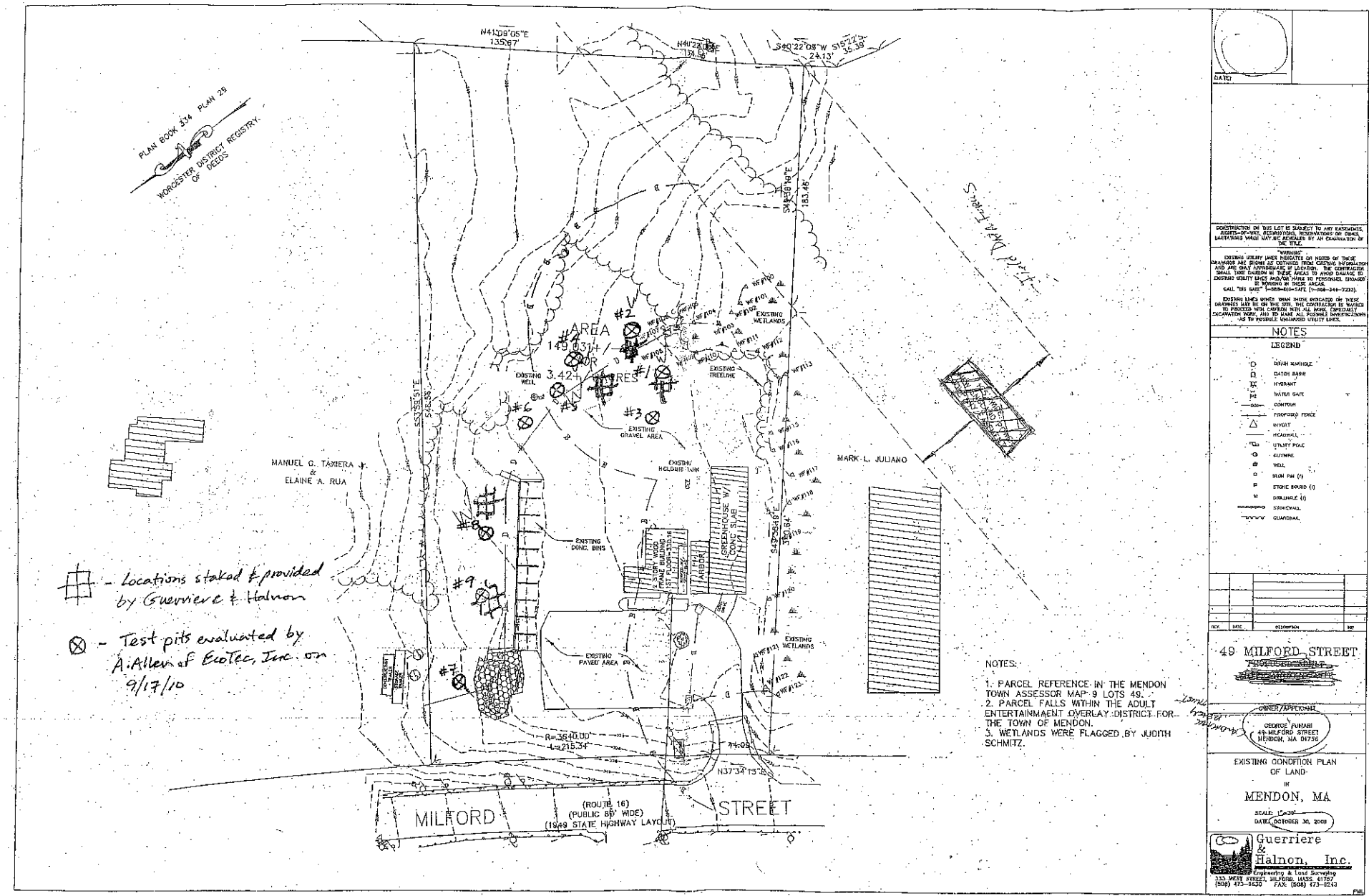
PIT NO. 7

49 MILFORD ST., MENDON SOIL INVESTIGATION PHOTOS
TAKEN ON 9.17.2010 BY A.ALLEN, ECOTEC, INC.

PIT NO. 8

PIT NO. 9

BURIED WETLAND OVERVIEW



NOTES:

1. PARCEL REFERENCE IN THE MENDON TOWN ASSESSOR MAP 9 LOTS 49.
2. PARCEL FALLS WITHIN THE ADULT ENTERTAINMAENT OVERLAY DISTRICT FOR THE TOWN OF MENDON.
3. WETLANDS WERE FLAGGED BY JUDITH SCHMITZ.

DATE:

CONSTRUCTION ON THIS LOT IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, RESERVATIONS OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

"WARNING"
EXISTING UTILITY LINES INDICATED OR NOTED ON THESE DRAWINGS ARE SHOWN AS OBTAINED FROM EXISTING INFORMATION AND ARE ONLY APPROXIMATE IN LOCATION. THE CONTRACTOR SHALL TAKE CAUTION IN THESE AREAS TO AVOID DAMAGE TO EXISTING UTILITY LINES AND/OR HARM TO PERSONNEL ENGAGED IN WORKING IN THESE AREAS.
CALL "DIG SAFE" (1-888-DIG-SAFE (1-888-344-7233)).

EXISTING LINES OTHER THAN THOSE SHOWN ON THESE DRAWINGS MAY BE ON THE SITE. THE CONTRACTOR IS WARNED TO PROCEED WITH CAUTION WITH ALL WORK, ESPECIALLY EXCAVATION WORK, AND TO MAKE ALL POSSIBLE INVESTIGATIONS AS TO POSSIBLE UNMARKED UTILITY LINES.

NOTES

LEGEND

- DRAIN MANHOLE
- CATCH BASIN
- HYDRANT
- WATER GATE
- CONTOUR
- PROPOSED FENCE
- INVERT
- HEADWALL
- UTILITY POLE
- GUYWIRE
- WELL
- IRON PIN (I)
- STONE BOUND (I)
- DRILLHOLE (I)
- STONEWALL
- GUARDRAIL

REV.	DATE	DESCRIPTION	BY

49 MILFORD STREET

OWNER/APPLICANT
GEORGE PUNARI
49 MILFORD STREET
MENDON, MA 01756

EXISTING CONDITION PLAN OF LAND
IN
MENDON, MA.

SCALE: 1"=30'
DATE: OCTOBER 30, 2008

Guerriere & Halnon, Inc.
Engineering & Land Surveying
333 WEST STREET, MILFORD, MASS. 01757
(508) 473-6630 FAX: (508) 473-8243

PM

SHEET 1 OF 1

G-8488

Stormwater Report

Stormwater Report

"49 Milford Street Adult Entertainment Site"

Mendon, MA

Date: March 16, 2020

Prepared For:
Showtime Entertainment LLC
49 Milford Street
Mendon, MA 01756

Prepared By:
Guerriere & Halnon, Inc.
333 West Street
Milford, MA 01757

G&H Project G-8488

3/16/2020

COMMONWEALTH OF MASSACHUSETTS
DALE MACKINNON
CIVIL
No. 34575
REGISTERED PROFESSIONAL ENGINEER

Table of Contents

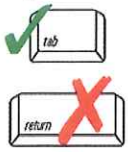
Appendices :

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

Dale MacKinnon 3/5/2020
Signature and Date

Checklist

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

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☐ Simple Dynamic ☐ Dynamic 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.

G-1816

Stormwater Report
"49 Milford Street"
Mendon, MA

SITE LOCATION & DESCRIPTION

The Site is located on the easterly side of Milford Street. Presently, there is a two-story wood framed structure with an attached greenhouse on the property. The building and site had been used as a greenhouse / garden shop business since it was constructed in 1975 until 2007. The area in front of the building is a combination of paved and gravel access/ parking. The areas to the right, rear, and left of the building were primarily used for storing and displaying product for sale. Presently there is just miscellaneous debris scattered around the site.

PROJECT DESCRIPTION

The project proponent intends to construct an approximate 5000 sf building with utility infrastructure, landscaping and parking area for a proposed Adult Entertainment use in the building. The existing buildings on the site will be razed. Proposed site work includes installation of water lines for fire protection and domestic use from the existing water main in Milford Street. A septic system including a grease trap and a pump station will be constructed on site. The stormwater system for the proposed site will be installed to meet the minimum requirements of Massachusetts DEP Stormwater Standards.

DESCRIPTION OF EXISTING DRAINAGE

The general grading of the site is westerly across the site. The runoff from the east abutting properties is diverted to the wetlands in the middle of the site that also flow westerly. An existing drain pipe enters the site from an abutter's property at the northeast corner near Milford Street. This runoff is from drainage uphill and north on Milford Street that outlets into private property without easements. This pipe outlets to a small riprap drain basin on-site. This basin outlets to an 8-inch PVC pipe that redirects this flow southeasterly to a riprap pad at the replicated wetlands behind the existing buildings. At the edge of the riprap basin there are concrete storage bins that act as a further diversion of stormwater to direct offsite runoff from the easterly direction to the south and toward the wetlands behind the parking lot and buildings. There are two existing catch basins in the front parking lot that discharge westerly to the wetlands along the westerly property line that is shared with Lot 47 (Taylor Rental). The majority of the remainder of the developed site flows overland southerly toward the back of the buildings and then westerly toward wetlands along the west property line.

The offsite runoff for both the existing and proposed site is redirected around or flows through the site in the westerly direction without interference from the proposed developed site. Therefore the runoff from offsite is not considered in the existing and proposed condition watershed. The existing site that is compare to the proposed site is 97, 350 sf.

DESCRIPTION OF PROPOSED DRAINAGE FACILITIES

In the Post-Development condition, the drainage area was subdivided into eight hydrologic areas. Refer to the Post-Development Watershed Plan in the Appendix B. These Watershed Areas are denoted as CB-1 to CB-5, front and rear roof areas and Area 7 which is overland flow that is not captured, and flows to the wetlands in the center of the site or toward the west property line abutting the Lot 47. As in the existing condition, the runoff flowing into the site from the east is either diverted to the wetlands or flows through the site and has no contact with the developed site. The diversion is created by the existing riprap basin with pipes entering and leaving the basin, and a proposed 1 foot high diversion berm to direct runoff around the developed site at the rear parking lot, or to CB-6 which pipes this runoff to the head of the central wetlands.
The proposed site will have 5 proposed hydrodynamic separators catch basins (STC 450i).
Four of these structures will connect to 570 foot - 3ft diameter HDPE double wall pipe that will be used for underground detention. A sediment forebay is proposed at the outlet of the basin structure. The high ground water elevation on the site has required an approximate 4 foot fill for the building location with grade falling off in all four directions from the building in order to install a proposed underground detention basin and to allow an outlet outside the wetlands.

SOIL MAPS

The NRCS soil survey describes the existing soils on site as predominately Hydrologic Soil Group "B" soils. See Appendix D. The Type "B" soils are Canton fine sandy loam. The soils division lines are plotted on soil maps included in Appendix D.

POLLUTANT REMOVAL

This project will incorporate facilities that will collect stormwater pollutants. Treatment of pollutants will be accomplished by:

a. Hydrodynamic Separator 65%
b. Extended Detention Basin 50%
c. Settling Forebay
(Credit taken as part of DB)

(Refer to Appendix F for TSS worksheets)

Stormwater Design Parameter

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

An analysis was performed for the 2-year, 10-year, 25-year, and 100-year 24-hour storm events. The SCS Unit Hydrograph method is capable of developing runoff hydrographs for both simple and complex drainage basins.

Utilizing the TR-55 method in HydroCAD, the following data was required for input:

- Watershed Area: Areas of each watershed were delineated and measured with autocad plans and expressed in square feet for these calculations.
- SCS Curve Number (Cn): Based on the existing and proposed cover type and hydrologic soil group, a weighted curve number (CN) was determined for each of the existing and proposed watersheds utilizing Table 2-2a- *Runoff Curve Numbers For Urban Areas* and *Worksheet 2, Runoff Curve Number and Runoff* from the Soil Conservation Service Technical Release 55 – Urban Hydrology for Small Watersheds
- Time of Concentration, Tc (Minutes): The time of concentration for each watershed was determined by finding the time necessary for runoff to travel from the hydraulically most distant point in the watershed to the point of concentration. A minimum time of 6 minutes was used when calculations would have had smaller time increments.
- SCS 24-Hour Storm Type: For the greater New England region, a Type III storm rainfall distribution is recommended for drainage calculations and was used for this project.
- Rainfall Precipitation: Rainfall precipitations for the 2, 10, 25, and 100 year storm events were obtained using Atlas 14- Rainfall Frequency Atlas and are as follows for Worcester South, MA:

2-year storm event: 3.22 inches
10-year storm event: 4.83 inches
25-year storm event: 6.08 inches
100-year storm event: 8.64 inches

All onsite closed channel drainage collection system will have at least 2 ft. of freeboard within the catch basins structure in the event of a 100-year storm event. The proposed drainage pipes will be HDPE pipe unless otherwise noted.

Massachusetts Stormwater Management Standards 1-10

The itemized report that follows will document design compliance with the Massachusetts Stormwater Management Standards 1-10.

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

	Run off		
Storm Events	Pre (cfs)	Post (cfs)	Change (cfs)
2-year	2.64	2.42	-0.22
10-year	5.73	5.05	-0.68
25-year	8.35	7.65	-0.70
100-year	13.91	12.34	-1.57

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

Hydrologic Group	Volume to Recharge x Total Impervious Area
A	0.60 inches of runoff
B	0.35 inches of runoff
C	0.25 inches of runoff
D	0.10 inches of runoff

Soils underlying the site are defined predominately as map unit 420B, Canton fine sandy loam, 3 to 8 percent slopes, and with hydrologic soil group "B (*USDA/NRCS Soil Survey of Worcester County) (***See Soil Data in Attachment Section)***.

The required volume of recharge for post-development conditions is calculated as follows;

Existing Impervious Area		17,695 sf
Proposed Pavement Impervious Area		35,760 sf
Proposed Roof Impervious Area		4,806 sf
Proposed Site Impervious Area		**39,566 sf**
Required Recharge Volume		
0.60" x 1' /12" x _____ sf =	cf	(A soils)
0.35" x 1' /12" x 39,566sf =	cf	(B soils)
0.25" x 1' /12" x _____ sf =	cf	(C soils)
0.10" x 1' /12" x _____ sf =	cf	(D soils)
TOTAL	**1,154 cf**	

Based on soil boring exploration the soil conditions are indicative of "B" type soils therefore, a "1982 Rawls Rate" of 1.07 in/hr was used ***(See Web Soil Report in Attachment Section D).***

Based on G&H"s understanding there has been a groundwater contamination of the site from a gas station which has caused the wells in this area to not be used, and a waterline was installed in Route 16 from Hopedale to provide fire and domestic for the site. We thought it best not to infiltrate runoff on the project site, because of this contamination. If the Town determines we should provide infiltration, then we would take the gutter down spouts and run a shallow leaching trench connecting all the downspouts and providing the volume of storage for recharge.

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

a) Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

b) Structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook; and

c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

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

The required water quality volume equals 0.5 inch of runoff times the impervious area of the post-development site

Impervious area = 39,566 sf

0.5" x 1' /12" x 39,566 s.f. = **1,380 c.f. Water Quality Volume Required**

The 450i Catchbasin/Hydrodynamic Separator has treatment capacity of 143 gals/min which converts to 0.32 cfs. The largest impervious area to the proposed 5 catch basins for the site is an area of 0.244 acre. Using this area and the required 0.5" factor, the required volume to treat is 444 cf. Based on the DEP conversion of water quality volume to the required discharge rate is 0.15 cfs which is below the allowable flow rate designated by the Stormceptor (***See Appendix E for Calculation).***

Treatment Train-1

Four 450i Catchbasin/Hydrodynamic Separator are proposed to connect with a 570 ft linear feet of 36" HDPE pipe detention system. The 36" pipe connects to the control structure DMH 2 – a 5 ft diameter manhole with a weir wall. The weir wall has an 8-inch orifice at elevation 326.00, and a 12-inch orifice at elevation 327.00, with the top of the 6" wide weir at elevation 329.5 feet. The outlet control structure has an 18" HDPE pipe with zero slope that discharges to a shallow sediment pond. A level spreader at elevation 326.0 of the sediment forebay will spread the outlet flow toward the wetlands

Treatment Train-2

This treatment train located in the rear of the lot east of the site wetlands has the 450i catch basin/ hydrodynamic separator that discharges through a 12" HDPE pipe and flared end section into a sediment forebay. Two proposed check dams slow the flow through a grass channel that outlets perpendicular to the downhill contour and has a riprap energy dissipater pad.

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

The long-term pollution prevention plan is provided in Appendix G.

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

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

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best

management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

The subject property does not discharge stormwater within the Zone II or Interim Wellhead Protection Area of a public water supply or to any other critical area.

Standard 7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Part of this project consists in reconfiguring already developed areas, so the project can be viewed as a redevelopment project. Because of the high ground elevation, concerns about contaminated ground water, and the replicated wetlands, compliance with Standard 3 are only provided to the maximum extent practicable.

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

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

Standard 9: An Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that storm water management systems function as designed.
See Appendix H for O&M

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

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

APPENDIX A

LOCUS

N.T.S.

U.S.G.S. Quadrangle

Scale: 1"=2000'

0 2000' 4000' 6000' 8000'

LOCUS MAP

49 Milford Street
Mendon, Massachusetts

Date: March 16, 2020 | *Project No. G-8488*

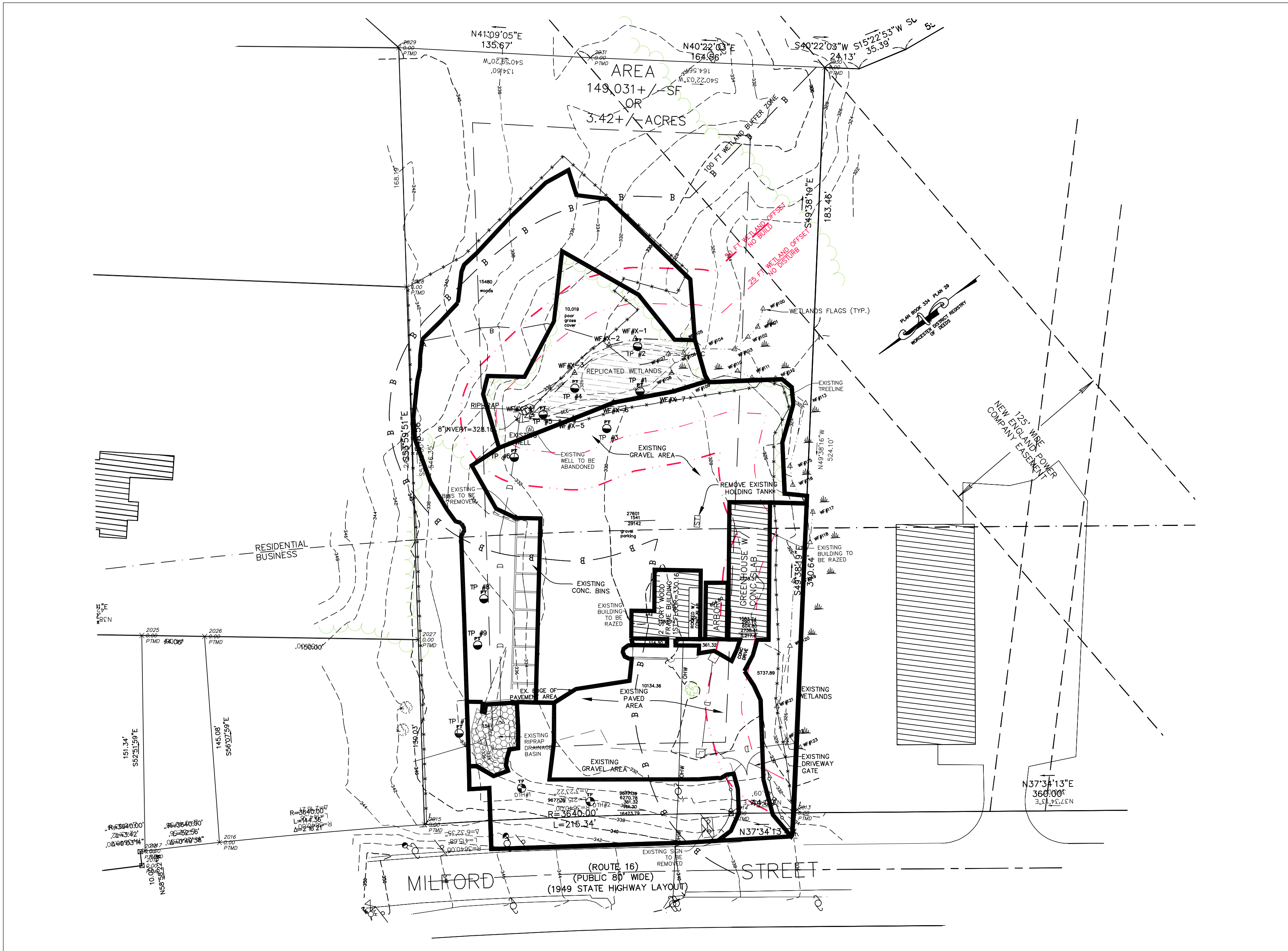
Guerriere & Halnon, Inc.
Engineering & Land Surveying
333 WEST STREET, MILFORD, MA 01757
(508) 473-6630 FAX: (508) 473-8243
WWW.GUERRIEREANDHALNON.COM

APPENDIX B
SUMMARY OF PEAK DISCHARGE RATES & PRE-DEVELOPMENT AND POST-DEVELOPMENT WATERSHED PLANS

49 Milford Street
Mendon, MA

Hydrocad Calculations
Proposed 570' of 36" HDPE Pipe Detention System

Atlas-14 Worcester South		Existing Site Conditions Runoff (CFS)	Proposed Site Conditions Runoff (CFS)		
100 year 24 hour Storm	8.64 inches	13.91	12.34	Peak Elev in 3' pipe = 328.58	or depth in pipe 2.58' of 3'
25 year 24 hour Storm	6.08 inches	8.35	7.65	Peak Elev in 3' pipe = 327.83'	or depth in pipe 1.83' of 3'
10 year 24 hour Storm	5.45 inches	5.73	5.05	Peak Elev in 3' pipe = 327.52	or depth in pipe 1.52' of 3'
2 year 24 hour Storm	3.22 inches	2.64	2.42	Peak Elev in 3' pipe = 327.01	or depth in pipe 1.01' of 3'



NOTES:
1. PARCEL REFERENCE IN THE MENDON TOWN ASSESSOR MAP 9 LOTS 49.
2. PARCEL IS WITHIN THE ADULT ENTERTAINMENT OVERLAY DISTRICT FOR TOWN OF MENDON.
3. ELEVATIONS REFER TO 1929 NGVD DATUM.
4. LIGHTING SHALL CONFORM TO THE MENDON BYLAW. ALL PROPOSED LIGHTING WILL NOT CAUSE GLARE OFF-SITE.

CONSTRUCTION ON THIS LOT IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, RESERVATIONS OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

"WARNING"
EXISTING UTILITY LINES INDICATED OR NOTED ON THESE DRAWINGS ARE SHOWN AS OBTAINED FROM EXISTING INFORMATION AND ARE ONLY APPROXIMATE IN LOCATION. THE CONTRACTOR SHALL TAKE CAUTION IN THESE AREAS TO AVOID DAMAGE TO EXISTING UTILITY LINES AND/OR HARM TO PERSONNEL ENGAGED IN WORKING IN THESE AREAS.
CALL "DIG SAFE" 1-888-DIG-SAFE (1-888-344-7233).

EXISTING LINES OTHER THAN THOSE INDICATED ON THESE DRAWINGS MAY BE ON THE SITE. THE CONTRACTOR IS WARNED TO PROCEED WITH CAUTION WITH ALL WORK, ESPECIALLY EXCAVATION WORK, AND TO MAKE ALL POSSIBLE INVESTIGATIONS AS TO POSSIBLE UNMARKED UTILITY LINES.

NOTES

LEGEND

- DRAIN MANHOLE
- CATCH BASIN
- HYDRANT
- WATER GATE
- CONTOUR
- PROPOSED FENCE
- INVERT
- HEADWALL
- UTILITY POLE
- GUYWIRE
- WELL
- IRON PIN (f)
- STONE BOUND (f)
- DRILLHOLE (f)
- STONEWALL
- GUARDRAIL

REV.	DATE	DESCRIPTION	INIT
2	03/12/2020	REVISIONS TO ADDRESS PLANNING BOARD COMMENTS	DMK
1	11/27/2019	WETLAND REPLICATION, 25' AND 50' OFFSETS	DMK

49 MILFORD STREET
PROPOSED ADULT ENTERTAINMENT SITE

OWNER/APPLICANT

GEORGE FUNARI
49 MILFORD STREET
MENDON, MA 01756
508-653-0139

PRE-DEVELOPEMENT WATERSHED PLAN

IN

MENDON, MA

SCALE: 1"=30'
DATE: JULY 21, 2008

Guerriere & Halnon, Inc.
Engineering & Land Surveying
333 WEST STREET, MILFORD, MASS. 01757
(508) 473-6630 FAX: (508) 473-8243

PML

SHEET 1 OF 2

G-8488

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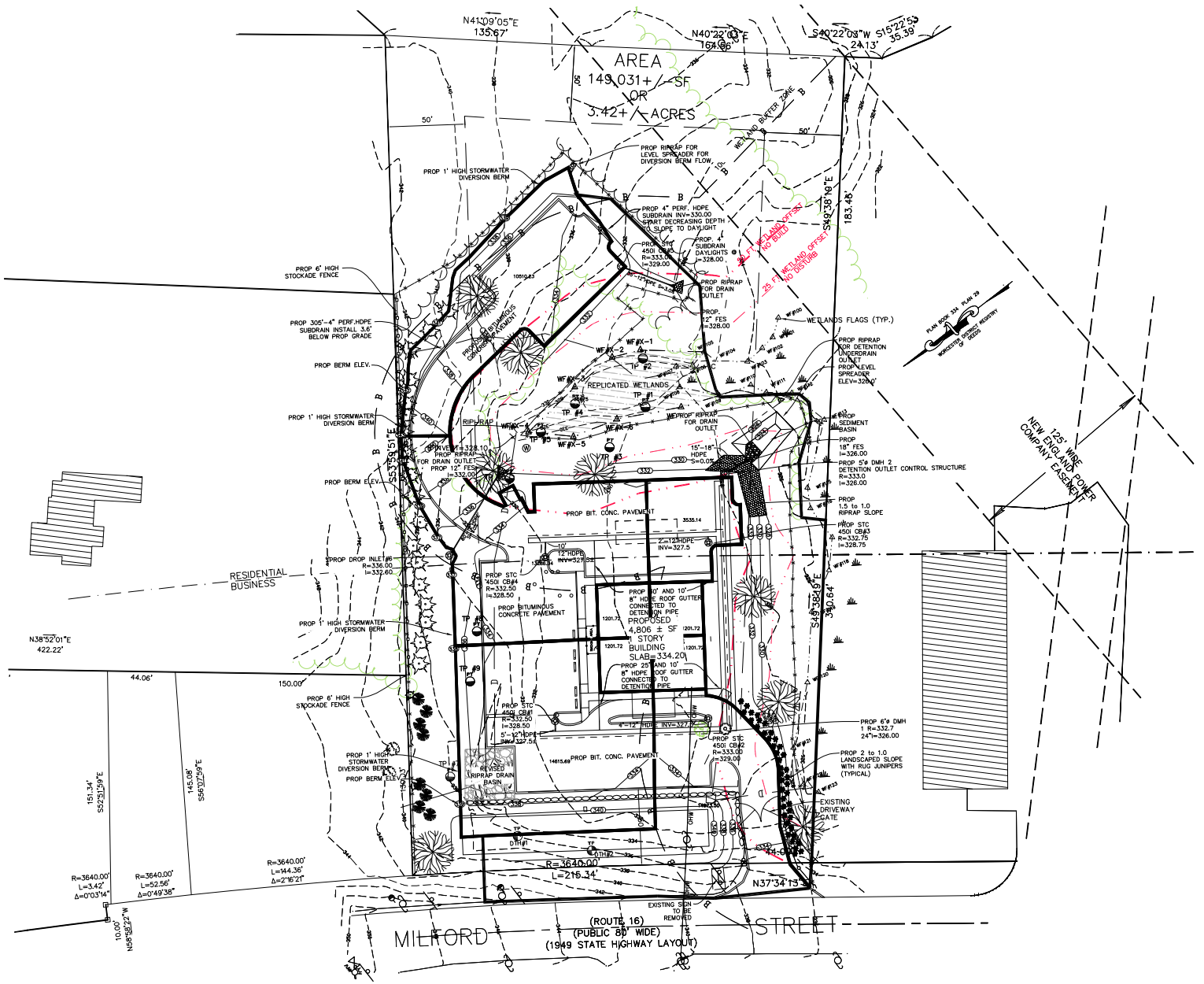

DATE: DATE:

NOTES:
1. PARCEL REFERENCE IN THE MENDON TOWN ASSESSOR MAP 9 LOTS 49.
2. PARCEL IS WITHIN THE ADULT ENTERTAINMENT OVERLAY DISTRICT FOR TOWN OF MENDON.
3. ELEVATIONS REFER TO 1929 NGVD DATUM.
4. LIGHTING SHALL CONFORM TO THE MENDON BYLAW. ALL PROPOSED LIGHTING WILL NOT CAUSE GLARE OFF-SITE.

CONSTRUCTION ON THIS LOT IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, RESERVATIONS OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

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EXISTING LINES OTHER THAN THOSE INDICATED ON THESE DRAWINGS MAY BE ON THE SITE. THE CONTRACTOR IS WARNED TO PROCEED WITH CAUTION WITH ALL WORK, ESPECIALLY EXCAVATION WORK, AND TO MAKE ALL POSSIBLE INVESTIGATIONS AS TO POSSIBLE UNMARKED UTILITY LINES.

NOTES

LEGEND

- DRAIN MANHOLE
- CATCH BASIN
- HYDRANT
- WATER GATE
- CONTOUR
- PROPOSED FENCE
- INVERT
- HEADWALL
- UTILITY POLE
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- IRON PIN (f)
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- DRILLHOLE (f)
- STONEWALL
- GUARDRAIL

REV.	DATE	DESCRIPTION	INIT
3	03/12/2020	REVISIONS TO ADDRESS PUBLIC HEARING	DMK
2	03/02/2020	REVISIONS TO ADDRESS REVIEW COMMENTS	DMK
1	11/27/2019	WETLAND REPLICATION, 25' AND 50' OFFSETS	DMK

49 MILFORD STREET
PROPOSED ADULT ENTERTAINMENT SITE

OWNER/APPLICANT

GEORGE FUNARI
49 MILFORD STREET
MENDON, MA 01756
508-653-0139

PROPOSED WATERSHED PLAN
IN
MENDON, MA

SCALE: 1"=30'
DATE: JULY 21, 2008

Guerriere & Halnon, Inc.
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333 WEST STREET, MILFORD, MASS. 01757
(508) 473-6630 FAX: (508) 473-8243

PML

SHEET 2 OF 2

G-8488

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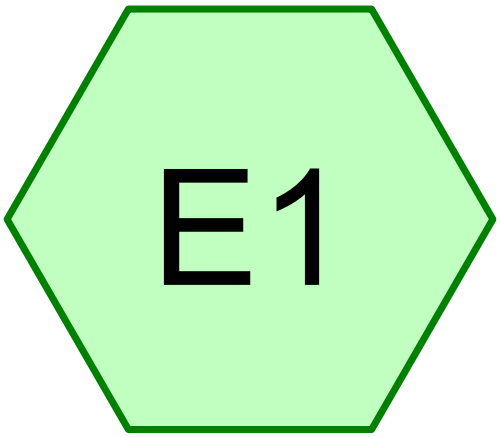
APPENDIX C
PRE and POST DEVELOPMENT DRAINAGE ANALYSIS

DRAINAGE ANALYSIS

HydroCAD Calculations – Pre-Development Conditions 2, 10, 25 and 100-Year Storm Events



EXISTING SITE RUNOFF

Subcat Reach Pond Link

Routing Diagram for 49 MILFORD STREET, MENDON EXISTING SITE CONDITIONS
Prepared by Microsoft, Printed 3/13/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.160	69	50-75% Grass cover, Fair, HSG B (E1)
0.230	79	<50% Grass cover, Poor, HSG B (E1)
0.415	61	>75% Grass cover, Good, HSG B (E1)
0.669	85	Gravel roads, HSG B (E1)
0.232	98	Paved parking, HSG B (E1)
0.174	98	Unconnected roofs, HSG B (E1)
0.355	55	Woods, Good, HSG B (E1)
2.235	**76**	**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: EXISTING SITE RUNOFF Runoff Area=97,346 sf 18.17% Impervious Runoff Depth>1.01"
Flow Length=203' Tc=7.1 min UI Adjusted CN=75 Runoff=2.64 cfs 0.188 af

Total Runoff Area = 2.235 ac Runoff Volume = 0.188 af Average Runoff Depth = 1.01"
81.83% Pervious = 1.829 ac 18.17% Impervious = 0.406 ac

Summary for Subcatchment E1: EXISTING SITE RUNOFF

Runoff = 2.64 cfs @ 12.11 hrs, Volume= 0.188 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Adj	Description
15,480	55		Woods, Good, HSG B
18,070	61		>75% Grass cover, Good, HSG B
10,019	79		<50% Grass cover, Poor, HSG B
6,950	69		50-75% Grass cover, Fair, HSG B
29,142	85		Gravel roads, HSG B
10,101	98		Paved parking, HSG B
7,584	98		Unconnected roofs, HSG B
97,346	76	75	Weighted Average, UI Adjusted
79,661			81.83% Pervious Area
17,685			18.17% Impervious Area
7,584			42.88% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	153	0.0800	4.55		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
7.1	203	Total			

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: EXISTING SITE RUNOFF Runoff Area=97,346 sf 18.17% Impervious Runoff Depth>2.14"
Flow Length=203' Tc=7.1 min UI Adjusted CN=75 Runoff=5.73 cfs 0.399 af

Total Runoff Area = 2.235 ac Runoff Volume = 0.399 af Average Runoff Depth = 2.14"
81.83% Pervious = 1.829 ac 18.17% Impervious = 0.406 ac

Summary for Subcatchment E1: EXISTING SITE RUNOFF

Runoff = 5.73 cfs @ 12.11 hrs, Volume= 0.399 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Adj	Description
15,480	55		Woods, Good, HSG B
18,070	61		>75% Grass cover, Good, HSG B
10,019	79		<50% Grass cover, Poor, HSG B
6,950	69		50-75% Grass cover, Fair, HSG B
29,142	85		Gravel roads, HSG B
10,101	98		Paved parking, HSG B
7,584	98		Unconnected roofs, HSG B
97,346	76	75	Weighted Average, UI Adjusted
79,661			81.83% Pervious Area
17,685			18.17% Impervious Area
7,584			42.88% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	153	0.0800	4.55		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
7.1	203	Total			

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: EXISTING SITE RUNOFF Runoff Area=97,346 sf 18.17% Impervious Runoff Depth>3.12"
Flow Length=203' Tc=7.1 min UI Adjusted CN=75 Runoff=8.35 cfs 0.581 af

Total Runoff Area = 2.235 ac Runoff Volume = 0.581 af Average Runoff Depth = 3.12"
81.83% Pervious = 1.829 ac 18.17% Impervious = 0.406 ac

Summary for Subcatchment E1: EXISTING SITE RUNOFF

Runoff = 8.35 cfs @ 12.11 hrs, Volume= 0.581 af, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Adj	Description
15,480	55		Woods, Good, HSG B
18,070	61		>75% Grass cover, Good, HSG B
10,019	79		<50% Grass cover, Poor, HSG B
6,950	69		50-75% Grass cover, Fair, HSG B
29,142	85		Gravel roads, HSG B
10,101	98		Paved parking, HSG B
7,584	98		Unconnected roofs, HSG B
97,346	76	75	Weighted Average, UI Adjusted
79,661			81.83% Pervious Area
17,685			18.17% Impervious Area
7,584			42.88% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	153	0.0800	4.55		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
7.1	203	Total			

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: EXISTING SITE RUNOFF Runoff Area=97,346 sf 18.17% Impervious Runoff Depth>5.28"
Flow Length=203' Tc=7.1 min UI Adjusted CN=75 Runoff=13.91 cfs 0.983 af

Total Runoff Area = 2.235 ac Runoff Volume = 0.983 af Average Runoff Depth = 5.28"
81.83% Pervious = 1.829 ac 18.17% Impervious = 0.406 ac

Summary for Subcatchment E1: EXISTING SITE RUNOFF

Runoff = 13.91 cfs @ 12.10 hrs, Volume= 0.983 af, Depth> 5.28"

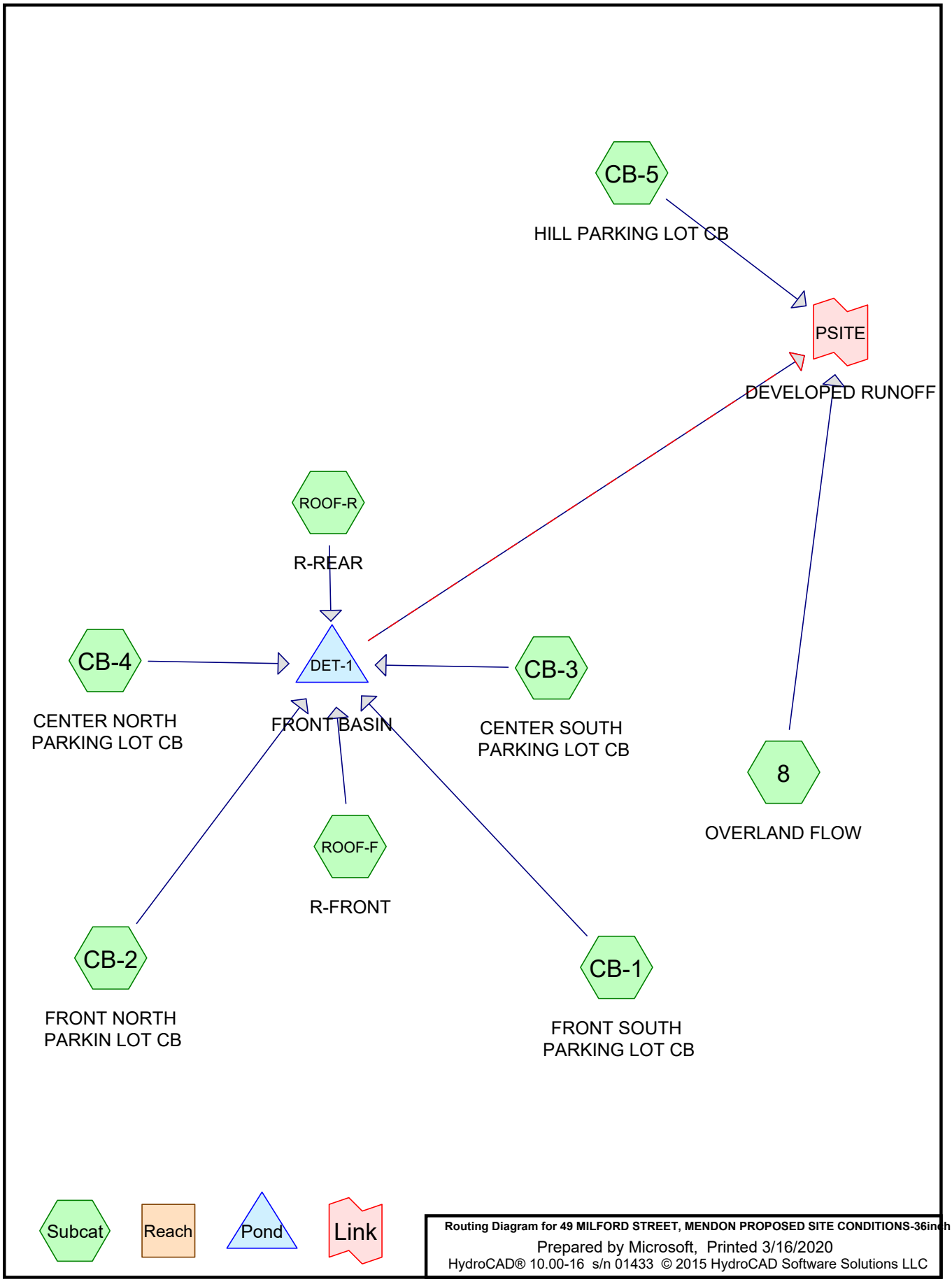
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Adj	Description
15,480	55		Woods, Good, HSG B
18,070	61		>75% Grass cover, Good, HSG B
10,019	79		<50% Grass cover, Poor, HSG B
6,950	69		50-75% Grass cover, Fair, HSG B
29,142	85		Gravel roads, HSG B
10,101	98		Paved parking, HSG B
7,584	98		Unconnected roofs, HSG B
97,346	76	75	Weighted Average, UI Adjusted
79,661			81.83% Pervious Area
17,685			18.17% Impervious Area
7,584			42.88% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	153	0.0800	4.55		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
7.1	203	Total			

DEVELOPED SITE DRAINAGE ANALYSIS

HydroCAD Calculations – Post Development Conditions 2, 10, 25 and 100-Year Storm Events



Routing Diagram for 49 MILFORD STREET, MENDON PROPOSED SITE CONDITIONS-36inch

Prepared by Microsoft, Printed 3/16/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.819	69	50-75% Grass cover, Fair, HSG B (8)
0.050	79	<50% Grass cover, Poor, HSG B (CB-1, CB-2, CB-4)
0.435	61	>75% Grass cover, Good, HSG B (CB-1, CB-2, CB-4, CB-5)
0.821	98	Paved parking, HSG B (CB-1, CB-2, CB-3, CB-4, CB-5)
0.110	98	Roofs, HSG B (ROOF-F, ROOF-R)
2.235	**80**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8: OVERLAND FLOW Runoff Area=35,675 sf 0.00% Impervious Runoff Depth>0.79"
Flow Length=168' Tc=7.3 min CN=69 Runoff=0.64 cfs 0.054 af

Subcatchment CB-1: FRONT SOUTH Runoff Area=14,973 sf 38.60% Impervious Runoff Depth>1.16"
Tc=6.0 min CN=76 Runoff=0.45 cfs 0.033 af

Subcatchment CB-2: FRONT NORTH Runoff Area=14,615 sf 57.89% Impervious Runoff Depth>1.70"
Tc=6.0 min CN=84 Runoff=0.67 cfs 0.047 af

Subcatchment CB-3: CENTER SOUTH Runoff Area=3,535 sf 100.00% Impervious Runoff Depth>2.99"
Tc=6.0 min CN=98 Runoff=0.25 cfs 0.020 af

Subcatchment CB-4: CENTER NORTH Runoff Area=13,253 sf 80.32% Impervious Runoff Depth>2.27"
Tc=6.0 min CN=91 Runoff=0.80 cfs 0.058 af

Subcatchment CB-5: HILL PARKING LOT Runoff Area=10,510 sf 69.84% Impervious Runoff Depth>1.93"
Tc=6.0 min CN=87 Runoff=0.55 cfs 0.039 af

Subcatchment ROOF-F: R-FRONT Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>2.99"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment ROOF-R: R-REAR Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>2.99"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Pond DET-1: FRONT BASIN Peak Elev=327.01' Storage=0.027 af Inflow=2.52 cfs 0.186 af
Primary=1.38 cfs 0.185 af Secondary=0.00 cfs 0.000 af Outflow=1.38 cfs 0.185 af

Link PSITE: DEVELOPED RUNOFF Inflow=2.42 cfs 0.278 af
Primary=2.42 cfs 0.278 af

Total Runoff Area = 2.235 ac Runoff Volume = 0.279 af Average Runoff Depth = 1.50"
58.34% Pervious = 1.304 ac 41.66% Impervious = 0.931 ac

Summary for Subcatchment 8: OVERLAND FLOW

Runoff = 0.64 cfs @ 12.12 hrs, Volume= 0.054 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
35,675	69	50-75% Grass cover, Fair, HSG B
35,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.5	118	0.0600	3.94		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
7.3	168	Total			

Summary for Subcatchment CB-1: FRONT SOUTH PARKING LOT CB

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.033 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
5,780	98	Paved parking, HSG B
8,505	61	>75% Grass cover, Good, HSG B
688	79	<50% Grass cover, Poor, HSG B
14,973	76	Weighted Average
9,193		61.40% Pervious Area
5,780		38.60% Impervious Area

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

Summary for Subcatchment CB-2: FRONT NORTH PARKIN LOT CB

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.047 af, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
8,460	98	Paved parking, HSG B
5,215	61	>75% Grass cover, Good, HSG B
940	79	<50% Grass cover, Poor, HSG B
14,615	84	Weighted Average
6,155		42.11% Pervious Area
8,460		57.89% Impervious Area

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

Summary for Subcatchment CB-3: CENTER SOUTH PARKING LOT CB

Runoff = 0.25 cfs @ 12.08 hrs, Volume= 0.020 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
3,535	98	Paved parking, HSG B
3,535		100.00% Impervious Area

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

Summary for Subcatchment CB-4: CENTER NORTH PARKING LOT CB

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
10,645	98	Paved parking, HSG B
2,056	61	>75% Grass cover, Good, HSG B
552	79	<50% Grass cover, Poor, HSG B
13,253	91	Weighted Average
2,608		19.68% Pervious Area
10,645		80.32% Impervious Area

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

Summary for Subcatchment CB-5: HILL PARKING LOT CB

Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.039 af, Depth> 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
3,170	61	>75% Grass cover, Good, HSG B
7,340	98	Paved parking, HSG B
10,510	87	Weighted Average
3,170		30.16% Pervious Area
7,340		69.84% Impervious Area

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

Summary for Subcatchment ROOF-F: R-FRONT

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.014 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
2,400	98	Roofs, HSG B
2,400		100.00% Impervious Area

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

Summary for Subcatchment ROOF-R: R-REAR

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.014 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
2,400	98	Roofs, HSG B
2,400		100.00% Impervious Area

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

Summary for Pond DET-1: FRONT BASIN

Inflow Area = 1.175 ac, 64.91% Impervious, Inflow Depth > 1.90" for 2-Year event
Inflow = 2.52 cfs @ 12.09 hrs, Volume= 0.186 af
Outflow = 1.38 cfs @ 12.22 hrs, Volume= 0.185 af, Atten= 45%, Lag= 7.8 min
Primary = 1.38 cfs @ 12.22 hrs, Volume= 0.185 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 327.01' @ 12.22 hrs Surf.Area= 0.037 ac Storage= 0.027 af

Plug-Flow detention time= 16.8 min calculated for 0.185 af (99% of inflow)
Center-of-Mass det. time= 12.8 min (819.0 - 806.2)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	0.092 af	**36.0" Round Pipe Storage** L= 570.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.00'	**18.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 326.00' / 326.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Device 1	326.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	327.00'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	329.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=1.38 cfs @ 12.22 hrs HW=327.01' (Free Discharge)
└**1=Culvert** (Passes 1.38 cfs of 2.75 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.38 cfs @ 3.95 fps)
  └**3=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.25 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link PSITE: DEVELOPED RUNOFF

Inflow Area = 2.235 ac, 41.66% Impervious, Inflow Depth > 1.49" for 2-Year event
Inflow = 2.42 cfs @ 12.12 hrs, Volume= 0.278 af
Primary = 2.42 cfs @ 12.12 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8: OVERLAND FLOW Runoff Area=35,675 sf 0.00% Impervious Runoff Depth>1.83"
Flow Length=168' Tc=7.3 min CN=69 Runoff=1.64 cfs 0.125 af

Subcatchment CB-1: FRONT SOUTH Runoff Area=14,973 sf 38.60% Impervious Runoff Depth>2.39"
Tc=6.0 min CN=76 Runoff=0.96 cfs 0.069 af

Subcatchment CB-2: FRONT NORTH Runoff Area=14,615 sf 57.89% Impervious Runoff Depth>3.11"
Tc=6.0 min CN=84 Runoff=1.22 cfs 0.087 af

Subcatchment CB-3: CENTER SOUTH Runoff Area=3,535 sf 100.00% Impervious Runoff Depth>4.59"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.031 af

Subcatchment CB-4: CENTER NORTH Runoff Area=13,253 sf 80.32% Impervious Runoff Depth>3.81"
Tc=6.0 min CN=91 Runoff=1.31 cfs 0.097 af

Subcatchment CB-5: HILL PARKING LOT Runoff Area=10,510 sf 69.84% Impervious Runoff Depth>3.40"
Tc=6.0 min CN=87 Runoff=0.95 cfs 0.068 af

Subcatchment ROOF-F: R-FRONT Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>4.59"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.021 af

Subcatchment ROOF-R: R-REAR Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>4.59"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.021 af

Pond DET-1: FRONT BASIN Peak Elev=327.52' Storage=0.047 af Inflow=4.39 cfs 0.325 af
Primary=2.85 cfs 0.324 af Secondary=0.00 cfs 0.000 af Outflow=2.85 cfs 0.324 af

Link PSITE: DEVELOPED RUNOFF Inflow=5.05 cfs 0.517 af
Primary=5.05 cfs 0.517 af

Total Runoff Area = 2.235 ac Runoff Volume = 0.519 af Average Runoff Depth = 2.79"
58.34% Pervious = 1.304 ac 41.66% Impervious = 0.931 ac

Summary for Subcatchment 8: OVERLAND FLOW

Runoff = 1.64 cfs @ 12.11 hrs, Volume= 0.125 af, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
35,675	69	50-75% Grass cover, Fair, HSG B
35,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.5	118	0.0600	3.94		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
7.3	168	Total			

Summary for Subcatchment CB-1: FRONT SOUTH PARKING LOT CB

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.069 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
5,780	98	Paved parking, HSG B
8,505	61	>75% Grass cover, Good, HSG B
688	79	<50% Grass cover, Poor, HSG B
14,973	76	Weighted Average
9,193		61.40% Pervious Area
5,780		38.60% Impervious Area

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

Summary for Subcatchment CB-2: FRONT NORTH PARKIN LOT CB

Runoff = 1.22 cfs @ 12.09 hrs, Volume= 0.087 af, Depth> 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
8,460	98	Paved parking, HSG B
5,215	61	>75% Grass cover, Good, HSG B
940	79	<50% Grass cover, Poor, HSG B
14,615	84	Weighted Average
6,155		42.11% Pervious Area
8,460		57.89% Impervious Area

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

Summary for Subcatchment CB-3: CENTER SOUTH PARKING LOT CB

Runoff = 0.38 cfs @ 12.08 hrs, Volume= 0.031 af, Depth> 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
3,535	98	Paved parking, HSG B
3,535		100.00% Impervious Area

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

Summary for Subcatchment CB-4: CENTER NORTH PARKING LOT CB

Runoff = 1.31 cfs @ 12.08 hrs, Volume= 0.097 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
10,645	98	Paved parking, HSG B
2,056	61	>75% Grass cover, Good, HSG B
552	79	<50% Grass cover, Poor, HSG B
13,253	91	Weighted Average
2,608		19.68% Pervious Area
10,645		80.32% Impervious Area

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

Summary for Subcatchment CB-5: HILL PARKING LOT CB

Runoff = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af, Depth> 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
3,170	61	>75% Grass cover, Good, HSG B
7,340	98	Paved parking, HSG B
10,510	87	Weighted Average
3,170		30.16% Pervious Area
7,340		69.84% Impervious Area

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

Summary for Subcatchment ROOF-F: R-FRONT

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af, Depth> 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
2,400	98	Roofs, HSG B
2,400		100.00% Impervious Area

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

Summary for Subcatchment ROOF-R: R-REAR

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af, Depth> 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
2,400	98	Roofs, HSG B
2,400		100.00% Impervious Area

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

Summary for Pond DET-1: FRONT BASIN

Inflow Area = 1.175 ac, 64.91% Impervious, Inflow Depth > 3.32" for 10-Year event
Inflow = 4.39 cfs @ 12.09 hrs, Volume= 0.325 af
Outflow = 2.85 cfs @ 12.18 hrs, Volume= 0.324 af, Atten= 35%, Lag= 5.6 min
Primary = 2.85 cfs @ 12.18 hrs, Volume= 0.324 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 327.52' @ 12.18 hrs Surf.Area= 0.039 ac Storage= 0.047 af

Plug-Flow detention time= 15.2 min calculated for 0.324 af (100% of inflow)
Center-of-Mass det. time= 12.0 min (806.6 - 794.6)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	0.092 af	**36.0" Round Pipe Storage** L= 570.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.00'	**18.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 326.00' / 326.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Device 1	326.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	327.00'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	329.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=2.85 cfs @ 12.18 hrs HW=327.52' (Free Discharge)
└**1=Culvert** (Passes 2.85 cfs of 5.55 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.83 cfs @ 5.25 fps)
  └**3=Orifice/Grate** (Orifice Controls 1.02 cfs @ 2.46 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link PSITE: DEVELOPED RUNOFF

Inflow Area = 2.235 ac, 41.66% Impervious, Inflow Depth > 2.78" for 10-Year event
Inflow = 5.05 cfs @ 12.14 hrs, Volume= 0.517 af
Primary = 5.05 cfs @ 12.14 hrs, Volume= 0.517 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8: OVERLAND FLOW Runoff Area=35,675 sf 0.00% Impervious Runoff Depth>2.77"
Flow Length=168' Tc=7.3 min CN=69 Runoff=2.53 cfs 0.189 af

Subcatchment CB-1: FRONT SOUTH Runoff Area=14,973 sf 38.60% Impervious Runoff Depth>3.45"
Tc=6.0 min CN=76 Runoff=1.39 cfs 0.099 af

Subcatchment CB-2: FRONT NORTH Runoff Area=14,615 sf 57.89% Impervious Runoff Depth>4.27"
Tc=6.0 min CN=84 Runoff=1.65 cfs 0.119 af

Subcatchment CB-3: CENTER SOUTH Runoff Area=3,535 sf 100.00% Impervious Runoff Depth>5.84"
Tc=6.0 min CN=98 Runoff=0.48 cfs 0.039 af

Subcatchment CB-4: CENTER NORTH Runoff Area=13,253 sf 80.32% Impervious Runoff Depth>5.03"
Tc=6.0 min CN=91 Runoff=1.70 cfs 0.128 af

Subcatchment CB-5: HILL PARKING LOT Runoff Area=10,510 sf 69.84% Impervious Runoff Depth>4.59"
Tc=6.0 min CN=87 Runoff=1.26 cfs 0.092 af

Subcatchment ROOF-F: R-FRONT Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>5.84"
Tc=6.0 min CN=98 Runoff=0.33 cfs 0.027 af

Subcatchment ROOF-R: R-REAR Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>5.84"
Tc=6.0 min CN=98 Runoff=0.33 cfs 0.027 af

Pond DET-1: FRONT BASIN Peak Elev=327.83' Storage=0.059 af Inflow=5.88 cfs 0.439 af
Primary=4.23 cfs 0.437 af Secondary=0.00 cfs 0.000 af Outflow=4.23 cfs 0.437 af

Link PSITE: DEVELOPED RUNOFF Inflow=7.65 cfs 0.718 af
Primary=7.65 cfs 0.718 af

Total Runoff Area = 2.235 ac Runoff Volume = 0.720 af Average Runoff Depth = 3.87"
58.34% Pervious = 1.304 ac 41.66% Impervious = 0.931 ac

Summary for Subcatchment 8: OVERLAND FLOW

Runoff = 2.53 cfs @ 12.11 hrs, Volume= 0.189 af, Depth> 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Description
35,675	69	50-75% Grass cover, Fair, HSG B
35,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.5	118	0.0600	3.94		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
7.3	168	Total			

Summary for Subcatchment CB-1: FRONT SOUTH PARKING LOT CB

Runoff = 1.39 cfs @ 12.09 hrs, Volume= 0.099 af, Depth> 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Description
5,780	98	Paved parking, HSG B
8,505	61	>75% Grass cover, Good, HSG B
688	79	<50% Grass cover, Poor, HSG B
14,973	76	Weighted Average
9,193		61.40% Pervious Area
5,780		38.60% Impervious Area

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

Summary for Subcatchment CB-2: FRONT NORTH PARKIN LOT CB

Runoff = 1.65 cfs @ 12.09 hrs, Volume= 0.119 af, Depth> 4.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Description
8,460	98	Paved parking, HSG B
5,215	61	>75% Grass cover, Good, HSG B
940	79	<50% Grass cover, Poor, HSG B
14,615	84	Weighted Average
6,155		42.11% Pervious Area
8,460		57.89% Impervious Area

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

Summary for Subcatchment CB-3: CENTER SOUTH PARKING LOT CB

Runoff = 0.48 cfs @ 12.08 hrs, Volume= 0.039 af, Depth> 5.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Description
3,535	98	Paved parking, HSG B
3,535		100.00% Impervious Area

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

Summary for Subcatchment CB-4: CENTER NORTH PARKING LOT CB

Runoff = 1.70 cfs @ 12.08 hrs, Volume= 0.128 af, Depth> 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Description
10,645	98	Paved parking, HSG B
2,056	61	>75% Grass cover, Good, HSG B
552	79	<50% Grass cover, Poor, HSG B
13,253	91	Weighted Average
2,608		19.68% Pervious Area
10,645		80.32% Impervious Area

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

Summary for Subcatchment CB-5: HILL PARKING LOT CB

Runoff = 1.26 cfs @ 12.09 hrs, Volume= 0.092 af, Depth> 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Description
3,170	61	>75% Grass cover, Good, HSG B
7,340	98	Paved parking, HSG B
10,510	87	Weighted Average
3,170		30.16% Pervious Area
7,340		69.84% Impervious Area

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

Summary for Subcatchment ROOF-F: R-FRONT

Runoff = 0.33 cfs @ 12.08 hrs, Volume= 0.027 af, Depth> 5.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Description
2,400	98	Roofs, HSG B
2,400		100.00% Impervious Area

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

Summary for Subcatchment ROOF-R: R-REAR

Runoff = 0.33 cfs @ 12.08 hrs, Volume= 0.027 af, Depth> 5.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.08"

Area (sf)	CN	Description
2,400	98	Roofs, HSG B
2,400		100.00% Impervious Area

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

Summary for Pond DET-1: FRONT BASIN

Inflow Area = 1.175 ac, 64.91% Impervious, Inflow Depth > 4.48" for 25-Year event
Inflow = 5.88 cfs @ 12.09 hrs, Volume= 0.439 af
Outflow = 4.23 cfs @ 12.16 hrs, Volume= 0.437 af, Atten= 28%, Lag= 4.5 min
Primary = 4.23 cfs @ 12.16 hrs, Volume= 0.437 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 327.83' @ 12.16 hrs Surf.Area= 0.038 ac Storage= 0.059 af

Plug-Flow detention time= 14.1 min calculated for 0.437 af (100% of inflow)
Center-of-Mass det. time= 11.3 min (799.5 - 788.2)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	0.092 af	**36.0" Round Pipe Storage** L= 570.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.00'	**18.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 326.00' / 326.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Device 1	326.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	327.00'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	329.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=4.23 cfs @ 12.16 hrs HW=327.83' (Free Discharge)
└**1=Culvert** (Passes 4.23 cfs of 7.16 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.06 cfs @ 5.90 fps)
  └**3=Orifice/Grate** (Orifice Controls 2.17 cfs @ 3.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link PSITE: DEVELOPED RUNOFF

Inflow Area = 2.235 ac, 41.66% Impervious, Inflow Depth > 3.86" for 25-Year event
Inflow = 7.65 cfs @ 12.13 hrs, Volume= 0.718 af
Primary = 7.65 cfs @ 12.13 hrs, Volume= 0.718 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8: OVERLAND FLOW Runoff Area=35,675 sf 0.00% Impervious Runoff Depth>4.89"
Flow Length=168' Tc=7.3 min CN=69 Runoff=4.50 cfs 0.334 af

Subcatchment CB-1: FRONT SOUTH Runoff Area=14,973 sf 38.60% Impervious Runoff Depth>5.74"
Tc=6.0 min CN=76 Runoff=2.29 cfs 0.164 af

Subcatchment CB-2: FRONT NORTH Runoff Area=14,615 sf 57.89% Impervious Runoff Depth>6.70"
Tc=6.0 min CN=84 Runoff=2.55 cfs 0.187 af

Subcatchment CB-3: CENTER SOUTH Runoff Area=3,535 sf 100.00% Impervious Runoff Depth>8.39"
Tc=6.0 min CN=98 Runoff=0.69 cfs 0.057 af

Subcatchment CB-4: CENTER NORTH Runoff Area=13,253 sf 80.32% Impervious Runoff Depth>7.55"
Tc=6.0 min CN=91 Runoff=2.49 cfs 0.191 af

Subcatchment CB-5: HILL PARKING LOT Runoff Area=10,510 sf 69.84% Impervious Runoff Depth>7.07"
Tc=6.0 min CN=87 Runoff=1.90 cfs 0.142 af

Subcatchment ROOF-F: R-FRONT Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>8.39"
Tc=6.0 min CN=98 Runoff=0.47 cfs 0.039 af

Subcatchment ROOF-R: R-REAR Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>8.39"
Tc=6.0 min CN=98 Runoff=0.47 cfs 0.039 af

Pond DET-1: FRONT BASIN Peak Elev=328.58' Storage=0.085 af Inflow=8.95 cfs 0.677 af
Primary=6.44 cfs 0.675 af Secondary=0.00 cfs 0.000 af Outflow=6.44 cfs 0.675 af

Link PSITE: DEVELOPED RUNOFF Inflow=12.34 cfs 1.151 af
Primary=12.34 cfs 1.151 af

Total Runoff Area = 2.235 ac Runoff Volume = 1.153 af Average Runoff Depth = 6.19"
58.34% Pervious = 1.304 ac 41.66% Impervious = 0.931 ac

Summary for Subcatchment 8: OVERLAND FLOW

Runoff = 4.50 cfs @ 12.11 hrs, Volume= 0.334 af, Depth> 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Description
35,675	69	50-75% Grass cover, Fair, HSG B
35,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
0.5	118	0.0600	3.94		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
7.3	168	Total			

Summary for Subcatchment CB-1: FRONT SOUTH PARKING LOT CB

Runoff = 2.29 cfs @ 12.09 hrs, Volume= 0.164 af, Depth> 5.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Description
5,780	98	Paved parking, HSG B
8,505	61	>75% Grass cover, Good, HSG B
688	79	<50% Grass cover, Poor, HSG B
14,973	76	Weighted Average
9,193		61.40% Pervious Area
5,780		38.60% Impervious Area

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

Summary for Subcatchment CB-2: FRONT NORTH PARKIN LOT CB

Runoff = 2.55 cfs @ 12.09 hrs, Volume= 0.187 af, Depth> 6.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Description
8,460	98	Paved parking, HSG B
5,215	61	>75% Grass cover, Good, HSG B
940	79	<50% Grass cover, Poor, HSG B
14,615	84	Weighted Average
6,155		42.11% Pervious Area
8,460		57.89% Impervious Area

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

Summary for Subcatchment CB-3: CENTER SOUTH PARKING LOT CB

Runoff = 0.69 cfs @ 12.08 hrs, Volume= 0.057 af, Depth> 8.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Description
3,535	98	Paved parking, HSG B
3,535		100.00% Impervious Area

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

Summary for Subcatchment CB-4: CENTER NORTH PARKING LOT CB

Runoff = 2.49 cfs @ 12.08 hrs, Volume= 0.191 af, Depth> 7.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Description
10,645	98	Paved parking, HSG B
2,056	61	>75% Grass cover, Good, HSG B
552	79	<50% Grass cover, Poor, HSG B
13,253	91	Weighted Average
2,608		19.68% Pervious Area
10,645		80.32% Impervious Area

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

Summary for Subcatchment CB-5: HILL PARKING LOT CB

Runoff = 1.90 cfs @ 12.08 hrs, Volume= 0.142 af, Depth> 7.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Description
3,170	61	>75% Grass cover, Good, HSG B
7,340	98	Paved parking, HSG B
10,510	87	Weighted Average
3,170		30.16% Pervious Area
7,340		69.84% Impervious Area

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

Summary for Subcatchment ROOF-F: R-FRONT

Runoff = 0.47 cfs @ 12.08 hrs, Volume= 0.039 af, Depth> 8.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Description
2,400	98	Roofs, HSG B
2,400		100.00% Impervious Area

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

Summary for Subcatchment ROOF-R: R-REAR

Runoff = 0.47 cfs @ 12.08 hrs, Volume= 0.039 af, Depth> 8.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.64"

Area (sf)	CN	Description
2,400	98	Roofs, HSG B
2,400		100.00% Impervious Area

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

Summary for Pond DET-1: FRONT BASIN

Inflow Area = 1.175 ac, 64.91% Impervious, Inflow Depth > 6.92" for 100-Year event
Inflow = 8.95 cfs @ 12.08 hrs, Volume= 0.677 af
Outflow = 6.44 cfs @ 12.16 hrs, Volume= 0.675 af, Atten= 28%, Lag= 4.5 min
Primary = 6.44 cfs @ 12.16 hrs, Volume= 0.675 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 328.58' @ 12.16 hrs Surf.Area= 0.027 ac Storage= 0.085 af

Plug-Flow detention time= 12.7 min calculated for 0.674 af (100% of inflow)
Center-of-Mass det. time= 10.4 min (789.2 - 778.8)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	0.092 af	**36.0" Round Pipe Storage** L= 570.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.00'	**18.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 326.00' / 326.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Device 1	326.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	327.00'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	329.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=6.44 cfs @ 12.16 hrs HW=328.58' (Free Discharge)
└**1=Culvert** (Passes 6.44 cfs of 11.30 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.52 cfs @ 7.21 fps)
  └**3=Orifice/Grate** (Orifice Controls 3.92 cfs @ 5.00 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=326.00' (Free Discharge)
└**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link PSITE: DEVELOPED RUNOFF

Inflow Area = 2.235 ac, 41.66% Impervious, Inflow Depth > 6.18" for 100-Year event
Inflow = 12.34 cfs @ 12.12 hrs, Volume= 1.151 af
Primary = 12.34 cfs @ 12.12 hrs, Volume= 1.151 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

APPENDIX D
USDA WEB SOIL SURVEY

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Worcester County, Massachusetts, Southern Part

49 Milford Street, Mendon, MA

December 13, 2019

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

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

Soil Map

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

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Special Line Features

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 12, Sep 12, 2019

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

Date(s) aerial images were photographed: Jul 28, 2019—Aug 15, 2019

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

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	0.3	4.2%
420B	Canton fine sandy loam, 3 to 8 percent slopes	7.3	95.8%
Totals for Area of Interest		**7.6**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Worcester County, Massachusetts, Southern Part

102C—Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w69g
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Chatfield, extremely stony, and similar soils: 39 percent
Hollis, extremely stony, and similar soils: 26 percent
Rock outcrop: 17 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Extremely Stony

Setting

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

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Hollis, Extremely Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Rock Outcrop

Setting

Parent material: Igneous and metamorphic rock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 12 percent

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Sutton, extremely stony
Percent of map unit: 3 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Paxton, extremely stony
Percent of map unit: 2 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, extremely stony
Percent of map unit: 1 percent
Landform: Ground moraines, depressions, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

420B—Canton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2w81b
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

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

Description of Canton

Setting

Landform: Hills, ridges, moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 10 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Montauk

Percent of map unit: 5 percent
Landform: Hills, drumlins, ground moraines, moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Charlton

Percent of map unit: 4 percent
Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 1 percent
Landform: Kettles, bogs, depressions, marshes, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX E
TSS REMOVAL CALCULATIONS
SEDIMENT FOREBAY DESIGN
HYDRODYNAMIC SEPARATOR DESIGN

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: MENDON Adult Entertainment 49 Milford Street

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
		1.00	0.00	1.00
Stormceptor 450i catch Basin	0.65	1.00	0.65	0.35
Extended Detention	0.50	0.35	0.18	0.18
		0.00	0.00	0.00

Total TSS Removal = 83%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: G-8488

Prepared By: Dale MacKinnon, PE

Date: 5-Mar-20

*Equals remaining load from previous BMP (E) which enters the BMP

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: 49 Milford Street rear parking lot

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
		1.00	0.00	1.00
Stormceptor 450i catch Basin	0.65	1.00	0.65	0.35
GRASS CHANNELS	0.50	0.35	0.17	0.18
		0.00	0.00	0.00

Total TSS Removal = 82%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: G-8488

Prepared By: Dale MacKinnon, PE

Date: 5-Mar-20

*Equals remaining load from previous BMP (E) which enters the BMP

49 Milford Street
Mendon, MA

Watershed Areas	Total Area	Impervious Area
	SF	SF
CB 1	14,973	5,780
CB 2	14,615	8,460
CB 3	3,535	3,535
CB 4	13,253	10,645
CB 5	10,510	7,340
Roof-Front	2,400	2,400
Roof-Back	2,400	2,400
WS 8 overland flow	35,675	0
TOTAL AREA	97,361	40,560

Front Drain System

CB 1 - CB 4 plus roof

Sediment Forebay required volume = 0.1-inch x impervious area

0.1 "	0.0833	ft/inch	33,220	sf	276.8 CF

Measurement of Sediment forebay as proposed

contour	324	188			
contour	326	710			
		898			898 CF

898cf>277cf Proposed sediment forebay is adequate in size for front system

Rear Drain System

CB- 5

Sediment Forebay required volume = 0.1-inch x impervious area

0.1 "	0.0833	ft/inch	7,340	sf	61.2 CF

Measurement of Sediment forebay as proposed

contour	328	40			
contour	329	156			
		196	98cf		98 CF

98cf>62cf Proposed sediment forebay is adequate in size for rear system

Project:Mendon Adult Entertainment
Location: 49 Milford Street, Mendon, MA
Guerriere & Halnon, Inc. Job Number G-8488

Determine required Water Quality Flow Rate for a Hydrodynamic Separtor

Structure Name	Impervious Area (Acres)	A (Area Square Miles)	Time of Concentration (min)	Time of Concentration (hr)	WQV (in)	qu Fig 2*or 4**	$Q_{0.5}$ (cfs)
WQU 3	0.24	0.00038125	6	0.100	0.5	752	0.14335

*See MassDEP Q Rate- Sept 10, 2013 - Page 4 for WQV = 0.5" $Q_{0.5}=(qu)(A)(WQV)$

**See MassDEP Q Rate- Sept 10, 2013 - Page7 for WQV = 1.0" $Q_{1.0}=(qu)(A)(WQV)$

4ft Diameter Stormceptor 450i Hydrodynamic Separator Treatment Capacity is 0.32 cfs

0.32 cfs > 0.15 cfs 450i is adequate for all 5 catch basin structures

APPENDIX F
CONSTRUCTION PERIOD POLLUTION PREVENTION PLAN

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

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

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

A. Names of Persons or Entity Responsible for Plan Compliance

Applicant: George Funari
Showtime Entertainment, LLC
49 Milford Street
Mendon, MA 01756
Tel: 508-653-0139

B. Construction Period Pollution Prevention Measures

1. Inventory materials to be present on site during construction.
2. Train employees and subcontractors in prevention and clean up procedures.
3. All materials stored on site will be stored in their appropriate containers and if possible under a roof or covered.
4. Follow manufacturer's recommendation for disposal of used containers.
5. Store only enough product on site to do the job.
6. On site equipment, fueling and maintenance measures:
    a. Inspect on-site vehicles and equipment daily for leaks.
    b. Conduct all vehicle and equipment maintenance and refueling in front of building, away from storm drains.
    c. Perform major repairs and maintenance off site.
    d. Use drip pans, drip cloths or absorbent pads when replacing spent fuels.
    e. Collect spent fuels and remove from site, per Local and State regulations.
    f. Maintain a clean construction entrance where truck traffic is frequent to reduce soil compaction constant sweeping is required and limit tracking of sediment into streets, sweeping street when silt is observed on street.
7. Install silt sacks or siltation baskets in all catch basins on site to reduce sediment runoff from site.
8. A temporary concrete washout station and equipment wash station shall be located on the site. Concrete washout station and equipment wash station shall not be within the 100' wetland buffer or the 200' riverfront area. Areas shall be surrounded with a silt fence/hay bale combination to contain materials and provide ease of cleanup.
9. Stock pile materials, and maintain Erosion Control around the materials where it can easily be accessed. Maintain easy access to clean up materials to include brooms, mops, rags gloves, goggles, sand, sawdust, plastic and metal trash containers.
10. Clean up spills.
    a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry clean up methods (sawdust, cat litter and/or rags and absorbent pads).
    b. Sweep up dry materials immediately. Never wash them away or bury them.
    c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil in a certified container and notify a certified hauler for removal.

d. Report significant spills to the Fire Department.

11. It is the responsibility of the site superintendent or employees designated by the Applicant to inspect erosion control and repair as needed, also to inspect all on site vehicles for leaks and check all containers on site that may contain hazardous materials daily.

C. Site Development Plans

1. See site plans for project entitled "Proposed Adult Entertainment Site, 49 Milford Street, Mendon, MA" prepared by Guerriere & Halnon, Inc., last revised 3/16/2020.

D. Construction Erosion and Sedimentation Control Plan;

1. See site plans for project entitled "Proposed Adult Entertainment Site, 49 Milford Street, Mendon, MA" prepared by Guerriere & Halnon, Inc., last revised 3/16/2020.

E. Plans

1. Construction Sequencing Plan – Actual sequence of construction activities to be determined by the site contractor.
   a. Record Order of Conditions (if required) - The site superintendent shall be aware of all the Conditions contained within the Order including inspection schedules.
   b. Install DEP File # Sign (if required).
   c. Prior to any work on the site including tree/brush clearing, the approved limit of clearing as well as the location of the proposed erosion control devices (such as silt fence/straw bales, etc.) must be staked on the ground under the direction of a Massachusetts registered Professional Land Surveyor.
   d. Install erosion control barrier at locations depicted on the plans.
   e. Strip off top and subsoil. Stockpile material to be reused, remove excess material from the site. Install and maintain erosion control barrier around stockpile.
   f. Rough grade site, maintaining a temporary low area/sediment trap away from the wetland.
   g. Install underground utilities; protect all open drainage structures with erosion/siltation control devices.
   h. Construct buildings.
   i. Install binder course of bituminous asphalt.
   j. Install wearing course of asphalt, and striping (where required).
   k. Maintain all erosion control devices until site is stabilized and a Certificate of Compliance (if required) is issued by the Conservation Commission.
   l. Clean out sediment basins and reconfigure for infiltration basins.
   m. The Contractor shall be responsible to schedule any required inspections of his/her work.
   n. Stabilized Construction entrance shall be maintained during construction.
2. Construction Waste Management Plan
   a. Dumpster for trash and bulk waste collection shall be provided separately for construction.
   b. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material are recommended.
   c. Segregate and provide containers for disposal options for waste.
   d. Do not bury waste and debris on site.
   e. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.
   f. The sewer system is only for disposal of human waste, and substances permitted for disposal by the Sewer Department.

F. Operation and Maintenance of Erosion and Sedimentation Controls

The operation and maintenance of sedimentation control shall be the responsibility of the contractor. The inspection and maintenance of the stormwater component shall be performed as noted below. The contractor shall, at all times have erosion control in place. The contractor, based on future weather reports shall prepare and inspect all erosion control devices; cleaning, repairing and upgrading is a priority so that the devices perform as per design. Inspect the site during rain events. Don't stay away from the site. At a minimum there should be inspection to assure the devices are not clogged or plugged, or that devices have not been destroyed or damaged during the rain event. After a storm event inspection is required to clean and repair any damage components. Immediate repair is required.

G. Inspection and Maintenance Schedules

1. Inspection must be conducted at least once every 7 days and within 24 hours of the end of a storm event 0.5 inches or greater.
2. Inspection frequency can be reduced to once a month if:
   a. The site is temporarily stabilized.
   b. Runoff is unlikely due to winter conditions, when site is covered with snow or ice.
3. Inspections must be conducted by qualified personnel, "qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls and who possess the skills to assess the conditions and take measures to maintain and ensure proper operation, also to conclude if the erosion control methods selected are effective.
4. For each inspection, the inspection report must include: (See attached inspection and maintenance log)
   a. The inspection date.
   b. Names, titles of personnel making the inspection.
   c. Weather information for the period since the last inspection.
   d. Weather information at the time of the inspection.
   e. Locations of discharges of sediment from the site, if any.
   f. Locations of BMP's that need to be maintained.
   g. Locations where additional BMP's may be required.
   h. Corrective action required or any changes to the SWPPP that may be necessary.
5. Qualified personnel shall inspect the following in-place work;

Inspection Schedule:

Erosion Control	Weekly
Catch Basins	Weekly
Temporary Sedimentation Traps/Basins	Weekly
Pavement Sweeping	Weekly

Please Note: Special maintenance shall also be made after a significant rainfall event of 0.5" or greater

Maintenance Schedule

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

H. Inspection and Maintenance Log Form.

1. See Construction Phase Inspection and Maintenance Log in Attachment Section.

Construction Phase Inspection and Maintenace Log
49 Milford Street
Mendon MA

Date _____ Prev. Insp. Date: _____

Inspector: _____ Title: _____

Weather: _____

Weather Since Last Inspection _____

Erosion Control - Inspect Weekly
Comments:
Corrective measures taken and date
On Site Pavement Sweeping - Inspect Weekly
Comments:
Corrective measures taken and date
Catch Basins/Stormceptor - Inspect Weekly
Comments:
Corrective measures taken and date
Construction Entrance - As Needed
Comments:
Corrective measures taken and date
Temporary Sediment Traps/Basins - Inspect Weekly
Comments:
Corrective measures taken and date

Notify Conservation Commission RE Issues Effecting Resource Areas

Comments:
Corrective measures taken and date

Clean Silt off Public Streets - Inspect Weekly

Comments:
Corrective measures taken and date

Stock Pile Materials erosion protection - Ring with Haybales - Inspect Weekly

Comments:
Corrective measures taken and date

Any Fuel or Chemical Spill - Inspect Daily

Comments:
Corrective measures taken and date

Temporary Ground Cover - Weekly

Comments:
Corrective measures taken and date

Lawn Area/Mulch Area/Erosion Washouts - Weekly

Comments:
Corrective measures taken and date

APPENDIX G
LONG TERM POLLUTION PREVENTION PLAN

The following shall serve as the Long-Term Pollution Prevention Plan required by Standard 4.

Names of Persons or Entities Responsible for Plan Compliance

George Funari
Showtime Entertainment, LLC
49 Milford Street
Mendon, MA 01756
Tel: 508-653-0139

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

B. Requirements for routine inspections and maintenance of stormwater BMPs
   1. Plans: The storm water Operation and Maintenance Plan shall consist of all Plans, documents and all local state and federal approvals as required for the subject property.
   2. Record Keeping:
      a. Maintain a log of all operation and maintenance activities for at least three years following construction, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location);

   3. Descriptions and Designs: The Best Management Practices (BMP) incorporated into the design include the following;
      a. Deep sump catch basins /hydrodynamic separator - installed to promote TSS Removal of solids. This BMP has a design rate of 65% TSS Removal.
      b. Extended Detention Basin w/ Sediment Forebay–has a design rate of 50% TSS Removal. Refer to TSS Removal Worksheet included in the Attachments.
      c. Grass Channel-has a 50% TSS Removal Rate

   4. BMP Maintenance: After construction it is the responsibility of the owner to perform maintenance. The cleaning of the components of the stormwater management system shall be as described in the O&M Plan in Appendix I.

C. Spill prevention and response plans
   1. Train employees and subcontractors in prevention and clean up procedures.
   2. All materials stored on site will be stored in their appropriate containers under a roof or in the approved underground storage tanks.
   3. Follow manufacturer's recommendation for disposal of used containers.
   4. On site equipment, fueling and maintenance measures:
      a. Inspect on-site vehicles and equipment daily for leaks.
      b. Conduct all vehicle and equipment maintenance off Site and refueling in one location, away from storm drains and wetlands.
   5. Clean up spills.
      a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry clean-up methods (sawdust, cat litter and/or rags and absorbent pads).
      b. Sweep up dry materials immediately. Never wash them away or bury them.
      c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil.

d. Report significant spills to the Fire Department, Conservation Commission and Board of Health.

D. Provisions for maintenance of lawns, gardens, and other landscaped areas

Dispose of clippings outside of the 100-foot buffer zone to the adjacent wetland and away from storm drainage and use 0% phosphate fertilizer.

E. Requirements for storage and use of herbicides, and pesticides

The application of herbicides or pesticides will be done by professional certified contractor.

F. Provisions for solid waste management

1. Waste Management Plan
   a. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material are recommended.
   b. Do not bury waste and debris on site.
   c. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.

G. Snow disposal and plowing plans

Snow storage is adequate around the site for large storm events, see site plan.

H. Winter Road Salt and/or Sand Use and Storage restrictions

No sand, salt, or chemicals for de-icing will be stored outside.

I. Provisions for prevention of illicit discharges to the stormwater management system

The discharge into the stormwater system is not being violated, see attachment for illicit discharges compliance.

J. Training the staff or personnel involved with implementing Long-Term Pollution Prevention Plan

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

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

George Funari
Showtime Entertainment, LLC
49 Milford Street
Mendon, MA 01756
Tel: 508-653-0139

APPENDIX H
STORMWATER MANAGEMENT O&M

OPERATION & MAINTENANCE

for

Showtime Entertainment LLC

49 Milford Street
Mendon, MA

Date: March 16, 2020

Project No. G-8488

Prepared By:
Guerriere & Halnon, Inc.
55 West Central Street
Franklin, Massachusetts 02038

Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING

Stormwater Management System
OPERATION & MAINTENANCE PLAN

49 Milford Street,
Mendon, Massachusetts 01756

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

March, 2020

The Stormwater Management System employs Best Management Practices (BMP's) as set forth in the revised Massachusetts Stormwater Standards and Massachusetts Stormwater Handbook effective January 2, 2008. This system has incorporated non-structural BMP's, including this Operation and Maintenance Plan, to reduce the types and concentrations of contaminants contained within stormwater runoff. Structural BMP's are also a part of the system and include pavement surfaces, proprietary hydrodynamic separator, and underground recharge chambers. The stormwater management system is designed to remove a total minimum of 80% TSS prior to outfalls in accordance with the Massachusetts Stormwater Standards. The drainage system will function to both remove contaminants and recharge the groundwater.

This Operation and Maintenance Plan is intended to identify the party or parties responsible for operation and maintenance of the drainage system and to set forth a schedule and tasks for inspections and maintenance.

Responsibility for Operation and Maintenance:

Owner: George Funari
Developer: Showtime Entertainment, LLC
Address: 49 Milford Street,
Mendon, MA 01756
Attn: George Funari 1-508 653-0139

The owners, its designated representative, or successor in title to the project shall be responsible for the continuous operation and maintenance of the system or shall enter into an agreement with a maintenance contractor to conduct the work.

The contractor shall have demonstrated capabilities in sediment removal, cleaning and maintenance of drainage structures, and shall have the equipment to physically remove the accumulated sediments and the ability to repair the structural components of the system.

Good Housekeeping Practices

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

Requirements for routine inspections and maintenance of stormwater BMPs

1. Plans:
   a. The stormwater Operation and Maintenance Plan shall consist of all Plans, documents

and all local state and federal approvals as required for the subject property.

b. The stormwater BMPs have been highlighted on the attached "Grading and Drainage Plan" for project entitled "49 Milford Street" dated October 30, 2008, and Revised thru March 16, 2020 prepared by Guerriere & Halnon, Inc. for the location of site BMPs.

2. Record Keeping:
   a. Maintain a log of all operation and maintenance activities for at least three years following construction, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location);
   b. Make this log available to MassDEP and the Conservation Commission upon request; and
   c. Allow MassDEP and the Conservation Commission to inspect each BMP to determine whether the responsible party is implementing the Operation and Maintenance Plan.

3. Descriptions and Designs: The Best Management Practices (BMP) incorporated into the design include the following;

Construction Phase

The proposed **Best Management Practices**, also known as **BMP's** are to be constructed in accordance with the Stormwater Management Standards and the design plans. During the construction process the contractor shall be designated as the person responsible for the operation and maintenance of the BMP's. See attached final approved plans last revised March 16, 2020

Temporary Sedimentation Basins.

Applications: Erosion and sedimentation control

- Used to filter and settle out sediment in stormwater runoff before water is released into a wetland or other unprotected and/or sensitive area and may be used for drainage areas of various sizes. Limitations:

How to Maintain:

- Direct stormwater runoff to sedimentation basins. Basin formed by excavating a depression similar to a small pond, or placing an earthen embankment across an existing drainage swale or naturally low area.
- Clear, grub and strip all vegetation and root material from area of embankment and place embankment fill in lifts, 9 inches per lift at maximum. Compact fill and construct side slopes 2:1 or flatter. Excavate rectangular outlet section from compacted embankment.
- Filter fabric can be installed on bottom and sides of basin, and covered by riprap. Extend outlet apron/spillway below toe of dam on level grade until stable conditions are reached (5 feet minimum). Cover inside face of stone outlet section with a 1-foot layer of ½ to ¼ inch aggregate. Vegetate embankments, spillways and disturbed areas down gradient of the basin, either with permanent or temporary seeding.
- Monitor the amount of sedimentation in the basin. Inspect after every rain event and

maintain as needed, including removing accumulated sediment, repairing erosion and piping holes, cleaning or replacing the spillway gravel, and reseeding or planting vegetation.

- Should ideally consist of a fore bay where debris and some sediment begins to settle out of the water; a check dam constructed of stone or hay bales which water must flow through, filtering out more sediments; and the actual sediment basin, which is a pool with a slow enough velocity that sediments have time to settle out of the water column before the water flows over the dam at the outlet and is released.
- Sediment basins should be sized to provide a minimum of 12 to 24 hours of detention to maximum expected runoff amounts for the duration of the basin's use.
- Often a critical stormwater management component for larger construction sites, and/or those with poorly drained upland soils.
- Construction of temporary sediment basins should occur before primary construction on a project begins. Upon permanent stabilization of contributing disturbed areas, the temporary basins shall be removed and the areas matching the design plan.

"Ownership Responsibility: Post-Development Phase

Upon completion of the project, the property owner will assume responsibility of the stormwater management system and the operation and maintenance of the **Best Management Practices**, also known as **BMP's**.

Pavement Sweeping:

Sweeping, the act of cleaning pavement can be done by mechanical sweepers, vacuum sweeper or hand sweeper. The quantity of sand is a direct correlation with the treatment of ice and snow and the types of chemicals and spreaders that are being used on site to manage snow. If a liquid deicer such as calcium chloride is used as a pretreatment to new events the amount of sand is minimized. Sweeping for this site should be done semi-annually at a minimum. Collecting the particulate before it enters the catch basins is cheaper and more environmentally friendly than in a catch basin mixing with oils and greases in the surface water runoff in catch basins.

Stormceptor STC 450i Grate Inlet Hydrodynamic Separator:

Maintain according to the specifications of the manufacturer and cleaned a minimum of twice per year. A copy of the Owner's Manual which includes the operation and maintenance for the Stormceptor unit is included at the end of this report. A commercially owned vacuum truck shall be used to remove sediment and floatables. Oils and Floatables shall be removed prior to the sediment removal. Only the pollutant volumes of each section need to be pumped out, and keeping the unit wet is important to prevent sediment from solidifying in the base of the unit. Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state and federal guidelines and regulations. In the case of an oil or bulk pollutant release, the system must be cleaned immediately following the spill in accordance with local and state regulations and the proper authorities notified.

Grass Swale:

a. The grassed swale shall be maintained as part of the lawn. Regular maintenance includes mowing, fertilizing, liming, watering, weed and pest control. Because of the nearby wetlands, all chemicals use for fertilizer, weed and pest control are required to be organic. All non-organic chemicals are prohibited. Do not mow shorter than three inches. Inspect semiannually, clean sediment when 3" deep at inlet or outlet. Inspect for washouts, cut grass weekly or brush minimum of once a month.

Applications: Convey stormwater away from work area and/or improve water quality and slow water flow down.

- Used to intercept, redirect, and convey surface flows in order to prevent erosion in unprotected areas or flooding in work areas.
- Act as drainage channels and are used during construction or at a disturbed site or road to divert the flows from an unstable area to one that is not as vulnerable to erosion. Can be used to reduce erosion in uplands, and/or prior to water flowing into wetlands or streams.

Limitations:

- Vegetated swales need to have adequately established vegetation before flow is diverted to them;
- Need to have adequate bottom stabilization to prevent scouring (soil being washed away).

How to Maintain:

- Usually consist of a ditch that is either vegetated or lined with rip rap, erosion control blankets, or other materials.
- Depth and spacing of swales should be dependent on runoff conditions of the specific site.
- Ensure the contributing area surface is stabilized and clear of debris.
- Need to be routinely maintained to prevent brush/sediment buildup. Inspect swale regularly and after every rain event (0.25 inches or greater). Repair and/or re-seed bare soil areas caused by erosion. Remove accumulated sediments and brush before it reaches a depth of six inches. Repair any erosion of the ditch lining. Repair riprap where underlying filter fabric or gravel is showing or if stones have dislodge. Repair any slumping side slopes.
- Temporary swales should be removed once construction is complete or once areas are stabilized. If leaving swales in place will allow for long-term benefits and be compatible with the ultimate use of the site, then they may remain in place.

Underground 36" HDPE Pipe as Extended Detention Basin

The basin should be inspected at least twice per year for signs of sediment accumulation. Open and inspect any drain manholes and outlet control structures. Remove any sediment, trash and debris. If found necessary, clean with high pressure water through a pipe cleaning nozzle.

Sediment Forebay and Level Spreader:

Inspect the sediment forebay "as labeled on the plan" after the first several rainfall events, after all major storms and on regularly scheduled dates monthly. If there is ponded water at the surface of the trench, remove and replace the first layer of stone aggregate and the filter fabric. Clean forebays 4 times per year. Grass height should be no greater than 6-inches and no less than 3- to 4-inches Infiltration

The outlet for the sediment forebay area is either flow through a checkdam or by overflowing an erosion control device known as a "level spreader". The level spreader "as shown on the plan" should also be inspected during the inspection of the sediment forebay for signs of soil erosion and repaired as necessary.

Estimated BMP Maintenance Costs

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

BMP	Estimated Maintenance Cost
Pavement sweeping	$ 400 per year
STC 450i Catch Basin Grate Hydrodynamic Separator	$ 200 per cleaning per unit
Underground Pipe as Extended Detention Basin	$ 500 per year
Sediment Forebay	$ 100 per year

OPERATION & MAINTENANCE (O&M)
BMP MAINTENANCE LOG

BMP MAINTENANCE LOG
PAVEMENT SWEEPING

Maintenance and Schedule: The owner shall keep the pavement swept with a mechanical sweeper or hand swept quarterly at a minimum

Date: ____________________ Performed by: ______________________________

Method of sweeping: ☐ Mechanical ☐ Hand ☐ Vacuum ☐ Other __________

Type of material collected: ______________________________

Disposal location: ______________________________

Other Comments: ______________________________

Date: ____________________ Performed by: ______________________________

Method of sweeping: ☐ Mechanical ☐ Hand ☐ Vacuum ☐ Other __________

Type of material collected: ______________________________

Disposal location: ______________________________

Other Comments: ______________________________

Date: ____________________ Performed by: ______________________________

Method of sweeping: ☐ Mechanical ☐ Hand ☐ Vacuum ☐ Other __________

Type of material collected: ______________________________

Disposal location: ______________________________

Other Comments: ______________________________

Date: ____________________ Performed by: ______________________________

Method of sweeping: ☐ Mechanical ☐ Hand ☐ Vacuum ☐ Other __________

Type of material collected: ______________________________

Disposal location: ______________________________

Other Comments: ______________________________

EXTENDED DETENTION BASIN

Maintenance and Schedule: Extended Detention Basin: Inspect twice per year and after every major event for the first few months. Mow basin at least twice per year. Clean sediment out of basin 2 times per year.

Date: ____________________ Performed by: ______________________________

Basin mowed: ☐ Yes ☐ No ☐ Yes ☐ No
Sediment present: ☐ Yes ☐ No ☐ Yes ☐ No
Sediment Removed: ☐ Yes ☐ No ☐ Yes ☐ No
Method: ☐ Excavation ☐ Hand ☐ Other ______________
Type of material collected: ______________________________
Disposal location: ______________________________
Other Comments: ______________ ______________

Date: ____________________ Performed by: ______________________________

Basin mowed: ☐ Yes ☐ No ☐ Yes ☐ No
Sediment present: ☐ Yes ☐ No ☐ Yes ☐ No
Sediment Removed: ☐ Yes ☐ No ☐ Yes ☐ No
Method: ☐ Excavation ☐ Hand ☐ Other ______________
Type of material collected: ______________________________
Disposal location: ______________________________
Other Comments: ______________ ______________

Date: ____________________ Performed by: ______________________________

Basin mowed: ☐ Yes ☐ No ☐ Yes ☐ No
Sediment present: ☐ Yes ☐ No ☐ Yes ☐ No
Sediment Removed: ☐ Yes ☐ No ☐ Yes ☐ No
Method: ☐ Excavation ☐ Hand ☐ Other ______________
Type of material collected: ______________________________
Disposal location: ______________________________
Other Comments: ______________ ______________

BMP MAINTENANCE LOG
SPILL CONTAINMENT KIT

Maintenance and Schedule: Inspect yearly to ensure all components are present and refill missing items. Kit shall be completely restocked after any spill event.

Date: ____________________ Performed by: ____________________
Inspection Type: ☐ Yearly ☐ Spill ☐ Other ____________________
If spill, type of spill: ____________________
Kit Complete: ☐ Yes ☐ No
Items Missing / Used: ____________________
Date Items Replaced ____________________
Other Comments: ____________________

Date: ____________________ Performed by: ____________________
Inspection Type: ☐ Yearly ☐ Spill ☐ Other ____________________
If spill, type of spill: ____________________
Kit Complete: ☐ Yes ☐ No
Items Missing / Used: ____________________
Date Items Replaced ____________________
Other Comments: ____________________

Date: ____________________ Performed by: ____________________
Inspection Type: ☐ Yearly ☐ Spill ☐ Other ____________________
If spill, type of spill: ____________________
Kit Complete: ☐ Yes ☐ No
Items Missing / Used: ____________________
Date Items Replaced ____________________
Other Comments: ____________________

BMP MAINTENANCE LOG
SEDIMENT FOREBAY

Maintenance and Schedule: Inspect monthly. Clean forebays 4 times per year. Grass height should be no greater than 6-inches and no less than 3- to 4-inches.

Date: ____________ Performed by: ____________

Forebay Mowed: ☐ Yes ☐ No

Sediment Present: ☐ Yes ☐ No Sediment Removed: ☐ Yes ☐ No

Method: ☐ Excavation ☐ Hand ☐ Other ____________

Type of material collected: ____________

Disposal location: ____________

Other Comments: ____________

Date: ____________ Performed by: ____________

Forebay Mowed: ☐ Yes ☐ No

Sediment Present: ☐ Yes ☐ No Sediment Removed: ☐ Yes ☐ No

Method: ☐ Excavation ☐ Hand ☐ Other ____________

Type of material collected: ____________

Disposal location: ____________

Other Comments: ____________

Date: ____________ Performed by: ____________

Forebay Mowed: ☐ Yes ☐ No

Sediment Present: ☐ Yes ☐ No Sediment Removed: ☐ Yes ☐ No

Method: ☐ Excavation ☐ Hand ☐ Other ____________

Type of material collected: ____________

Disposal location: ____________

Other Comments: ____________

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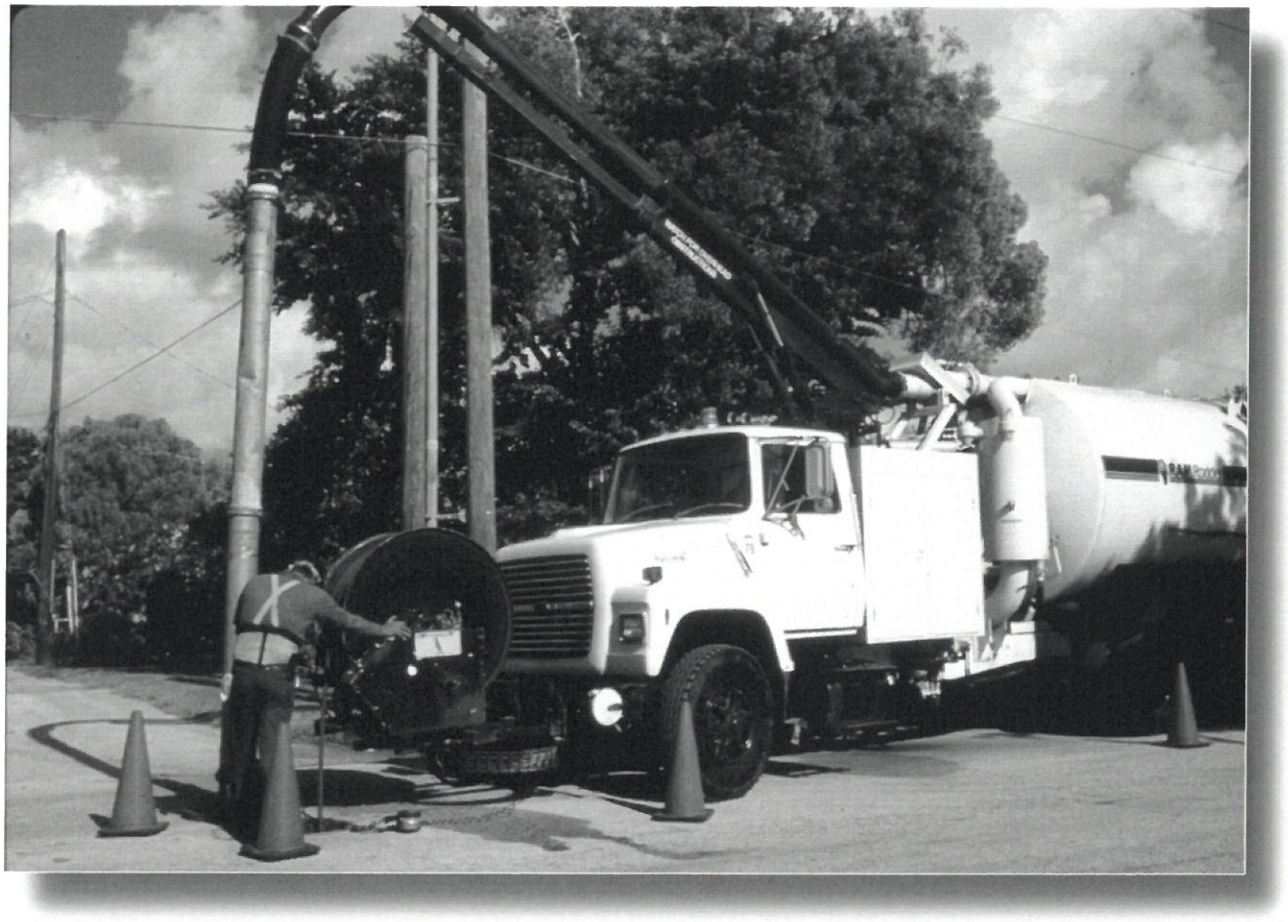

THE STORMCEPTOR® SYSTEM

Owner's Manual

Stormceptor® Owner's Manual Contents

Rev. 3/2006

Thank You!

We want to thank you for selecting the Stormceptor System to use in your efforts in protecting the environment. Stormceptor is one of the most effective and maintenance friendly storm water quality treatment devices available. If you have any questions regarding the operation and maintenance of the Stormceptor System, please call your local Rinker Materials representative, or the Stormceptor Information Line at (800) 909-7763.

1. *Stormceptor Overview*

The Stormceptor System is a water quality device used to remove total suspended solids (TSS) and free oil (TPH) from storm water run-off. Stormceptor takes the place of a conventional manhole or inlet structure within a storm drain system. Rinker Materials manufactures the Stormceptor System with precast concrete components and a fiberglass disc insert. A fiberglass Stormceptor can also be provided for special applications.

The Stormceptor System product line consists of four patented designs:

- The In-Line (Conventional) Stormceptor, available in eight model sizes ranging from 900 to 7200 gallon storage capacity.
- An In-Line (Series) Stormceptor is available in three model sizes ranging from 11,000 to 16,000 gallon storage capacity.
- The Submerged Stormceptor, an in-line system designed for oil and sediment removal in partially submerged pipes, available in all models sizes ranging from 450*i* to 16,000 gallon storage capacity.
- The Inlet Stormceptor is a 450 gallon unit designed for small drainage areas.

Stormceptor removes free oil and suspended solids from storm water preventing hazardous spills and non-point source pollution from entering downstream lakes and rivers. Rinker Materials and its affiliates market and manufacture the Stormceptor System in the United States and Australia. Several thousand Stormceptor Systems have been installed in various locations throughout North America, Australia and the Caribbean since 1990.

In the Stormceptor, a fiberglass insert separates the treatment chamber from the by-pass chamber. The different insert designs are illustrated in Figures 1 and 2. These designs are easily distinguishable from the surface once the cover has been removed.

There are four versions of the in-line disc insert: single inlet/outlet, multiple inlet, in-line series insert and submerged designs. In the non-submerged "disc" design you will be able to see the inlet pipe, the drop pipe opening to the lower chamber, the weir, a 6" oil inspection/cleanout pipe, a large 24" riser pipe opening offset on the outlet side of the structure, and the outlet pipe from the unit. The weir will be around the 24" outlet pipe on the multiple inlet disc insert and on large diameter pipe applications.

The STC (series) Stormceptors consist of two chambers comprised of similar fiberglass inserts. These units also contain a 6" oil/inspection cleanout pipe and 24" outlet riser pipes.

The submerged disc insert has a higher weir and a second inlet drop pipe. In the inlet design you will be able to see an inlet drop pipe and an outlet riser pipe as well as a central oil inspection/cleanout port.

2. *Stormceptor System Operation*

The Stormceptor consists of a lower treatment chamber, which is always full of water, and a by-pass chamber. Storm water flows into the by-pass chamber via the storm sewer pipe or grated inlet (Inlet Stormceptor). Normal flows are diverted by a weir and drop pipe arrangement into a treatment chamber. Water flows up through the submerged outlet pipe based on the head at the inlet weir and is discharged back into the by-pass chamber downstream of the weir. The treated storm water continues down stream via the storm sewer system.

Oil and other liquids with a specific gravity less than water rise in the treatment chamber and become trapped under the fiberglass insert. Sediment will settle to the bottom of the chamber by gravity. The circular design of the treatment chamber is critical to prevent turbulent eddy currents and to promote settling.

During infrequent high flow conditions, storm water will by-pass the weir and be conveyed to the outlet sewer directly. The by-pass is an integral part of the Stormceptor since other oil/grit separators have been noted to scour during high flow conditions (Schueler and Shepp, 1993).

For further details please refer to *The Stormceptor System Technical Manual*.

The key benefits of Stormceptor include:

- Capable of removing more than 80% of the total sediment load when properly applied as a source control for small drainage areas
- Removes free oil from storm water during normal flow conditions
- Will not scour or resuspend trapped pollutants
- Ideal spill control device for commercial and industrial developments
- Vertical orientation facilitates maintenance and inspections
- Small foot print

3. *Identification of Stormceptor*

All In-Line (including Submerged) Stormceptors are provided with their own frame and cover. The cover has the name STORMCEPTOR clearly embossed on it to allow easy identification of the unit. The name Stormceptor is not embossed on the inlet models due to the variability of inlet grates used/approved across North America. You will be able to identify the Inlet Stormceptor by looking into the grate since the insert will be visible.

Once you have located a unit, there still may be a question as to the size of the unit. Comparing the measured depth from the water level (bottom of insert) to the bottom of the tank with Table 1 should help determine the size of the unit.

Table 1. Stormceptor Dimensions*	
Model	**Pipe Invert to Top of Base Slab**
450*i*	60"
900	55"
1200	71"
1800	105"
2400	94"
3600	134"
4800	128"
6000	150"
7200	134"
11000*s*	128"**
13000*s*	150"**
16000*s*	134"**

* *Depths are approximate*

** *Depths per structure*

Starting in 1996, a metal serial number tag has been affixed to the fiberglass insert. If the unit does not have a serial number, or if there is any uncertainty regarding the size of the Stormceptor using depth measurements, please contact the Rinker Materials Stormceptor information line at (800) 909-7763 for assistance.

4. *Stormceptor Maintenance Guidelines*

The performance of all storm water quality measures that rely on sedimentation decreases as they fill with sediment (See Table 2 for Stormceptor capacities). An estimate of performance loss can be made from the relationship between performance and storage volume. Rinker Materials recommends maintenance be performed when the sediment volume in the unit reaches 15% of the total storage. This recommendation is based on several factors:

- Sediment removal is easier when removed on a regular basis (as sediment builds up it compacts and solidifies making maintenance more difficult).
- Development of a routine maintenance interval helps ensure a regular maintenance schedule is followed. Although the frequency of maintenance will depend on site conditions, it is estimated that annual maintenance will be required for most applications; annual maintenance is a routine occurrence which is easy to plan for and remember.
- A minimal performance degradation due to sediment build-up can occur.

In the event of any hazardous material spill, Rinker Materials recommends maintenance be performed immediately. Maintenance should be performed by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required.

Table 2. Stormceptor Capacities			
Model	**Sediment Capacity ft³ (L)**	**Oil Capacity US gal (L)**	**Total Holding Capacity US gal (L)**
450*i*	45 (1276)	86 (326)	470 (1779)
900	75 (2135)	251 (950)	952 (3604)
1200	113 (3202)	251 (950)	1234 (4671)
1800	193 (5470)	251 (950)	1833 (6939)
2400	155 (4387)	840 (3180)	2462 (9320)
3600	323 (9134)	840 (3180)	3715 (14063)
4800	465 (13158)	909 (3441)	5059 (19150)
6000	609 (17235)	909 (3441)	6136 (23227)
7200	726 (20551)	1059 (4009)	7420 (28088)
11000*s*	942 (26687)	2797 (10588)*	11194 (42374)
13000*s*	1230 (34841)	2797 (10588)*	13348 (50528)
16000*s*	1470 (41632)	3055 (11564)*	15918 (60256)

** Total both structures combined*

4.1 *Recommended Maintenance Procedure*

For the "disc" design, oil is removed through the 6" inspection/cleanout pipe and sediment is removed through the 24" diameter outlet riser pipe. Alternatively, oil could be removed from the 24" opening if water is removed from the treatment chamber, lowering the oil level below the drop pipes.

The depth of sediment can be measured from the surface of the Stormceptor with a dipstick tube equipped with a ball valve (Sludge Judge®). It is recommended that maintenance be performed once the sediment depth exceeds the guideline values provided in Table 3 for the reasons noted in Section 4.0 Stormceptor Maintenance Guidelines.

Table 3. Sediment Depths Indicating Required Maintenance	
Model	**Sediment Depth***
450*i*	8" (200 mm)
900	8" (200 mm)
1200	10" (250 mm)
1800	15" (375 mm)
2400	12" (300 mm)
3600	17" (425 mm)
4800	15" (375 mm)
6000	18" (450 mm)
7200	15" (375 mm)
11000*s*	17" (425 mm)**
13000*s*	20" (500 mm)**
16000*s*	17" (425 mm)**

** Depths are approximate*

*** In each structure*

No entry into the unit is required for routine maintenance of the Inlet Stormceptor or the smaller disc insert models of the In-Line Stormceptor. Entry to the level of the disc insert may be required for servicing the larger disc insert models. Any potential obstructions at the inlet can be observed from the surface. The fiberglass insert has been designed as a platform for authorized maintenance personnel in the event that an obstruction needs to be removed.

Typically, maintenance is performed by the Vacuum Service Industry, a well established sector of the service industry that cleans underground tanks, sewers, and catch-basins. Costs to clean a Stormceptor will vary based on the size of the unit and transportation distances. If you need assistance for cleaning a Stormceptor unit, contact your local Rinker Materials representative, or the Stormceptor Information Line at (800) 909-7763.

Figures 1 and 2 will help illustrate the access point for routine maintenance of Stormceptor.

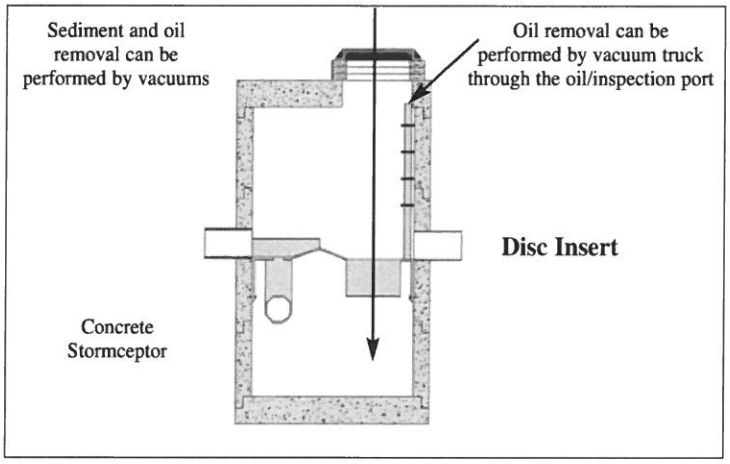

Figure 1 Single Inlet/Outlet "Disc" Insert
In-Line Stormceptor

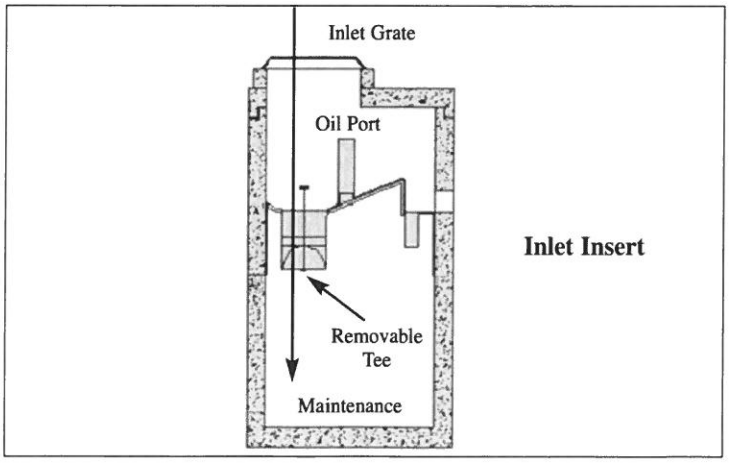

Figure 2 STC 450*i*
Inlet Stormceptor

4.2 *Disposal of Trapped Material from Stormceptor*

The requirements for the disposal of material from Stormceptor are similar to that of any other Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents.

In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. In some areas, mixing the water with the sediment will create a slurry that can be discharged into a trunk sanitary sewer. In all disposal options, approval from the disposal facility operator/agency is required. Petroleum waste products collected in Stormceptor (oil/chemical/fuel spills) should be removed by a licensed waste management company.

What if I see an oil rainbow or sheen at the Stormceptor outlet?

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a rainbow or sheen can be seen at very small oil concentrations (< 10 ppm). Stormceptor will remove over 95% of all free oil and the appearance of a sheen at the outlet with high influent oil concentrations does not mean that the unit is not working to this level of removal. In addition, if the influent oil is emulsified, the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified or dissolved oil conditions.

5.0 *Recommended Safety Procedures*

Rinker Materials strongly recommends that any person who enters a Stormceptor System follow all applicable OSHA regulations for entry in permit required confined spaces, as outlined in 29 CFR 1910.146. A permit required confined space consists of a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry and exit.
- Is not designed for continuous employee occupancy.
- Contains or has one of the following:
  - a potential to contain a hazardous atmosphere.
  - a material that has the potential for engulfing an entrant.
  - any other recognized serious safety hazard.

Storm water and wastewater systems fall under OSHA guidelines for a permit required confined space. Failure to follow OSHA guidelines for entry and work in a permit required confined space can result in serious injury or death. Please exercise extreme caution and follow appropriate safety procedures when entering any confined space.

Two square pick holes in the cover vent the Stormceptor, allow for removal of the cover, and provide sampling ports for air quality monitoring before the cover is removed. If you must enter the Stormceptor, please note that if the disc insert inside is wet, it can be slippery.

Recognizing that every work site is different, the responsibility for safety falls on the contractor. The contractor must ensure that all employees and subcontractors follow established safety procedures and OSHA regulations for working in and around permit required confined spaces as well as for any other safety hazard that may be present on that particular site.

6.0 *Stormceptor Monitoring Protocol*

If monitoring of your Stormceptor System is required, we recommend you follow the procedures outlined below by the Rinker Materials Stormceptor office. If you have any questions regarding monitoring please contact the Rinker Materials Stormceptor Product Manager at (800) 909-7763.

6.1 *Pollutants to be Monitored*

Table 4 indicates the pollutants to be monitored during the storm events and the minimum acceptable detection limit for each pollutant to be analyzed. Approved federal or state laboratory analysis methodologies are to be used for the analysis.

The optional metals indicated in Table 4 refer to the Resource Conservation Recovery Act and may be covered by a generic metals scan. Bacteria monitoring will not be required unless explicitly requested elsewhere.

Two sediment samples are to be extracted from the monitored Stormceptor at the end of the study and analyzed for the particle size distribution and water content. A minimum of 8 U.S. sieve sizes should be used to determine the particle size distribution. Sieves that are used must include, but are not limited to 35, 60, 100, 140, 200, 270 and 400. Three clay particle sizes must be analyzed to denote particle sizes between 5 and 25 μm. The particle size distributions should be plotted on a standard grain size distribution graph.

Table 4. Monitoring Pollutants	
Pollutant	**Minimum Detection Limit (MDL)**
Total Suspended Solids (TSS)	5 mg/l
Total Phosphorus (P)	0.02 mg/l
Total Kjeldahl Nitrogen (TKN)	0.1 mg/l
Copper (Cu)	0.001 mg/l
Cadmium (Cd)	0.005 mg/l
Lead (Pb)	0.05 mg/l
Zinc (Zn)	0.01 mg/l
Chromium (Cr)	0.01 mg/l
Total Petroleum Hydrocarbons (TPH)	1 mg/l
Conductivity	0.1 μmho/cm
Fecal Coliform*	1/100 ml
Additional Metals (optional)	
Arsenic (As)	0.005 mg/l
Barium (Ba)	0.01 mg/l
Mercury (Hg)	0.0005 mg/l
Selenium (Se)	0.005 mg/l
Silver (Ag)	0.01 mg/l

* Only if explicitly requested in Terms of Reference

6.2 *Monitoring Methodology*

The following monitoring protocol should be followed to ensure reasonable monitoring results and interpretation:

- Monitoring protocols should conform to **EPA 40 CFR Part 136.**
- The **EPA guideline of 72 hours dry period** prior to a monitoring event should be used. This will ensure that there is sufficient pollutant build-up available for wash-off during the monitored event.
- Flow proportional monitoring must be conducted for the parameters indicated in Table 1. Samples should be analyzed separately for the first flush versus the remainder of the storm event. Monitoring need not extend longer than an 8-hour period after the start of the storm event (composite).
- **Sediment sampling** (measuring the sediment depth in the unit at the beginning and end of the monitoring period) must be conducted. The water content of the sediment layer must be analyzed to determine the dry volume of suspended solids. Sediment depth sampling will indicate the rate of pollution accumulation in the unit, provide confirmation that the unit is not scouring and confirm the flow proportional monitoring results. A mass balance using the sediment sampling should be calculated to validate the flow proportional sampling.

- **Grab sampling** (just taking samples at the inlet and outlet) is an unacceptable methodology for testing the performance of the Stormceptor during wet weather conditions unless it is flow weighted (flow weighted composite sample from numerous grab samples) over the entire storm.
- The oil containment area underneath the insert should be inspected via the vent pipe for dry weather spills capture once a month during the monitoring period since the flow rate of a dry weather spill may not trigger the automated samplers.
- A tipping bucket rain gauge should be installed on-site to record the distribution of storm intensities and rainfall volume during the monitored events.
- Results that are within the laboratory error (both inlet and outlet) or are representative of relatively clean water should be discarded. Typical concentrations of pollutants in storm water are:

TSS	100 mg/L
Total P	0.33 mg/L
TKN	1.50 mg/L
Total Cu	34 μg/L
Total Pb	144 μg/L
Total Zn	160 μg/L

A threshold first flush/composite TSS value of 50 mg/L at the inlet to the Stormceptor should be used as the lower limit of an acceptable storm for reporting event efficiency. Monitoring results where the influent TSS concentration is less than 50 mg/L should only be used in mass load removal calculations over the entire monitoring period with other storms where the influent concentration is greater than 50 mg/L. The results should not be analyzed if the influent TSS concentrations during all monitored storms are less than 50 mg/L. Storms where the influent TSS concentration is less than 10 mg/L should be discarded from all analyses.

- A threshold storm event volume equal to 1.5 times the storage volume of the Stormceptor being monitored should be used as the lower limit of an acceptable storm for monitoring.
- Sampling at the outlet of the Stormceptor should be conducted within the 24" outlet riser pipe to accurately define event performance.
- The personnel monitoring the Stormceptor should record incidental information in a log file. Information such as weather, site conditions, inspection and maintenance information, monitoring equipment failure, etc. provide valuable information that can explain anomalous results.
- Laboratory results of monitored samples should be analyzed within 10 days of being submitted to the lab.
- Weekly inspections of the sampling tubes, flow meter, rain gauge, and quality samplers should be conducted to ensure proper operation of the monitoring equipment. Debris and sediment that collects around the sampling intakes should be cleaned after each event.
- During the installation of automated quality samplers, care should be exercised to ensure that representative samples will be extracted (placement of intakes, ensuring that tubing is not constricted or crimped).
- Sampling should be conducted for a minimum of 6 storms. Ideally 15 storms should be sampled if the budget allows.

Call the Stormceptor Information Line (800-909-7763) for more detailed information and test results.

TECHNICAL INFORMATION:

- Stormceptor CD ROM
- Stormceptor Technical Manual
- Stormceptor Installation Guide
- Stormceptor Brochure

TEST RESULTS:

- STEP Report (Independent Verification)
- University of Coventry Study
- ETV Canada (Federal Verification)
- National Water Research Institute Test
- Westwood, MA Field Monitoring Study
- Edmonton, Canada Field Monitoring Study
- Seattle Field Monitoring
- Como Park, MN Field Monitoring Study
- Florida Atlantic University Submerged Stormceptor Testing
- Oil Removal Field Validation
- Sludge Analyses and Particle Size Analyses

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Rev. 3/2006

<u>APPENDIX I :</u>
ILLICIT DISCHARGE
COMPLIANCE STATEMENT

Illicit Discharge Compliance Statement

It is the intent of the Owner, George Funari, Showtime Entertainment LLC, 49 Milford Street, Mendon, MA 01757 to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease. There will be no connection to the storm water system to inadvertently direct other types of liquids, chemicals or solids into the storm drainage system.

Respectfully Acknowledged,

George E Funari