CITY OF MARLBOROUGH MEETING POSTING

Meeting Name: **Conservation Commission**

Date: **June 18, 2020 (Thursday)**

Time: **7:00 PM**

Location: **Will be conducted via remote participation**

Participation will be via Virtual Means Only - Pursuant to Governor Baker's March 12, 2020 Order Suspending Certain Provisions of the Open Meeting Law, G.L. c. 30A, §18, and the Governor's March 15, 2020 Order imposing strict limitation on the number of people that may gather in one place, this meeting of the Marlborough Conservation Commission will be conducted via remote participation. The public may participate in this meeting via Remote Participation: A link to the website for the meeting will be provided on the City's website on the City public meeting Calendar and on the Conservation Commission website at least 48 hours prior to the meeting. To access the City web site go to: https://www.marlborough-ma.gov/ **and choose calendar and click on the June 18, 2020 meeting date. Any questions please call: 508-460-3768.**

Public Hearings:

7:00 PM Request for Determination of Applicability
26 Flint Dr. - Paul Spitzer
Proposes to add a patio and fire pit next to wetlands.

7:10 Notice of Intent (Continuation)
I-495 and I-290 - Mass Dept. of Transportation (MDOT)
Propose to make improvements to the existing interchange at I-495 and I-290, in order to improve the traffic operation at I-495 southbound Exit 25B. Work is proposed next to wetlands.

7:20 Notice of Intent (212-1220) (Continuation)
Rte. 20 reconstruction from Peters Ave. to Marlborough/Sudbury town line - MassDOT
Proposes to reconstruct Rte 20 from Peters Ave. to the Marlborough/Sudbury town line. They will replace deteriorated pavement structures, widen the travel way to safe and acceptable lane and shoulder widths, adding new sidewalks and provide upgrades to the existing drainage system. Several sections of this work are within the buffer zone to wetlands.

7:30 Notice of Intent (212-1219) (Continuation)
Farm Rd. (Map 73, Parcels 14 & 15A) - Michael Downey **-** The New England Center for Children, Inc.
Proposes to construct a residential school building for the New England Center for Children with a footprint of 13,250 sq. ft. The proposal includes parking drainage and utilities. Some of the work is proposed within the buffer zone to a wetland (across the street from the old airport.)

7:40 Notice of Intent (Continuation)
447 Boston Post Rd. (known as Harrison Arms) - Wayside Apartments LLC
Propose to make some modification to the existing parking lot, drainage and landscaping near wetlands.

7:50 Notice of Intent (212-1218) (Continuation)
339 Boston Post Rd. and adjoining parcels - James Driscoll, WP Marlborough MA Owner, LLC

Proposes to construct a 4 multi-family residential building, garages, a pool, associated parking lots, dog park and a community garden within buffer zone, Bordering Land Subject to Flooding, and/or Riverfront Area. (aka: MaGee Farm and more recently Heritage Farm, LLC)

8:00 Notice of Intents (3 separate filings as noted below)
Hayes Memorial Dr. - The Gutierrez Company

- Lot K - Construct a 29,540 ± s.f. warehouse distribution center with associated parking, drainage, utilities and landscaping. Map 88, Parcel 1 and Map 88 Parcel 35. Work is proposed near wetlands
- Lot L - Construct an 80,880 s.f. warehouse distribution center with associated parking, drainage, utilities and landscaping. Map 99, Parcel 1 and Map 88 Parcel 35. Work is proposed near wetlands. Lot L.
- Lot M - Construct a 24,020 ± s.f. warehouse distribution center with associated parking, drainage, utilities and landscaping. Assessors Map 88 Parcel 1 and Map 99, Lots 1 & 6. Work is proposed near wetlands

Certificates of Compliance

- 212-1207 95 Lakeshore Dr
- 212-1195 228 Littlefield Ln.

Draft Orders of Conditions

- 190 Sudbury St. (212-1221)

Violation Updates:

Correspondence/Other Business

- Letter from CSX Transportation, Inc. RE: 2020 Vegetation Management Railroad Right of Way

Discussion

- Ft. Meadow Lake Survey and Treatment Plan

Next Conservation Commission meetings – July 2nd and July 23rd , 2020

Adjournment

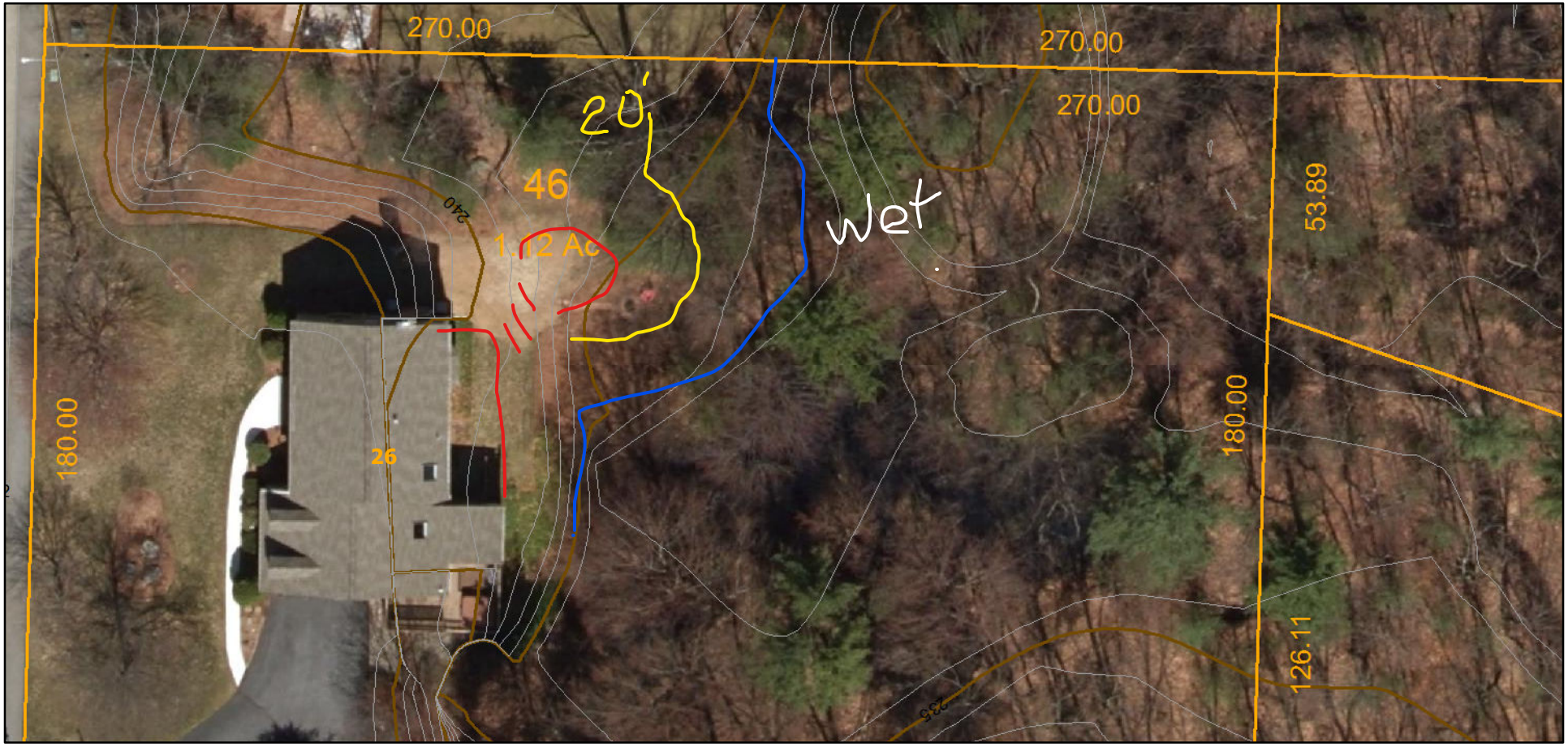
26 Flint Dr. patio location

Marlborough, MA

1 inch = 34 Feet

0 34 69 104

June 17, 2020



CAI Town Line
Parcel Lines - Ortho
Other Legal - Ortho
Parcel Addresses It 2000
Contours 1 ft
Contours 5ft

Patio
20' BZ
wetland

HIGHWAY GUARD DETAILS

GUARDRAIL RETROFIT ON BRIDGE TO TRANSITION TO THRIE BEAM
GUARDRAIL, TL-3 (SINGLE FACED) STA 86+20 TO STA 78+85 (I-290)
(STEEL DEEP POST STA 79+05 TO STA 82+10)
(STEEL DEEP POST STA 84+10 TO STA 84+30)

GUARDRAIL, TL-3 (SINGLE FACED) STA 76+09 TO STA 86+20 (I-290 WB MEDIAN)
TRANSITION TO THRIE BEAM STA 86+20 TO GUARDRAIL RETROFIT ON BRIDGE (I-290 WB MEDIAN)

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE BELOW

MARLBOROUGH - HUDSON
I-495 SOUTHBOUND TO I-290 WESTBOUND

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	11	13
PROJECT FILE NO.	610552		

CONSTRUCTION PLAN
SHEET 7 OF 8

CONTINUED ON SHEET NO. 19

CONTINUED ON SHEET NO. 21

610552 HD18(NOI CONST PLAN).DWG Plotted on 12-Jun-2020 10:04 AM

MAP 26 LOT 21B
NEW ENGLAND POWER COMPANY
BK 12131 PG 1
DONALD J LYNCH BLVD

TOWN LINE
AUX BL B SHLO 5680
NO ACCESS
EXIST SHLO LINE
MAP 26 LOT 30
NGLAND POWER COMPANY
25-190 BIGELOW ST

WF#2 HNTB
WF#2 HNTB (REVISED PER SITE VISIT)
WF#3 HNTB
WF#4 HNTB
WF#5 HNTB
WF#6 HNTB
WF#7 HNTB
WF#8 HNTB
WF#9 HNTB
WF#10 HNTB
WF#11 HNTB
12 HNTB

PROP FULL DEPTH PAVEMENT
RET UP
LIMIT OF WORK
PROP SLOPE LIMIT
PROP FES
PROP LOAM & HYDROSEED (SEE NOTE 15)
CLEARING AND GRUBBING
RETAIN EXIST HEADWALL
PROP MODIFIED ROCKFILL
PROP GUARDRAIL, TL-3 (SINGLE FACED) (STEEL DEEP POST)
PROP SEDIMENT CONTROL BARRIER
BORDERING VEGETATED WETLAND
PROP HMA BERM TYPE A
PROP FULL DEPTH PVMT
PROP TRANSITION TO THRIE BEAM
BEGIN PROP HMA BERM TYPE A
PROP RESURFACING BRIDGE PAVEMENT MICROMILLING & OVERLAY
RETAIN BRIDGE M-6-15
PROP TRANSITION TO THRIE BEAM
R&D EXIST GUARDRAIL
PROP CB
SAWCUT
PROP HMA BERM TYPE A
PROP RESURFACING STANDARD MILLING & OVERLAY
100 FOOT BUFFER ZONE TO BORDERING VEGETATED WETLAND
EOP
PROP GUARDRAIL, TL-3 (SINGLE FACED)
ADJ CB
RET
ADJ CB
PROP HMA BERM TYPE A
PROP FULL DEPTH PVMT

BORDERING VEGETATED WETLAND

I-290 WESTBOUND
I-290 EASTBOUND
I-290 RECORD ℄

62.3'
57.6'
103.24'
+66.71
POC

Δ=13°22'51"
R=8430.00'
L=1968.75'
T=988.87'

Δ=14°51'44"
R=14777.87'
L=3833.29'
T=1927.46'

179
N: 2956425.709'
E: 629711.255'
EL: 315.180'
MTRV

MAP 26 LOT 27
OLGA H TORRES
BK 1005 PG 27

NO ACCESS
EXIST SHLO LINE

0 20 50 100
SCALE: 1" = 20'

HOWARD STEIN HUDSON

June 5, 2020

Ms. Judith Schmitz
Massachusetts DEP – Central Region Circuit Rider
8 New Bond Street
Worchester, Massachusetts 01606

Re: Boston Post Road East (Route 20), Marlborough (608467)
DEP File #212-1220

Dear Ms. Schmitz:

Howard Stein Hudson (HSH) has reviewed the comments prepared by the Massachusetts Department of Environmental Protection (MassDEP), dated May 20, 2020, and send via email for the Boston Post Road East (Route 20) resurfacing project in Marlborough, MA, and offers the following responses:

Comment 1: *Can the culverts conveying Broad Meadow Brook and/or the unnamed perennial stream be replaced with larger structures that will meet the Massachusetts Stream Crossing Standards to a greater extent, and provide greater infrastructure resiliency?*

Response 1: The Broad Meadow Brook culvert and the unnamed perennial stream culvert were inspected and are in good condition. A capacity analysis of the existing culverts was completed following the Federal Highway Administrations Hydraulic Design Series Number 5 "Hydraulic Design of Highway Culverts Third Edition". The hydraulic analysis was modeled using HY-8 program software. The culvert's hydraulic capacity was analyzed for the 50-year storm following the MassDOT LRFD Bridge Manual – Part 1 Chapter 1.34 "Hydraulic and Scour Design Flood Selection Guidelines". The results of the analysis confirmed that the culverts are hydraulically adequate to convey the 50-year storm. Calculations for Broad Meadow Brook are provided in Attachment A. The analysis of the unnamed perennial stream culvert is provided in a Hager Pond Culvert Analysis Technical Memo (Attachment B). Given the condition and the culverts ability to convey a 50-year storm event MassDOT does not intend to replace the culverts.

Comment 2: *Peak flows increase for all design storms for the overall project, with significant increases proposed at Design Point 3 (Broad Meadow Brook). The applicant should verify that the proposed increases in peak flows will not cause damage or flooding to downstream properties or infrastructure.*

Response 2: Two different calculations were used to determine if there would be any downstream damage or flooding caused by the proposed discharge at design point No.3.

1. Stream Stats was used to determine the 100-year flow entering the culvert (132 cfs). The HY-8 program was used to analyze the existing 100-year storm event on the downstream side (outlet) of the culvert to determine the depth of flow and elevation (276.50 ft.). The 100-year storm event flow from the discharge of design point No.3 (5 cfs) was added to the Stream Status flow to determine the stream elevation during a 100-year storm event (276.53 ft.). The addition of the 100-year storm from design point No.3 increased the stream elevation by 0.03 ft. The existing and proposed HY-8 culvert analysis results & Stream Stats flow data are provided in Attachment A.

2. Manning's equation for open channel flow was used to determine a stream elevation approximately 20 ft. downstream from the outlet of culvert. The cross-section was determined from the existing conditions survey. The Stream Stats flow for the 100-year storm event was used to determine the depth of the stream and elevation using the manning's equation for open channel flow. The elevation was determined to be 276.50 ft. The 100-year storm event flow from the discharge of design point No.3 was added to the Stream Stats flow to determine the stream depth and elevation (276.54 ft.). The addition of the 100-year storm from design point No.3 increased the stream elevation by 0.04 ft. The existing and proposed open flow calculations are provided in Attachment C. The 100-year flood elevation provided by FEMA flood map on the downstream side of the culvert is 276.4 ft.

   A summary of the HY-8 and open flow channel calculations for the existing and proposed conditions are provided in Table 1.0. The two different calculations were used to determine if there would be any downstream damage or flooding caused by the proposed discharge at design point No.3. The increase flow from Design Point No.3 for a 100-year storm would raise the flood elevation by 0.04 ft., therefore it was determined that the increase of flow of 5 cfs will not have a negative impact on properties and infrastructure downstream of the culvert.

Table 1.0 Broad Meadow Brook – Discharge Analysis

Event	Flow (cfs)	Open Channel flow (Manning Equation) Stream Elevation	HY-8 Stream Elevation	FEMA Flood Elevation
Existing 100 Year Storm	132	276.50	276.50	276.4
Proposed 100 Year Storm	137	276.54	276.53	276.4

Comment 3: *Where larger outfalls are proposed (Wetlands A, B, G) the applicant should verify that additional velocity from the outfalls won't cause erosion or scour.*

Response 3: The outfall pipe velocities at Wetlands A, B and G are lower than the MassDOT maximum allowable velocity of 10 ft./s. Stone at pipe ends are called out at Wetlands A and G and were designed according to the FHWA Hydraulic Engineering Circular #14. The outfall into Wetland G is discharging less flow compared to existing conditions therefore no stone was proposed. Given the outlet velocities, the HEC #14 design reference calls for a minimum Class 1 (5") riprap. The MassDOT standard item Stone at Pipe Ends requires stone to be not less than 50lb, not more than 125 lb., and 75% of the volume shall consists of stones not less than 75 lbs, which exceeds the FHWA requirements. Therefore the proposed riprap is adequate to prevent erosion at the outfalls.

Comment 4: *Beyond replacing existing catch basins, the project proposes no BMPs to reduce TSS and improve the water quality of discharges into Mowry Brook/Wetlands A&B (DP#2), Broadmeadow Brook/Wetlands F&G (DP#3), Wetland I (DP#10), and Hager Pond/Wetland G (DP#11).*

Response 4: During the design we looked at the potential for siting additional stormwater quality BMP's within these four catchment areas, but due to site constraints (i.e., limited right-of-way, existing utilities, ledge, high groundwater or unsuitable in-situ soils), they were determined to be unsuitable for the installation of BMPs.

Comment 5: *In addition, a new discharge will convey runoff directly to Hager Pond with minimal treatment (25% TSS). The applicant cites the presence of high groundwater, subsurface concrete, and utilities as reasons why additional BMPs are not practicable. Can additional measures such as permeable pavement, tree box filters, proprietary separators, infiltration beyond the footprint of the concrete, etc.*

be incorporated into the project design to improve the water quality of runoff into waterbodies and wetlands? The Stormwater Report only describes the treatment trains for the sub-catchments that contain infiltration structures and does not discuss how Stormwater Standard 4 is met at the outfalls to waterbodies and wetlands.

Response 5: MassDOT does not use permeable pavements for roadway/sidewalk construction or the inclusion of tree box filters or proprietary separators. A redevelopment project is required to meet Stormwater Management Standard No.4 only to the maximum extent practicable.

Comment 6: *A portion of the project discharges to an Outstanding Resource Water associated with the Sudbury Reservoir, therefore Stormwater Standard 6 applies. Four waterbodies receiving stormwater discharges from the project have TMDLS (Hop Brook, Hager Pond, Sudbury Reservoir, & the Unnamed Perennial Tributary (Wetland H)), however BMPs are only proposed to reduce pollutants from a portion of the roadway that drains towards Hop Brook. Can pollutant reduction measures be incorporated into the project design for discharges to Hager Pond, the Sudbury Reservoir and the Unnamed Perennial Tributary?*

Response 6: MassDOT understands that source control and pollution prevention are particularly important for critical areas including Outstanding Resource Waters. As previously mentioned the design attempted to incorporate additional BMPs but were unable to do so due to site constraints (i.e., limited right-of-way, existing utilities, ledge, high groundwater or unsuitable in-situ soils).

In general, long term pollution prevention and related maintenance activities will be conducted consistent with MassDOT Highway Division's NPDES Stormwater MS4 Permit, and the measures outlined in MassDOT's Stormwater Management Plan (SWMP). For the facilities covered by this Operation and Maintenance Plan, long term pollution prevention includes the following measures:

<u>Litter Pick - up</u>
MassDOT will conduct litter pick - up from the stormwater management facilities in conjunction with routine road maintenance activities.

<u>Routine Inspection and Maintenance of Stormwater BMPs</u>
MassDOT will conduct inspection and maintenance of the stormwater management practices in accordance with the guidelines discussed above.

Spill Prevention and Response

MassDOT will implement response procedures for releases of significant materials such as fuels, oils, or chemical materials onto the ground or other areas that could reasonably be expected to discharge to surface or groundwater pursuant to the requirements set forth in the Unified Response Manual (URM) for the Massachusetts Highway System, dated 2014, which provides a well-defined program for responding to emergency spill events with established responder responsibilities.

Applicable containment and cleanup procedures will be performed immediately. Impacted material collected during the response must be removed promptly and disposed of in accordance with Federal, State, and local requirements. A licensed emergency response contractor may be required to assist in cleanup of releases depending on the amount of the release and the ability of the responsible party to perform the required response including isolation and containment, where appropriate, in the event of an emergency spill or other unexpected event.

Reportable quantities will immediately be reported to the applicable Federal, State, and local agencies as required by law. The applicable MassDOT District office should also be notified.

Maintenance of Landscaped Areas

Routine mowing should be conducted according to standard MassDOT practices. MassDOT shall minimize use of fertilizers, herbicides, and pesticides for the maintenance of facilities covered by this plan. Any use of fertilizers, herbicides, or pesticides shall be reviewed and approved by the applicable MassDOT District Environmental Engineer prior to application. Local Conservation Commission review may also be required.

Prohibition of Illicit Discharges

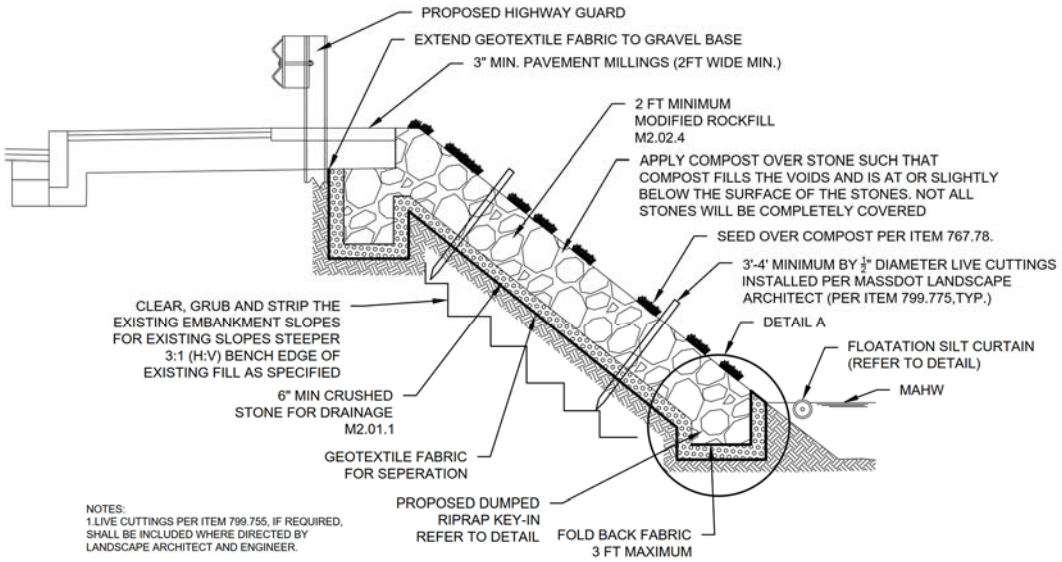
MassDOT's Stormwater Management Plan (SWMP) prohibits illicit discharges to the stormwater management system. Illicit discharges are discharges that do not entirely consist of stormwater, except for certain specified non - stormwater discharges.

Pursuant to Standard 7, the project is considered a redevelopment. It will meet the pretreatment and structural best management practices of Standard 6 to the maximum extent practicable and improve upon existing conditions.

Comment 7: *Modified Rock Fill Slopes are proposed along Broad Meadow Brook and Hager Pond. Are bioengineering methods available that can be used instead of rip rap to provide more natural slopes? Additional details should be provided for the proposed grass swale adjacent to Hager Pond.*

Response 7: The improved revetment of the Hager Pond bank was included at the request of the Conservation Commission Agent and City of Marlborough DPW following our pre-filing site walk where numerous erosion concerns were observed on the bank of Hager Pond. The work on the Hager Pond bank was added to the project as a water quality measure requested by the City. Further, the proposed Hager Pond bank revetment has been bio-engineered by the Landscape Architect for this project and will include a mulch and wetland seed surface treatment as well as the placement of up to 150 live cuttings. The contractor will be responsible for a minimum of 1 full growing season for all plantings associated with the project from the date of substantial project completion. MassDOT's Landscape Architect will inspect the work during this time period to verify survivability and that satisfactory growth has occurred. The proposed bioengineered slope is a tremendous improvement over existing conditions substantially addressing this comment. Refer to photograph of existing Hager Pond bank conditions and proposed Modified Rockfill Slope Detail at Hager Pond, respectively, provided below for further clarification.

Hager Pond Bank (March 2019)



MODIFIED ROCK FILL SLOPE DETAIL AT HAGER POND

NOT TO SCALE

Proposed Bioengineering Hager Pond Bank Treatment Detail (above)

For further information regarding the seeding and planting requirements referenced in the above detail see Attachment D – Special Provisions for Item 767.78 Composted Mulch over Modified Rockfill and Item 799.775 Live Cuttings.

Regarding the second part of this question, grass swales are not proposed adjacent to Hager Pond in this project.

Comment 8: *Seasonal high groundwater should be determined at all infiltration locations to confirm that the structures/basin won't intercept groundwater, which could affect the ability of the BMP to drain within 72 hours, reduce the volume available for peak flow, and/or result in inadequate treatment of stormwater prior contact with groundwater.*

Response 8: Boring were used to determine the seasonal high groundwater at all locations where infiltration structures are proposed. The boring logs are included in Appendix B of the Stormwater Report. The 72-hour draw calculations for each infiltration structure are provided in Appendix E Recharge and Water quality Calculations of the Stormwater report.

Comment 9: *Additional requirements: Before the activity described in the Notice of Intent can commence, you must obtain a Water Quality Certification. Please complete a 401 Water Quality Certification application form (http://www.mass.gov/eea/agencies/massdep/service/approvals/brp-ww-10-11.html) and file it with this Regional Office for review. Review under Section 404 may be required. (Call 1-800-362-4367 for information).*

Response 9: A 401 Water Quality Certification application and an individual permit application to the Army Corps of Engineers as set forth in the CWA Section 404(b)(1) Guidelines will be submitted and approved prior to the commencement of construction.

We have enclosed the supporting documents in the following attachments:

Attachment A – Existing & Proposed HY8 Analysis of culvert & Stream Stats flow data
Attachment B – Hager Pond Culvert Analysis Technical Memo
Attachment C – Existing & Proposed Open Channel Flow analysis
Attachment D – Special Provisions for Item 767.78 Composted Mulch over Modified Rockfill and Item 799.775 Live Cuttings

Please contact me at (508) 500-7041 or styler@hshassoc.com if you have any additional questions or comments.

Sincerely,

Steven J. Tyler, P.E.
Associate | Senior Civil Engineer

Attachment A

Existing & Proposed HY8 Analysis of Culvert & Stream Stats Flow Data

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 110 cfs

Design Flow: 132 cfs

Maximum Flow: 155 cfs

Table 1 - Summary of Culvert Flows at Crossing: Broad Meadow Existing - 100 yr

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
279.09	110.00	110.00	0.00	1
279.27	114.50	114.50	0.00	1
279.46	119.00	119.00	0.00	1
279.65	123.50	123.50	0.00	1
279.86	128.00	128.00	0.00	1
280.04	132.00	132.00	0.00	1
280.28	137.00	137.00	0.00	1
280.51	141.50	141.50	0.00	1
280.74	146.00	146.00	0.00	1
280.98	150.50	150.50	0.00	1
281.09	155.00	152.37	2.54	8
281.00	150.83	150.83	0.00	Overtopping

Rating Curve Plot for Crossing: Broad Meadow Existing - 100 yr

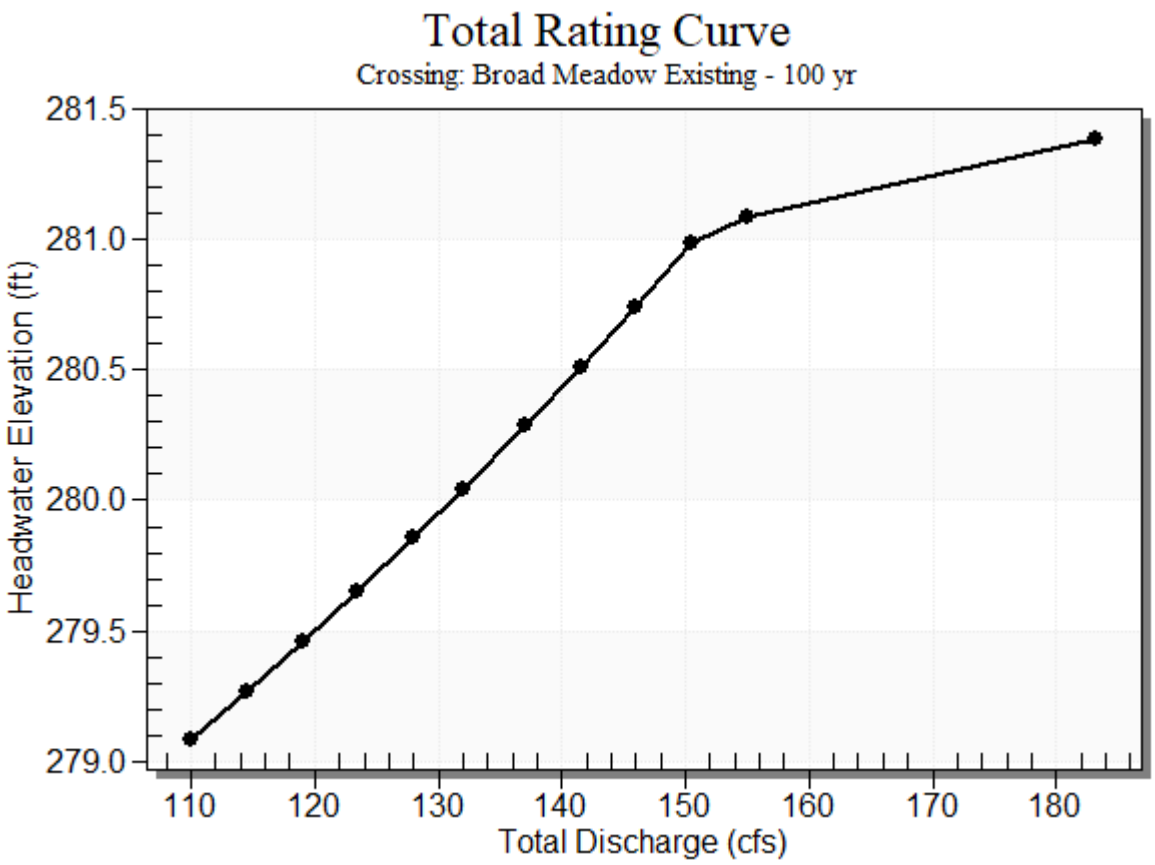


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
110.00	110.00	279.09	4.488	3.622	5-S2n	1.717	2.468	1.959	2.273	11.232	5.070
114.50	114.50	279.27	4.670	3.780	5-S2n	1.768	2.535	2.018	2.318	11.346	5.125
119.00	119.00	279.46	4.858	3.942	5-S2n	1.818	2.601	2.077	2.363	11.459	5.178
123.50	123.50	279.65	5.054	4.109	5-S2n	1.867	2.666	2.135	2.407	11.570	5.229
128.00	128.00	279.86	5.256	4.280	5-S2n	1.917	2.730	2.192	2.450	11.679	5.279
132.00	132.00	280.04	5.442	4.436	5-S2n	1.960	2.787	2.242	2.487	11.775	5.322
137.00	137.00	280.28	5.683	4.637	5-S2n	2.014	2.857	2.305	2.532	11.889	5.375
141.50	141.50	280.51	5.908	4.822	5-S2n	2.062	2.919	2.362	2.573	11.984	5.421
146.00	146.00	280.74	6.141	5.012	5-S2n	2.110	2.981	2.418	2.612	12.078	5.466
150.50	150.50	280.98	6.382	5.186	5-S2n	2.158	3.000	2.473	2.651	12.169	5.509
155.00	152.37	281.09	6.484	5.255	5-S2n	2.178	3.000	2.495	2.690	12.214	5.552

****

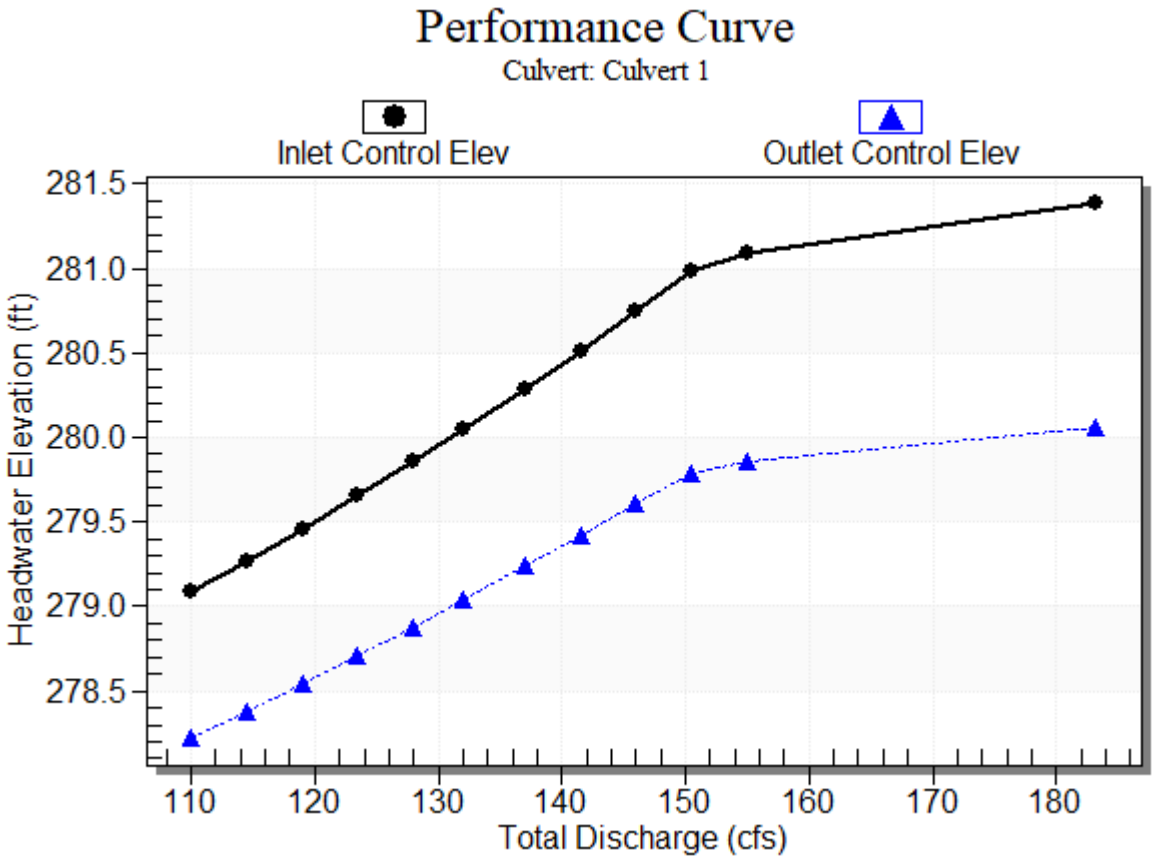
Straight Culvert

Inlet Elevation (invert): 274.60 ft, Outlet Elevation (invert): 274.00 ft

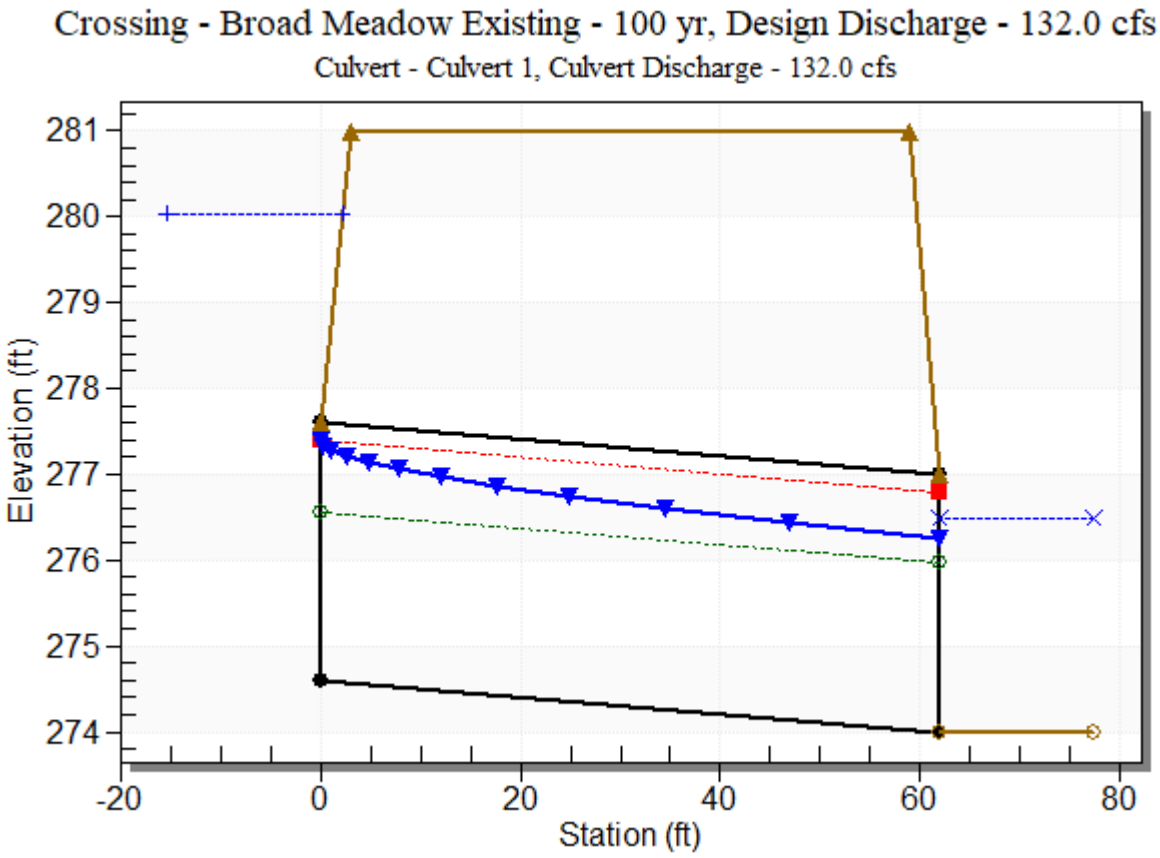
Culvert Length: 62.00 ft, Culvert Slope: 0.0097

****

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 274.60 ft

Outlet Station: 62.00 ft

Outlet Elevation: 274.00 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Broad Meadow Existing -

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
110.00	276.27	2.27	5.07	0.92	0.72
114.50	276.32	2.32	5.12	0.94	0.72
119.00	276.36	2.36	5.18	0.96	0.72
123.50	276.41	2.41	5.23	0.98	0.73
128.00	276.45	2.45	5.28	0.99	0.73
132.00	276.49	2.49	5.32	1.01	0.73
137.00	276.53	2.53	5.37	1.03	0.73
141.50	276.57	2.57	5.42	1.04	0.73
146.00	276.61	2.61	5.47	1.06	0.73
150.50	276.65	2.65	5.51	1.08	0.73
155.00	276.69	2.69	5.55	1.09	0.74

Tailwater Channel Data - Broad Meadow Existing - 100 yr

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 5.00 ft

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.0065

Channel Manning's n: 0.0300

Channel Invert Elevation: 274.00 ft

Roadway Data for Crossing: Broad Meadow Existing - 100 yr

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 35.00 ft

Crest Elevation: 281.00 ft

Roadway Surface: Paved

Roadway Top Width: 56.00 ft

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

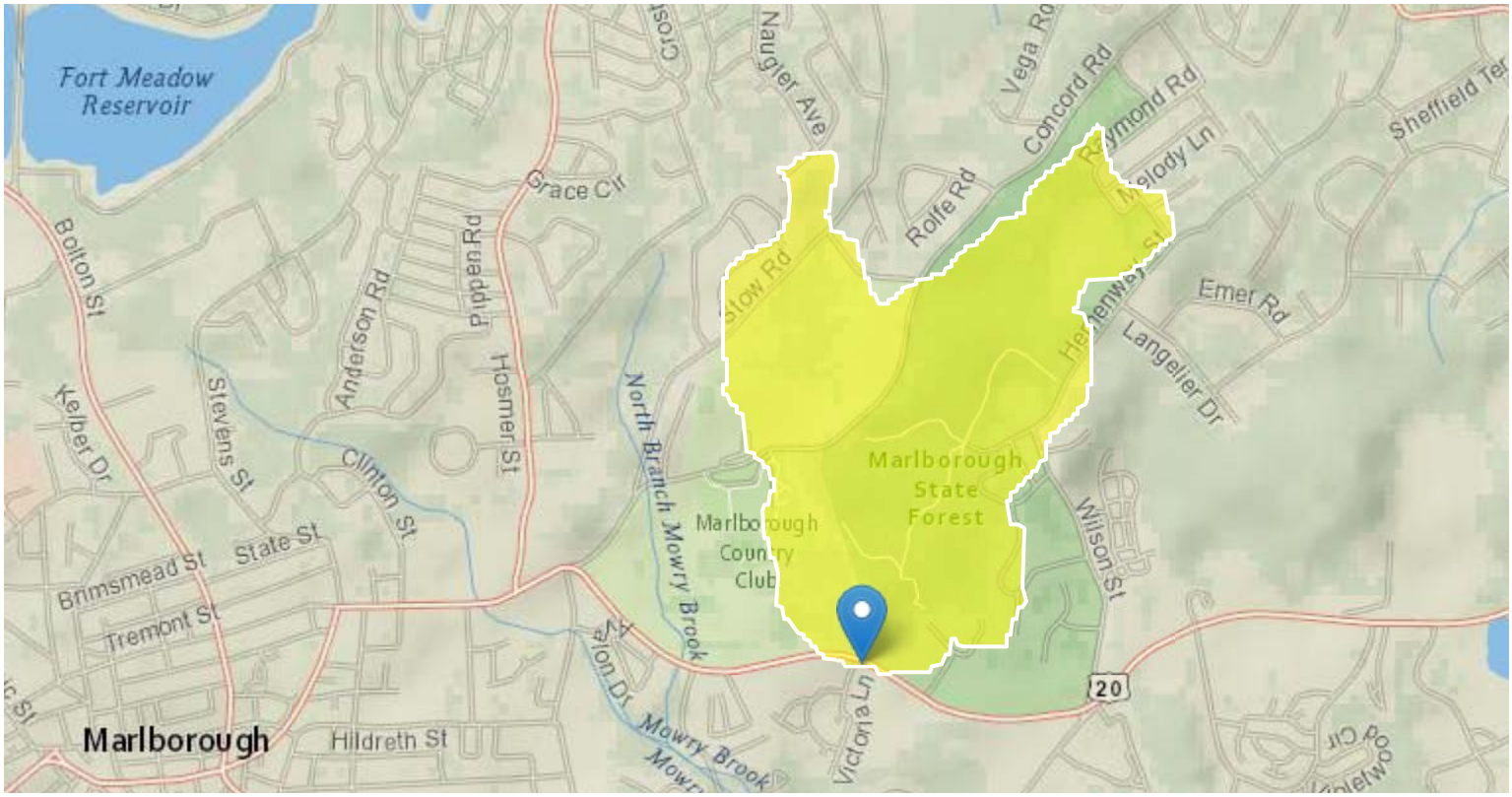
Minimum Flow: 110 cfs

Design Flow: 132 cfs

Maximum Flow: 155 cfs

Broad Meadow Brook StreamStats Report

Region ID: MA
Workspace ID: MA20200513133615703000
Clicked Point (Latitude, Longitude): 42.34922, -71.51808
Time: 2020-05-13 09:36:34 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.68	square miles
ELEV	Mean Basin Elevation	358	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	8.26	percent

Peak-Flow Statistics Parameters[Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.68	square miles	0.16	512
ELEV	Mean Basin Elevation	358	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	8.26	percent	0	32.3

Peak-Flow Statistics Flow Report[Peak Statewide 2016 5156]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp
2 Year Peak Flood	29.3	ft^3/s	14.9	57.8	42.3
5 Year Peak Flood	49.6	ft^3/s	24.8	99.2	43.4
10 Year Peak Flood	66	ft^3/s	32.2	135	44.7
25 Year Peak Flood	90.1	ft^3/s	42.4	191	47.1
50 Year Peak Flood	110	ft^3/s	50.2	242	49.4
100 Year Peak Flood	132	ft^3/s	58.2	299	51.8
200 Year Peak Flood	155	ft^3/s	66.5	363	54.1
500 Year Peak Flood	190	ft^3/s	77.4	464	57.6

Peak-Flow Statistics Citations

Zarriello, P.J.,2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (https://dx.doi.org/10.3133/sir20165156)

Application Version: 4.3.11

Table 1 - Summary of Culvert Flows at Crossing: Broad Meadow Existing - 100 yr

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
279.09	110.00	110.00	0.00	1
279.27	114.50	114.50	0.00	1
279.46	119.00	119.00	0.00	1
279.65	123.50	123.50	0.00	1
279.86	128.00	128.00	0.00	1
280.04	132.00	132.00	0.00	1
280.28	137.00	137.00	0.00	1
280.51	141.50	141.50	0.00	1
280.74	146.00	146.00	0.00	1
280.98	150.50	150.50	0.00	1
281.09	155.00	152.37	2.54	8
281.00	150.83	150.83	0.00	Overtopping

Rating Curve Plot for Crossing: Broad Meadow Existing - 100 yr

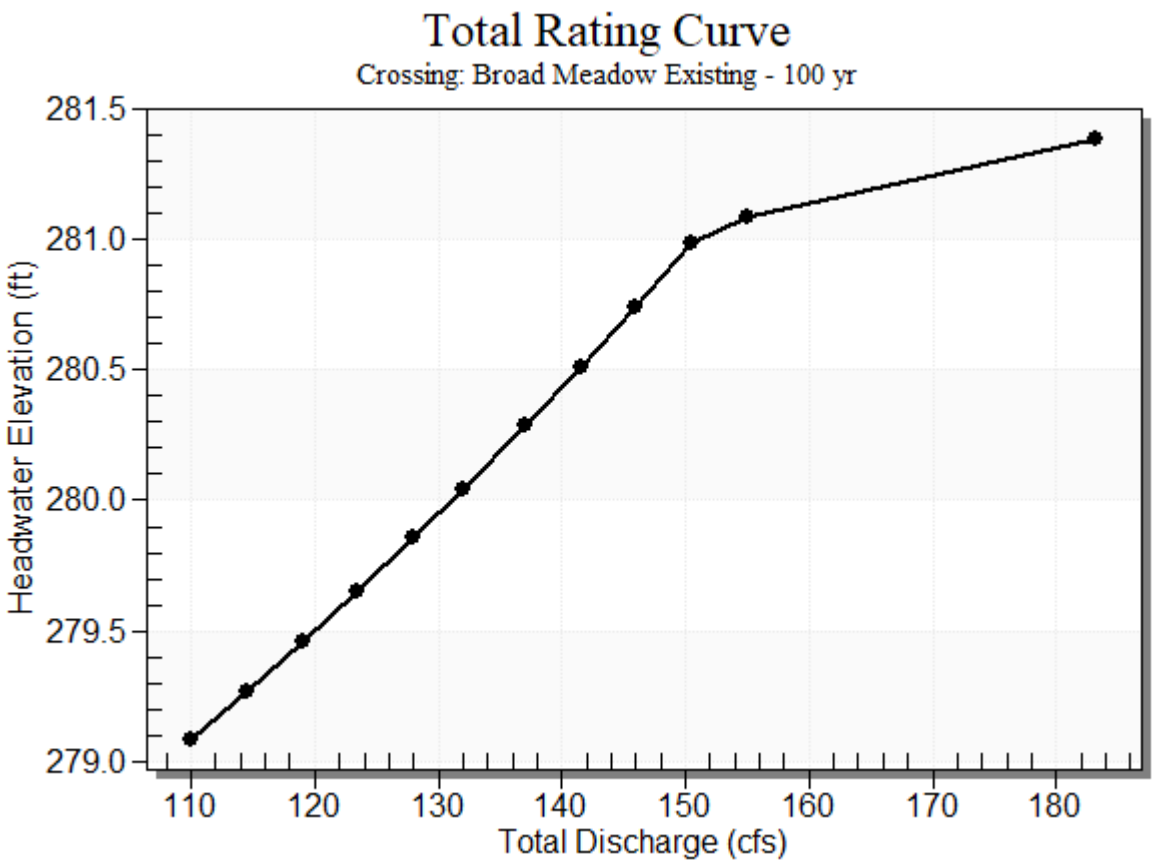


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
110.00	110.00	279.09	4.488	3.622	5-S2n	1.717	2.468	1.959	2.273	11.232	5.070
114.50	114.50	279.27	4.670	3.780	5-S2n	1.768	2.535	2.018	2.318	11.346	5.125
119.00	119.00	279.46	4.858	3.942	5-S2n	1.818	2.601	2.077	2.363	11.459	5.178
123.50	123.50	279.65	5.054	4.109	5-S2n	1.867	2.666	2.135	2.407	11.570	5.229
128.00	128.00	279.86	5.256	4.280	5-S2n	1.917	2.730	2.192	2.450	11.679	5.279
132.00	132.00	280.04	5.442	4.436	5-S2n	1.960	2.787	2.242	2.487	11.775	5.322
137.00	137.00	280.28	5.683	4.637	5-S2n	2.014	2.857	2.305	2.532	11.889	5.375
141.50	141.50	280.51	5.908	4.822	5-S2n	2.062	2.919	2.362	2.573	11.984	5.421
146.00	146.00	280.74	6.141	5.012	5-S2n	2.110	2.981	2.418	2.612	12.078	5.466
150.50	150.50	280.98	6.382	5.186	5-S2n	2.158	3.000	2.473	2.651	12.169	5.509
155.00	152.37	281.09	6.484	5.255	5-S2n	2.178	3.000	2.495	2.690	12.214	5.552

****

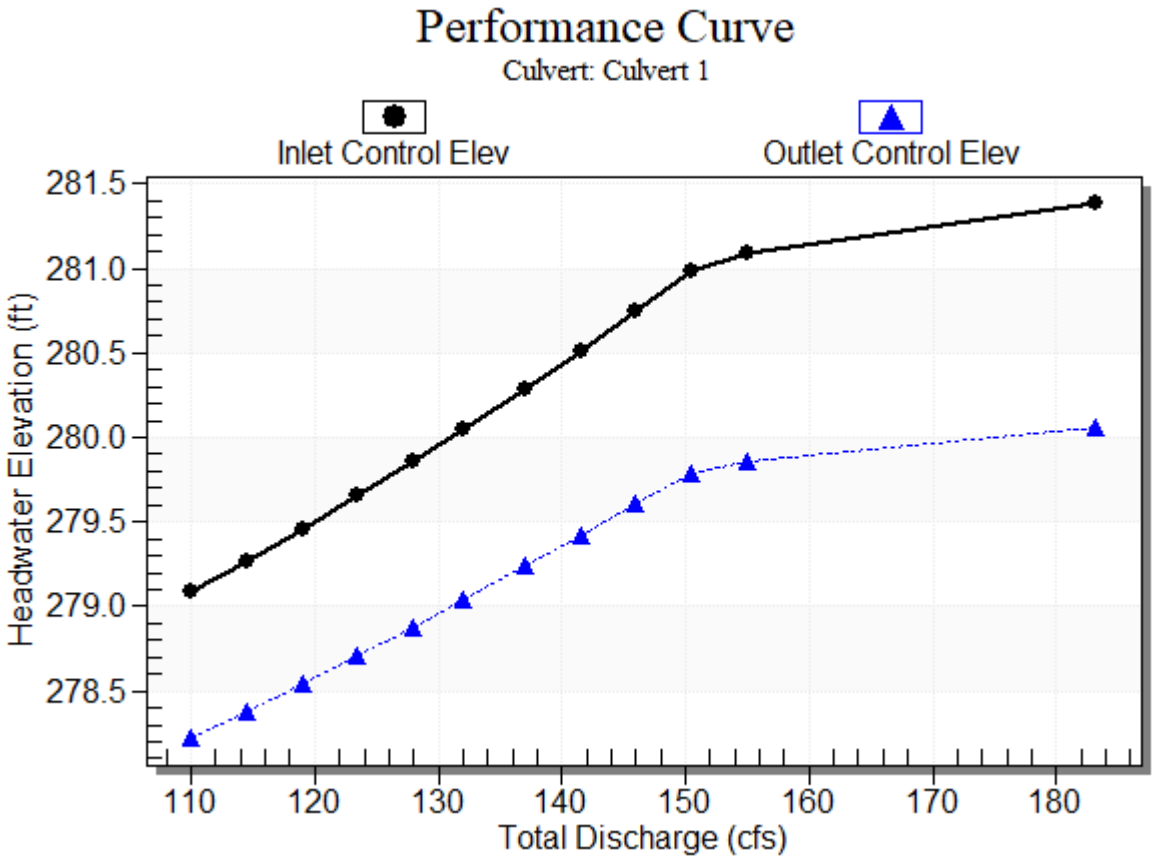
Straight Culvert

Inlet Elevation (invert): 274.60 ft, Outlet Elevation (invert): 274.00 ft

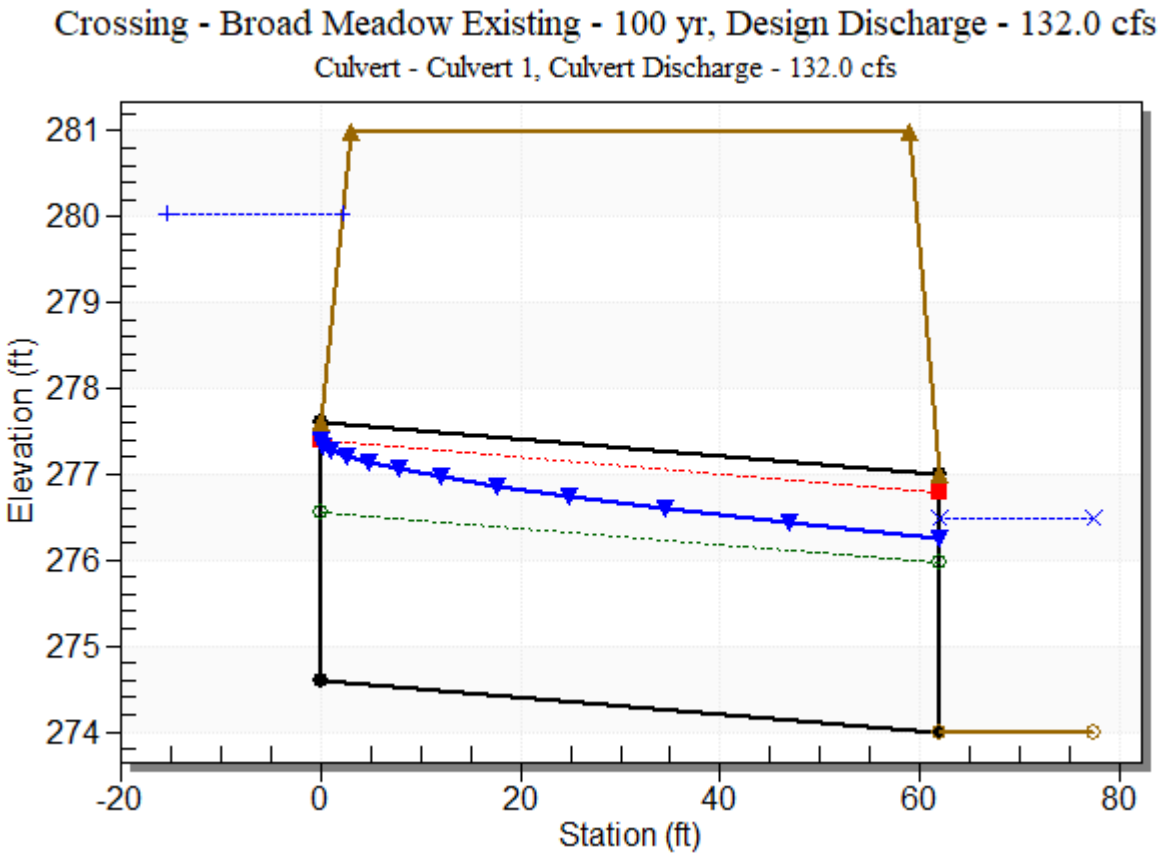
Culvert Length: 62.00 ft, Culvert Slope: 0.0097

****

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 274.60 ft

Outlet Station: 62.00 ft

Outlet Elevation: 274.00 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Broad Meadow Existing -

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
110.00	276.27	2.27	5.07	0.92	0.72
114.50	276.32	2.32	5.12	0.94	0.72
119.00	276.36	2.36	5.18	0.96	0.72
123.50	276.41	2.41	5.23	0.98	0.73
128.00	276.45	2.45	5.28	0.99	0.73
132.00	276.49	2.49	5.32	1.01	0.73
137.00	276.53	2.53	5.37	1.03	0.73
141.50	276.57	2.57	5.42	1.04	0.73
146.00	276.61	2.61	5.47	1.06	0.73
150.50	276.65	2.65	5.51	1.08	0.73
155.00	276.69	2.69	5.55	1.09	0.74

Tailwater Channel Data - Broad Meadow Existing - 100 yr

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 5.00 ft

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.0065

Channel Manning's n: 0.0300

Channel Invert Elevation: 274.00 ft

Roadway Data for Crossing: Broad Meadow Existing - 100 yr

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 35.00 ft

Crest Elevation: 281.00 ft

Roadway Surface: Paved

Roadway Top Width: 56.00 ft

Attachment B

Hager Pond Culvert Analysis Technical Memo

TO:	Hanan Fouad, P.E.	DATE:	12/7/2017
FROM:	Matthew Jasmin, P.E.	MASSDOT PROJECT NO.:	608467
SUBJECT:	Hager Pond Culvert Analysis		

Summary

Howard Stein Hudson ("HSH") is pleased to submit this existing culvert analysis to the Massachusetts Department of Transportation ("MassDOT"). MassDOT is proposing roadway improvements along Boston Post Road (Route 20) in Marlborough, Massachusetts. Related project activities include roadway rehabilitation, safety improvements, and drainage system improvements. HSH was tasked with analyzing the capacity of the existing 4.5' x 4' culvert on Boston Post Road that discharges into Hager Pond. Please see Figure 1 for a USGS Map of the project area and Appendix 1 for photos of the existing culvert. Results of the analysis and descriptions of the design sources are provided in the following sections.

Project Description

EXISTING CULVERT

The existing Hager Pond Culvert is 4.5 feet (ft) wide by 4 ft high and 54.3 ft long. Due to limited survey data, the culvert inverts and slope had to be calculated from field tape measurements. The calculated slope of the culvert was 0.004 ft/ft. The culvert tailwater was determined from the existing survey data.

CROSSED WATERWAY

The total contributing area of the watershed is 677.29 Acres and the total impervious cover is 19.2% of the total site area (130.1 Acres). The watershed's hydrologic soil ratings vary from A, B C, and D throughout the watershed. The culverts approach channel has a shallow slope of 0.005 ft/ft before discharging into Hager Pond.

HIGHWAY CONVEYED

The crossing is located on Boston Post Road (Route 20) in Marlborough, Massachusetts. The road is classified as Urban Principal Arterial and has a current ADT of 22,160.

LAND USES

Land uses in the project area include commercial, industrial, and residential.

Data Collection

DATA SOURCES AND APPLICATION

Table 1. Data Sources and Application

Data	Sources	Application
Rainfall Data	NRCC Extreme Precipitation in New York and New England	Inputted rainfall data into a HydroCAD TR-20 analysis to determine the watershed discharges.
Soil Data	NRCS Soil Map Survey	Determined the underlying soil properties and hydrologic groups.
Site Data	MassGIS Oliver, Field Survey	Inputted project data including topography and wetlands. Analyzed existing culvert and site data.
Stream/Channel Features	USGS StreamStats, Field Survey	Determined the contributing watershed area and properties.

Engineering Methods

HYDROLOGIC ANALYSES

The existing watershed hydrologic analyses was completed following the MassDOT LRFD Bridge Manual – Part 1 Chapter 1.3 "Hydraulic Study Procedure". The existing flow generated by the existing watershed was calculated with a TR-20 HydroCAD analysis.

The existing watershed was delineated using a combination of survey, GIS topography and StreamStats data. See Figure 2 for the existing watershed area. The total contributing area of the watershed is 677.29 Acres. The watershed was broken down by the surface conditions and the

underlying soil conditions. A weighted CN number for the watershed was determined to be 61. In addition, a Time of Concentration (Tc) of 240 minutes was calculated. Please see the existing watershed HydroCAD report for the 10, 50, and 100 year storm events in Appendix 2 and the discharge results summarized in Table 2.

Table 2. Existing Watershed Discharge

Storm Event	Discharge (cfs)
10-Year Storm Event	126.39
50-Year Storm Event	310.38
100-Year Storm Event	433.99

HYDRAULIC ANALYSES

The existing culvert hydraulic analysis was completed following the Federal Highway Administrations Hydraulic Design Series Number 5 "Hydraulic Design of Highway Culverts Third Edition". The hydraulic analyses was modeled using HY-8. The culvert's hydraulic capacity was analyzed for the 50 year storm following the MassDOT LRFD Bridge Manual – Part 1 Chapter 1.34 "Hydraulic and Scour Design Flood Selection Guidelines".

For the hydraulic analysis, the existing watershed data, culvert data, tailwater data, and roadway data were inputted into HY-8. Please see Table 3 for the existing culvert data.

Table 3. Existing Culvert Data

Size (ft x ft)	Length (ft)	Slope (ft/ft)	Invert In Elevation (ft)	Invert Out Elevation (ft)	Tailwater Elevation (ft)	Roadway Elevation (ft)
4.5 W x 4.0 H	54.3	0.004	219.67	219.45	222.16	228.25

Following the FHWA Hydraulic Design of Highway Culverts, the allowable headwater for the culvert is 7.46' (See Appendix 3). The 50 year storm discharge of 310.38 cfs was inputted into HY-8 which resulted in a headwater of 9.38' at elevation 229.05'. This is unacceptable as it is above the allowable

headwater of 7.6' and 0.87' above the existing road elevation of 228.25. Please see Table 4 and Appendix 3 for a summary of the HY-8 Results.

Table 4. HY-8 50-year Storm Analysis

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Allowable Headwater Elevation (ft)	Inlet Control Depth (ft)	Allowable Headwater Depth (ft)
310.38	224.27	229.05	227.13	9.38	7.46

SCOUR ANALYSES

The existing culvert scour analysis was completed following the Federal Highway Administration's Hydraulic Engineering Circular No. 14, Third Edition "Hydraulic Design of Energy Dissipators for Culverts and Channels". The scour analysis was modeled using HY-8.

The underlying soil at the culvert outlet is sandy loam. A typical material standard deviation, as provided in the FWHA design guide, was used in the HY-8 Scour Hole analysis. The analysis resulted in a scour hole 106.4 feet long, 54.3 feet wide, 8.1 deep, and with a volume of 12,826 ft^3. This scour hole is overly large compared to the existing site constraints. Therefore scour countermeasures should be designed for the culvert. Please see the HY-8 Scour Hole Dimensions in Table 5.

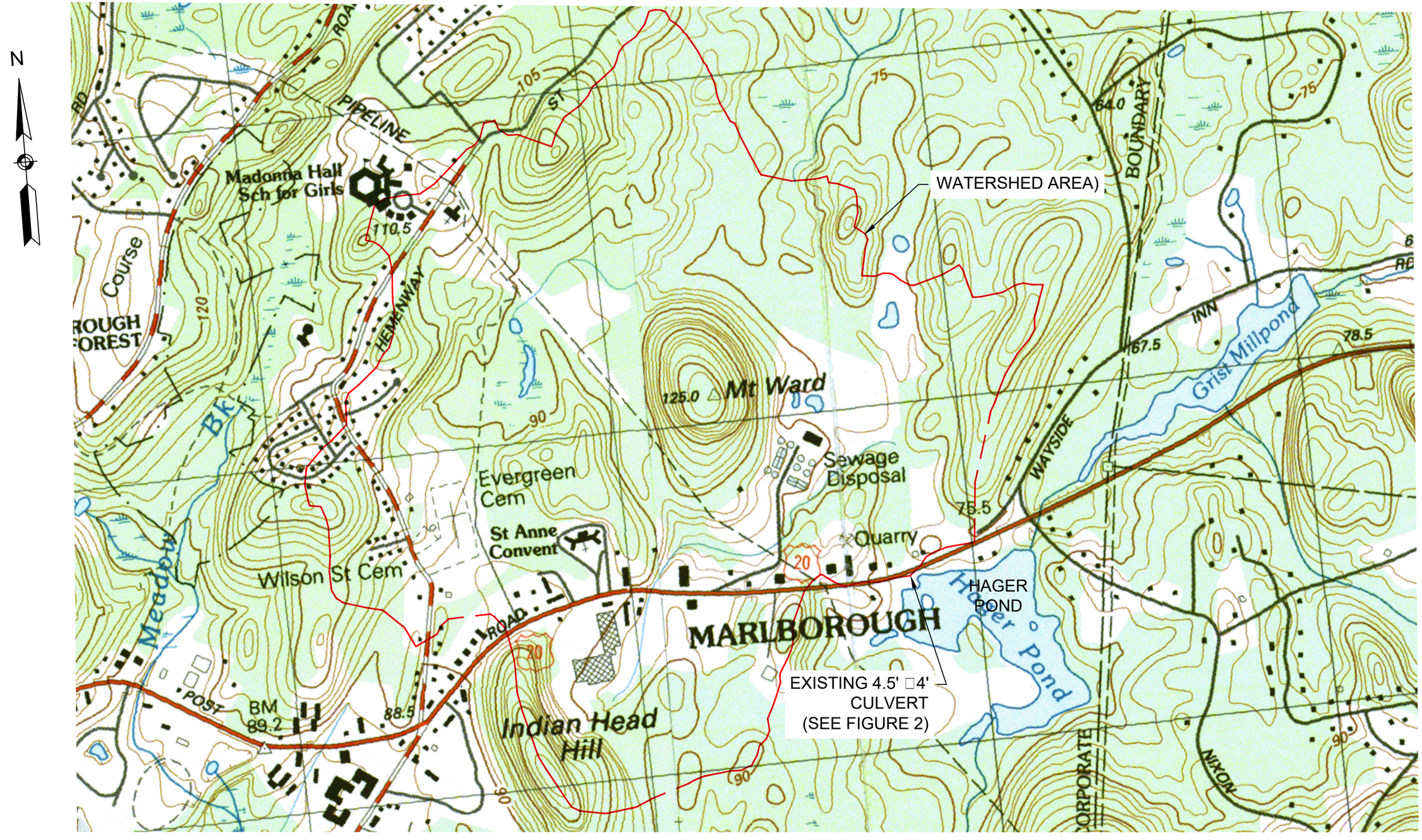
Table 5. HY-8 Scour Hole Dimensions

Length (ft)	Width (ft)	Depth (ft)	Volume (ft^3)
106.4	54.3	8.1	12,699

Conclusion

Based on the provided calculations, the existing culvert is not adequately sized for the 50 year storm event. Adjacent properties would be minimally effected by flooding due to the existing topography near Hager Pond. An additional HY-8 analysis was completed and determined that a 4' x 8' culvert with scour countermeasures would provide sufficient capacity for the 50 year storm event. (See Appendix 5)

Figure 1:
USGS Map

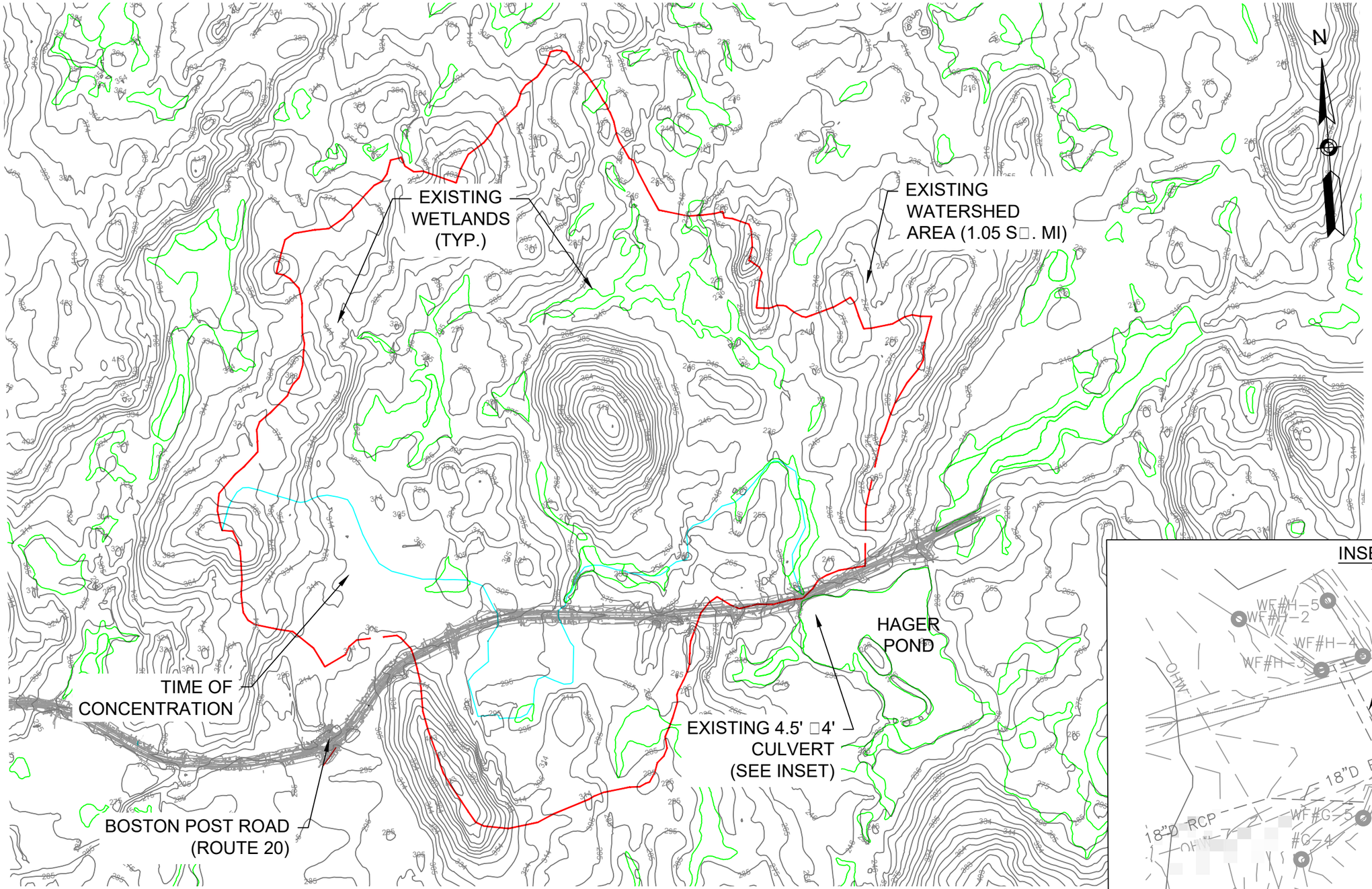


HOWARD STEIN HUDSON
11 Beacon Street, Suite 1010
Boston, MA 02108
www.hshassoc.com

HAGER POND CULVERT
USGS QUAD

FIGURE:	FIGURE 1
DATE:	12/6/17
JOB	201361.32
SCALE:	NTS
REV: 0	BY: RJM
DWG REF:	N/A

Figure 2:
Existing Watershed Area



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HAGER POND CULVERT
EXISTING WATERSHED AREA

FIGURE:	FIGURE 2
DATE:	12/6/17
JOB	201361.32
SCALE:	NTS
REV: 0	BY: RJM
DWG REF:	N/A

Appendix 1: Photos

HOWARD STEIN HUDSON

May 31, 2017

Re: Hager Pond Culvert Crossing
Boston Post Road E (Route 20)
Marlborough, MA

48"x48" Open Bottom Box Culvert (Upstream) – Condition observed to be adequate and structurally sound

Looking down box culvert upstream – from what could be seen, inside of culvert looks structurally sound

Upstream box culvert – broken paved swale from Route 20

Approximately 18" built up sediment upstream side of box culvert, water level approximately 30" depth

Upstream box culvert – face of guardrail approximately 6' off face of culvert

Upstream box culvert – guardrail height approximately 22"

Looking upstream from box culvert

Broken paved swale from Route 20 – upstream box culvert

Downstream culvert (Hager Pond outlet) – overgrown vegetation

Small crack in downstream headwall (approximately 18" in length)

Downstream sediment build up

Downstream box culvert (Hager Pond outlet)

Downstream box culvert (Hager Pond outlet)

South side Route 20 sediment build up to guard rail

Slope on south side of Route 20 along Hager Pond, east of culvert crossing

Looking west along Route 20 at culvert crossing outlet to Hager Pond

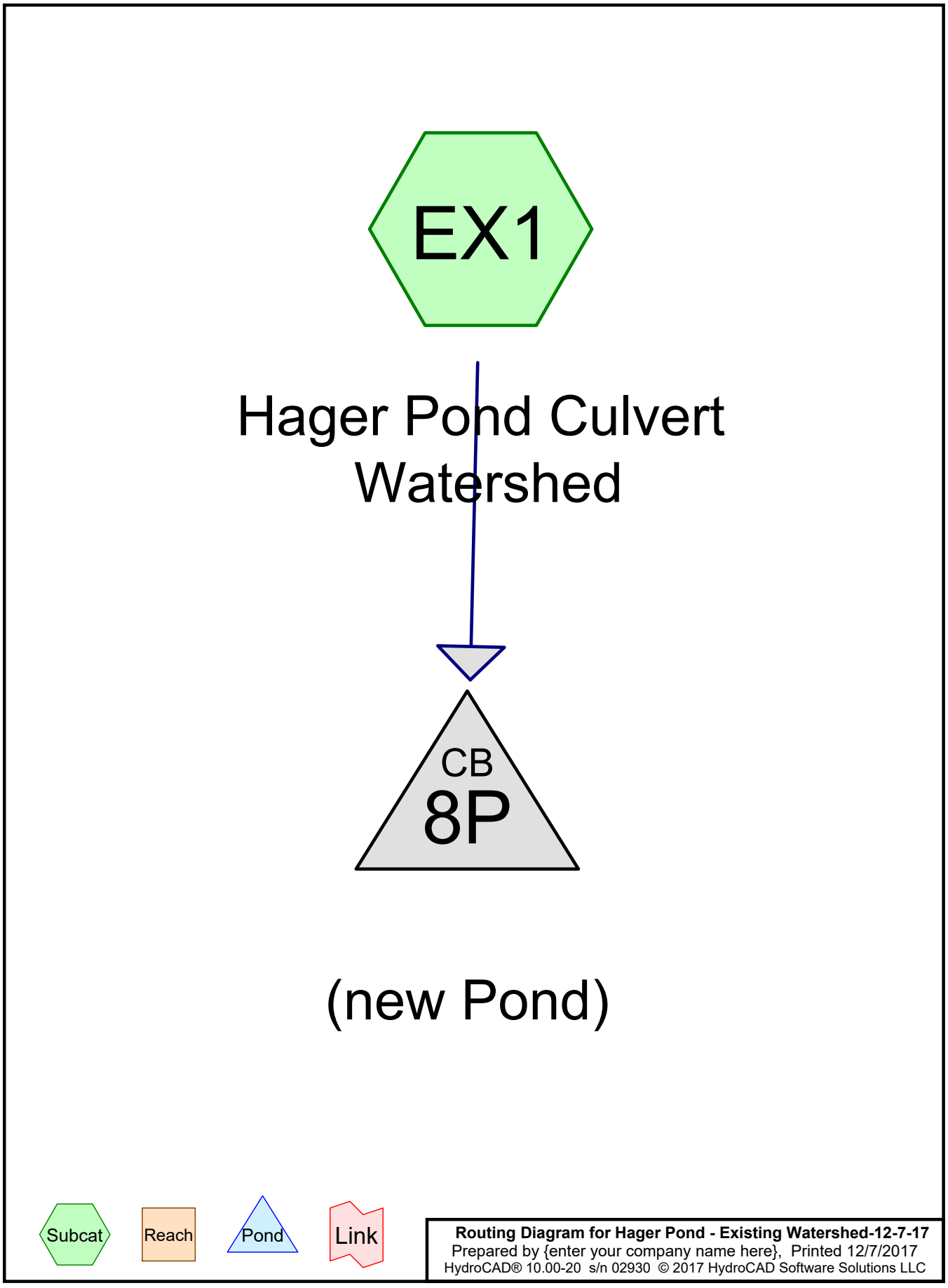
Slope on south side of Route 20 along Hager Pond, east of culvert crossing

Upstream sediment build up north side of Route 20

Eroded Slope on south side of Route 20 along Hager Pond, east of culvert crossing

Headwall at upstream (Northern) headwall

Appendix 2:
HydroCAD Existing Watershed Area



Routing Diagram for Hager Pond - Existing Watershed-12-7-17
Prepared by {enter your company name here}, Printed 12/7/2017

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
20.435	39	>75% Grass cover, Good, HSG A (EX1)
1.803	61	>75% Grass cover, Good, HSG B (EX1)
38.927	98	Paved parking, HSG A (EX1)
16.804	98	Paved parking, HSG B (EX1)
65.104	98	Paved parking, HSG C (EX1)
9.268	98	Paved parking, HSG D (EX1)
98.144	36	Woods, Fair, HSG A (EX1)
46.271	60	Woods, Fair, HSG B (EX1)
75.250	73	Woods, Fair, HSG C (EX1)
109.291	30	Woods, Good, HSG A (EX1)
81.626	55	Woods, Good, HSG B (EX1)
55.232	70	Woods, Good, HSG C (EX1)
59.135	77	Woods, Good, HSG D (EX1)
677.290	**61**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
266.797	HSG A	EX1
146.504	HSG B	EX1
195.586	HSG C	EX1
68.403	HSG D	EX1
0.000	Other	
677.290		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
20.435	1.803	0.000	0.000	0.000	22.238	>75% Grass cover, Good	EX1
38.927	16.804	65.104	9.268	0.000	130.103	Paved parking	EX1
98.144	46.271	75.250	0.000	0.000	219.665	Woods, Fair	EX1
109.291	81.626	55.232	59.135	0.000	305.284	Woods, Good	EX1
266.797	**146.504**	**195.586**	**68.403**	**0.000**	**677.290**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	EX1	0.00	0.00	1,339.0	0.0050	0.015	18.0	0.0	0.0
2	EX1	0.00	0.00	1,360.0	0.0050	0.015	18.0	0.0	0.0
3	8P	219.67	219.40	54.3	0.0050	0.011	54.0	48.0	0.0

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 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 EX1: Hager Pond Culvert Runoff Area=677.290 ac 19.21% Impervious Runoff Depth>1.17"
Flow Length=11,602' Tc=240.0 min CN=61 Runoff=126.39 cfs 66.105 af

Pond 8P: (new Pond) Peak Elev=224.60' Inflow=126.39 cfs 66.105 af
54.0" x 48.0" Box Culvert n=0.011 L=54.3' S=0.0050 '/' Outflow=126.39 cfs 66.105 af

Total Runoff Area = 677.290 ac Runoff Volume = 66.105 af Average Runoff Depth = 1.17"
80.79% Pervious = 547.187 ac 19.21% Impervious = 130.103 ac

Summary for Subcatchment EX1: Hager Pond Culvert Watershed

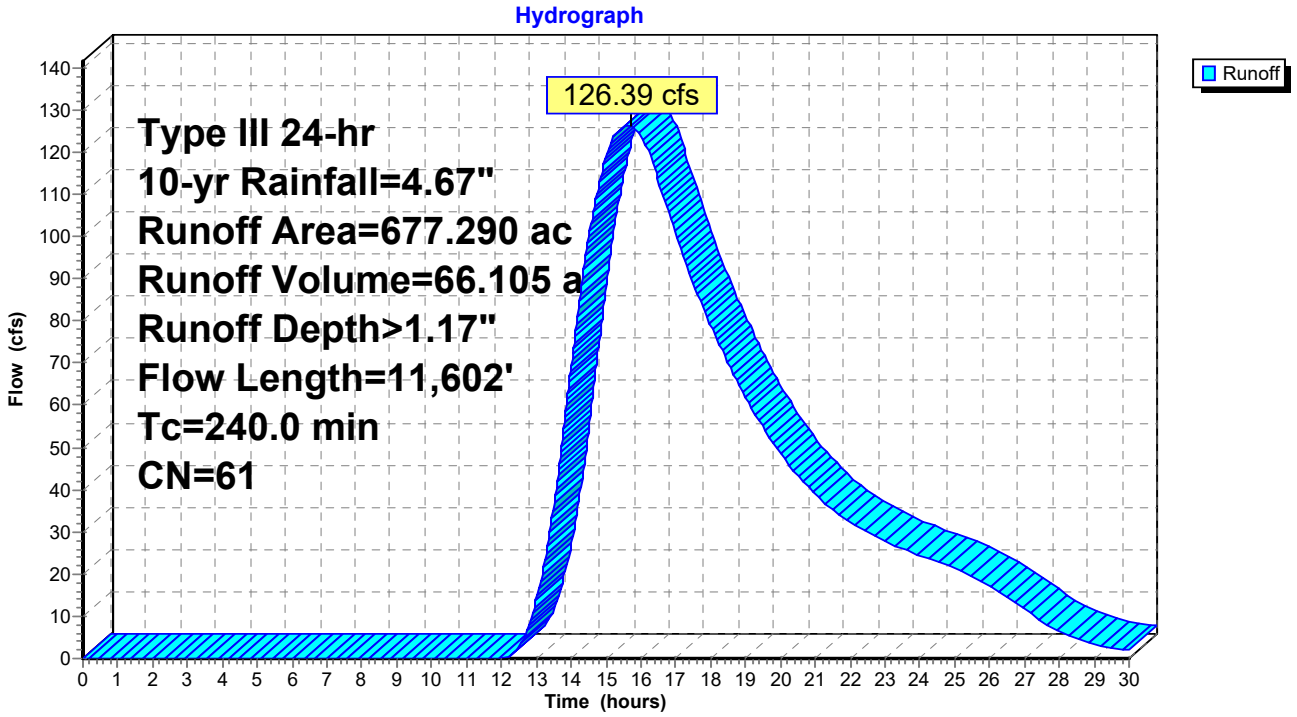
Runoff = 126.39 cfs @ 15.73 hrs, Volume= 66.105 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.67"

Area (ac)	CN	Description
3.887	98	Paved parking, HSG A
28.507	30	Woods, Good, HSG A
1.801	98	Paved parking, HSG B
13.211	55	Woods, Good, HSG B
1.803	61	>75% Grass cover, Good, HSG B
20.435	39	>75% Grass cover, Good, HSG A
73.168	36	Woods, Fair, HSG A
27.324	60	Woods, Fair, HSG B
69.642	73	Woods, Fair, HSG C
53.003	77	Woods, Good, HSG D
7.228	98	Paved parking, HSG D
48.055	55	Woods, Good, HSG B
6.553	98	Paved parking, HSG B
47.183	30	Woods, Good, HSG A
6.434	98	Paved parking, HSG A
21.351	30	Woods, Good, HSG A
11.496	98	Paved parking, HSG A
27.622	70	Woods, Good, HSG C
14.874	98	Paved parking, HSG C
24.976	36	Woods, Fair, HSG A
18.947	60	Woods, Fair, HSG B
5.608	73	Woods, Fair, HSG C
15.080	98	Paved parking, HSG A
5.280	30	Woods, Good, HSG A
1.870	98	Paved parking, HSG B
0.620	55	Woods, Good, HSG B
46.160	98	Paved parking, HSG C
15.390	70	Woods, Good, HSG C
2.030	98	Paved parking, HSG A
6.970	30	Woods, Good, HSG A
6.580	98	Paved parking, HSG B
19.740	55	Woods, Good, HSG B
4.070	98	Paved parking, HSG C
12.220	70	Woods, Good, HSG C
2.040	98	Paved parking, HSG D
6.132	77	Woods, Good, HSG D
677.290	61	Weighted Average
547.187		80.79% Pervious Area
130.103		19.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.1	100	0.0800	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.31"
4.3	203	0.1000	0.79		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
12.8	321	0.0280	0.42		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
3.1	205	0.0480	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	123	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	289	0.1380	0.93		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
70.8	1,590	0.0056	0.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.6	775	0.0030	0.78	37.31	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
6.1	1,339	0.0050	3.64	6.44	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
29.5	794	0.0010	0.45	21.54	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
6.2	1,360	0.0050	3.64	6.44	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
28.6	2,439	0.0100	1.42	68.11	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
34.3	2,064	0.0050	1.00	48.16	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
240.0	11,602	Total			

Subcatchment EX1: Hager Pond Culvert Watershed



Summary for Pond 8P: (new Pond)

[57] Hint: Peaked at 224.60' (Flood elevation advised)

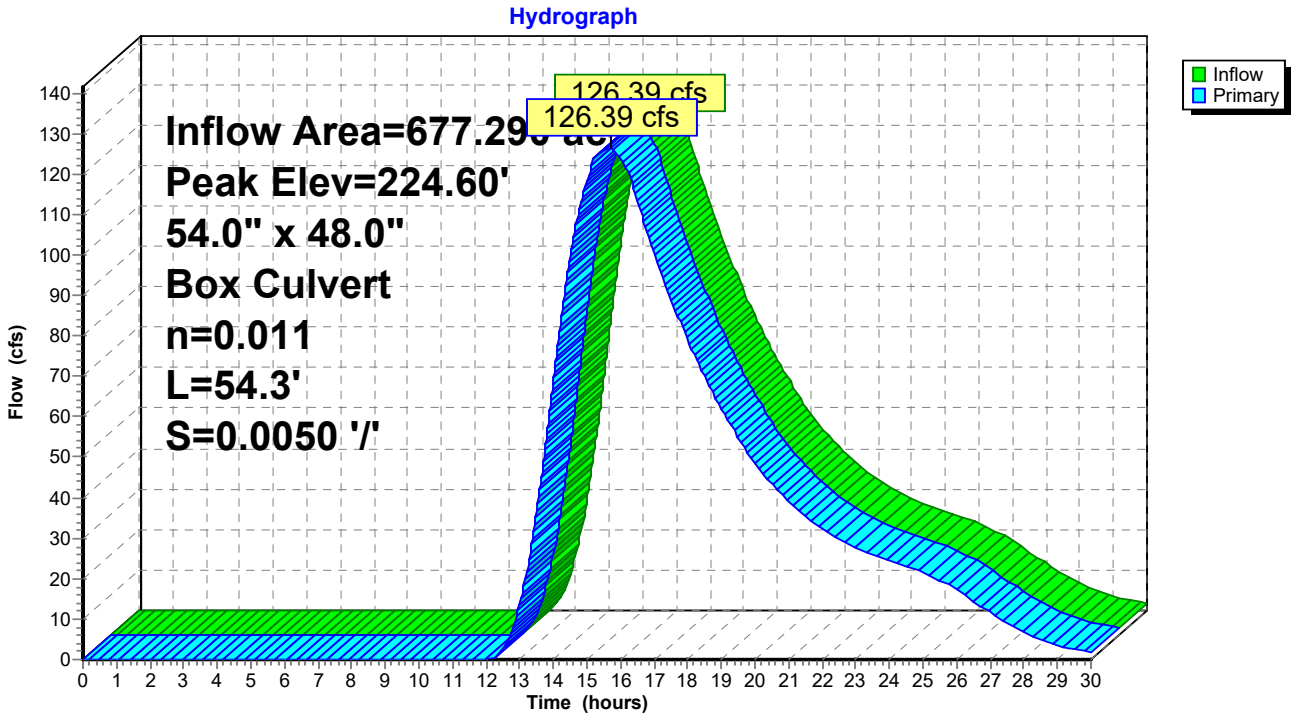
Inflow Area = 677.290 ac, 19.21% Impervious, Inflow Depth > 1.17" for 10-yr event
Inflow = 126.39 cfs @ 15.73 hrs, Volume= 66.105 af
Outflow = 126.39 cfs @ 15.73 hrs, Volume= 66.105 af, Atten= 0%, Lag= 0.0 min
Primary = 126.39 cfs @ 15.73 hrs, Volume= 66.105 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 224.60' @ 15.73 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	219.67'	**54.0" W x 48.0" H Box Culvert** L= 54.3' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 219.67' / 219.40' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 18.00 sf

Primary OutFlow Max=126.38 cfs @ 15.73 hrs HW=224.60' TW=222.16' (Fixed TW Elev= 222.16')
1=Culvert (Inlet Controls 126.38 cfs @ 7.02 fps)

Pond 8P: (new Pond)



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 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 EX1: Hager Pond Culvert Runoff Area=677.290 ac 19.21% Impervious Runoff Depth>2.67"
Flow Length=11,602' Tc=240.0 min CN=61 Runoff=310.38 cfs 150.836 af

Pond 8P: (new Pond) Peak Elev=235.27' Inflow=310.38 cfs 150.836 af
54.0" x 48.0" Box Culvert n=0.011 L=54.3' S=0.0050 '/' Outflow=310.38 cfs 150.836 af

Total Runoff Area = 677.290 ac Runoff Volume = 150.836 af Average Runoff Depth = 2.67"
80.79% Pervious = 547.187 ac 19.21% Impervious = 130.103 ac

Summary for Subcatchment EX1: Hager Pond Culvert Watershed

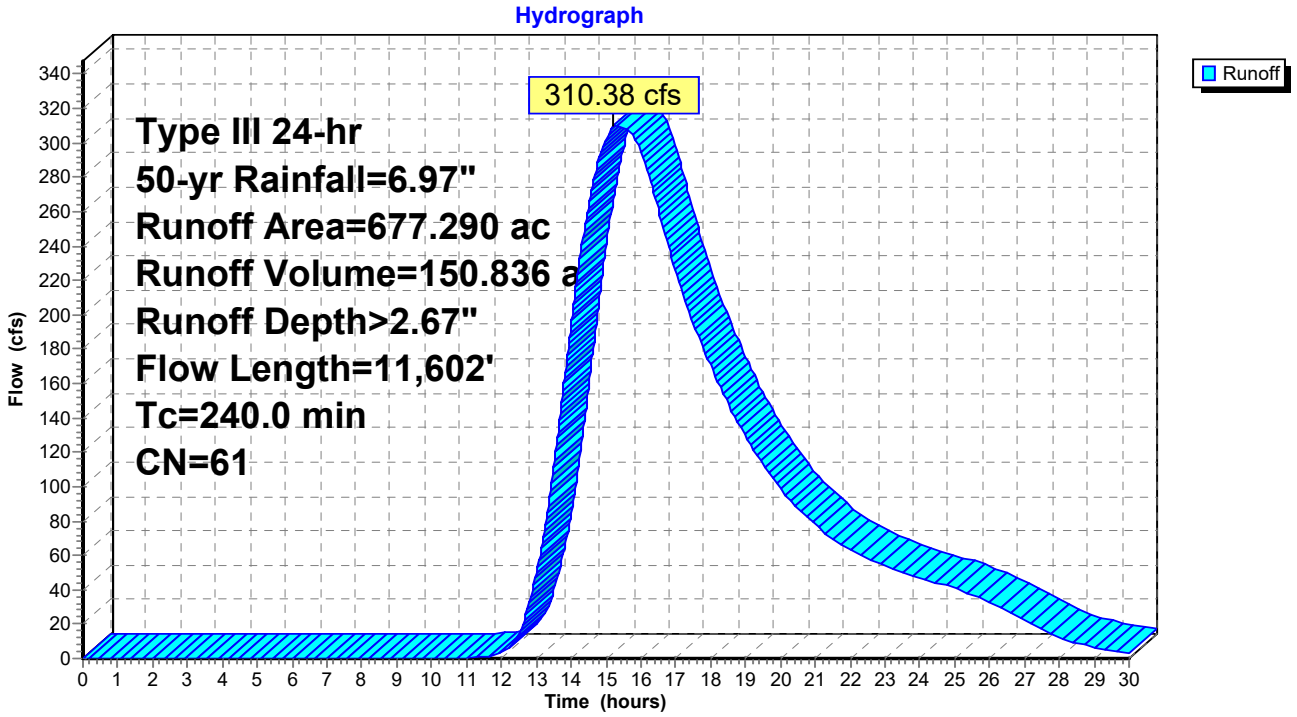
Runoff = 310.38 cfs @ 15.21 hrs, Volume= 150.836 af, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-yr Rainfall=6.97"

Area (ac)	CN	Description
3.887	98	Paved parking, HSG A
28.507	30	Woods, Good, HSG A
1.801	98	Paved parking, HSG B
13.211	55	Woods, Good, HSG B
1.803	61	>75% Grass cover, Good, HSG B
20.435	39	>75% Grass cover, Good, HSG A
73.168	36	Woods, Fair, HSG A
27.324	60	Woods, Fair, HSG B
69.642	73	Woods, Fair, HSG C
53.003	77	Woods, Good, HSG D
7.228	98	Paved parking, HSG D
48.055	55	Woods, Good, HSG B
6.553	98	Paved parking, HSG B
47.183	30	Woods, Good, HSG A
6.434	98	Paved parking, HSG A
21.351	30	Woods, Good, HSG A
11.496	98	Paved parking, HSG A
27.622	70	Woods, Good, HSG C
14.874	98	Paved parking, HSG C
24.976	36	Woods, Fair, HSG A
18.947	60	Woods, Fair, HSG B
5.608	73	Woods, Fair, HSG C
15.080	98	Paved parking, HSG A
5.280	30	Woods, Good, HSG A
1.870	98	Paved parking, HSG B
0.620	55	Woods, Good, HSG B
46.160	98	Paved parking, HSG C
15.390	70	Woods, Good, HSG C
2.030	98	Paved parking, HSG A
6.970	30	Woods, Good, HSG A
6.580	98	Paved parking, HSG B
19.740	55	Woods, Good, HSG B
4.070	98	Paved parking, HSG C
12.220	70	Woods, Good, HSG C
2.040	98	Paved parking, HSG D
6.132	77	Woods, Good, HSG D
677.290	61	Weighted Average
547.187		80.79% Pervious Area
130.103		19.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.1	100	0.0800	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.31"
4.3	203	0.1000	0.79		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
12.8	321	0.0280	0.42		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
3.1	205	0.0480	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	123	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	289	0.1380	0.93		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
70.8	1,590	0.0056	0.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.6	775	0.0030	0.78	37.31	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
6.1	1,339	0.0050	3.64	6.44	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
29.5	794	0.0010	0.45	21.54	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
6.2	1,360	0.0050	3.64	6.44	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
28.6	2,439	0.0100	1.42	68.11	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
34.3	2,064	0.0050	1.00	48.16	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
240.0	11,602	Total			

Subcatchment EX1: Hager Pond Culvert Watershed



Summary for Pond 8P: (new Pond)

[57] Hint: Peaked at 235.27' (Flood elevation advised)

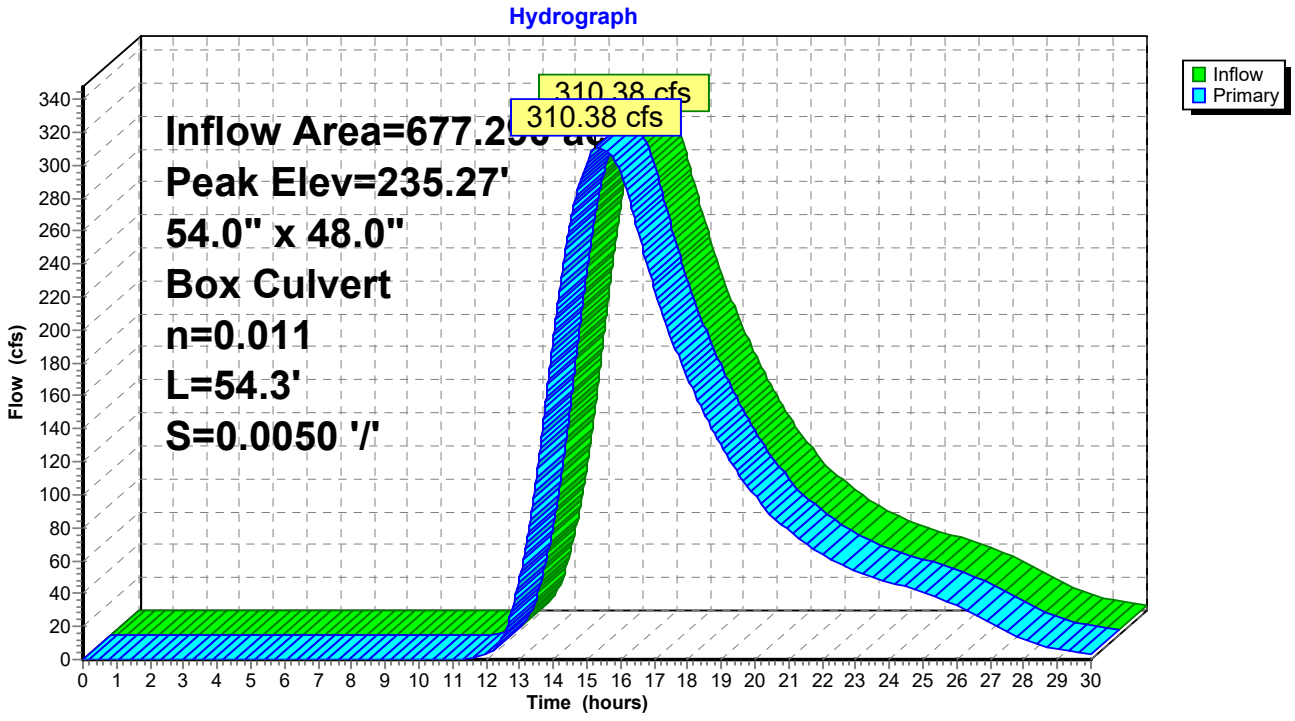
Inflow Area = 677.290 ac, 19.21% Impervious, Inflow Depth > 2.67" for 50-yr event
Inflow = 310.38 cfs @ 15.21 hrs, Volume= 150.836 af
Outflow = 310.38 cfs @ 15.21 hrs, Volume= 150.836 af, Atten= 0%, Lag= 0.0 min
Primary = 310.38 cfs @ 15.21 hrs, Volume= 150.836 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 235.27' @ 15.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	219.67'	**54.0" W x 48.0" H Box Culvert** L= 54.3' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 219.67' / 219.40' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 18.00 sf

Primary OutFlow Max=310.38 cfs @ 15.21 hrs HW=235.27' TW=222.16' (Fixed TW Elev= 222.16')
1=Culvert (Inlet Controls 310.38 cfs @ 17.24 fps)

Pond 8P: (new Pond)



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 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 EX1: Hager Pond Culvert Runoff Area=677.290 ac 19.21% Impervious Runoff Depth>3.66"
Flow Length=11,602' Tc=240.0 min CN=61 Runoff=433.99 cfs 206.415 af

Pond 8P: (new Pond) Peak Elev=247.52' Inflow=433.99 cfs 206.415 af
54.0" x 48.0" Box Culvert n=0.011 L=54.3' S=0.0050 '/' Outflow=433.99 cfs 206.415 af

Total Runoff Area = 677.290 ac Runoff Volume = 206.415 af Average Runoff Depth = 3.66"
80.79% Pervious = 547.187 ac 19.21% Impervious = 130.103 ac

Summary for Subcatchment EX1: Hager Pond Culvert Watershed

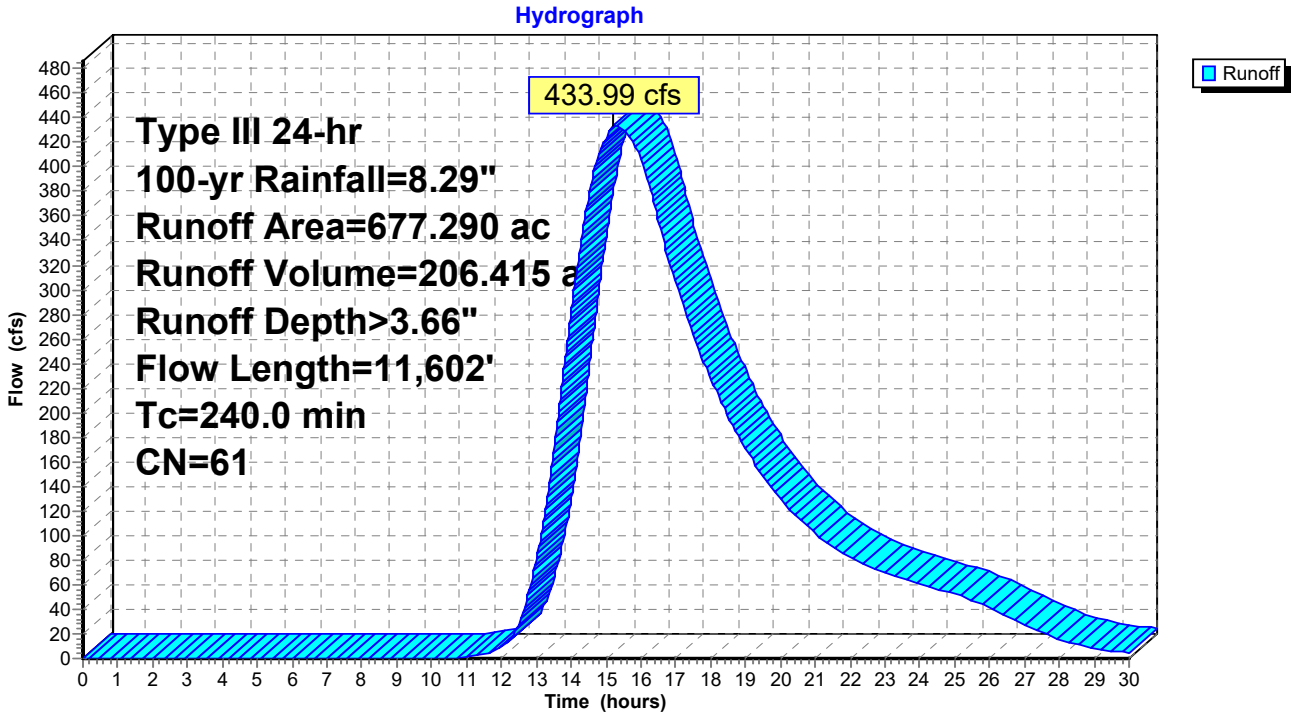
Runoff = 433.99 cfs @ 15.20 hrs, Volume= 206.415 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.29"

Area (ac)	CN	Description
3.887	98	Paved parking, HSG A
28.507	30	Woods, Good, HSG A
1.801	98	Paved parking, HSG B
13.211	55	Woods, Good, HSG B
1.803	61	>75% Grass cover, Good, HSG B
20.435	39	>75% Grass cover, Good, HSG A
73.168	36	Woods, Fair, HSG A
27.324	60	Woods, Fair, HSG B
69.642	73	Woods, Fair, HSG C
53.003	77	Woods, Good, HSG D
7.228	98	Paved parking, HSG D
48.055	55	Woods, Good, HSG B
6.553	98	Paved parking, HSG B
47.183	30	Woods, Good, HSG A
6.434	98	Paved parking, HSG A
21.351	30	Woods, Good, HSG A
11.496	98	Paved parking, HSG A
27.622	70	Woods, Good, HSG C
14.874	98	Paved parking, HSG C
24.976	36	Woods, Fair, HSG A
18.947	60	Woods, Fair, HSG B
5.608	73	Woods, Fair, HSG C
15.080	98	Paved parking, HSG A
5.280	30	Woods, Good, HSG A
1.870	98	Paved parking, HSG B
0.620	55	Woods, Good, HSG B
46.160	98	Paved parking, HSG C
15.390	70	Woods, Good, HSG C
2.030	98	Paved parking, HSG A
6.970	30	Woods, Good, HSG A
6.580	98	Paved parking, HSG B
19.740	55	Woods, Good, HSG B
4.070	98	Paved parking, HSG C
12.220	70	Woods, Good, HSG C
2.040	98	Paved parking, HSG D
6.132	77	Woods, Good, HSG D
677.290	61	Weighted Average
547.187		80.79% Pervious Area
130.103		19.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.1	100	0.0800	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.31"
4.3	203	0.1000	0.79		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
12.8	321	0.0280	0.42		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
3.1	205	0.0480	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	123	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	289	0.1380	0.93		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
70.8	1,590	0.0056	0.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.6	775	0.0030	0.78	37.31	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
6.1	1,339	0.0050	3.64	6.44	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
29.5	794	0.0010	0.45	21.54	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
6.2	1,360	0.0050	3.64	6.44	**Pipe Channel, RCP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
28.6	2,439	0.0100	1.42	68.11	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
34.3	2,064	0.0050	1.00	48.16	**Channel Flow,** Area= 48.0 sf Perim= 28.0' r= 1.71' n= 0.150 Very weedy reaches w/pools
240.0	11,602	Total			

Subcatchment EX1: Hager Pond Culvert Watershed



Summary for Pond 8P: (new Pond)

[57] Hint: Peaked at 247.52' (Flood elevation advised)

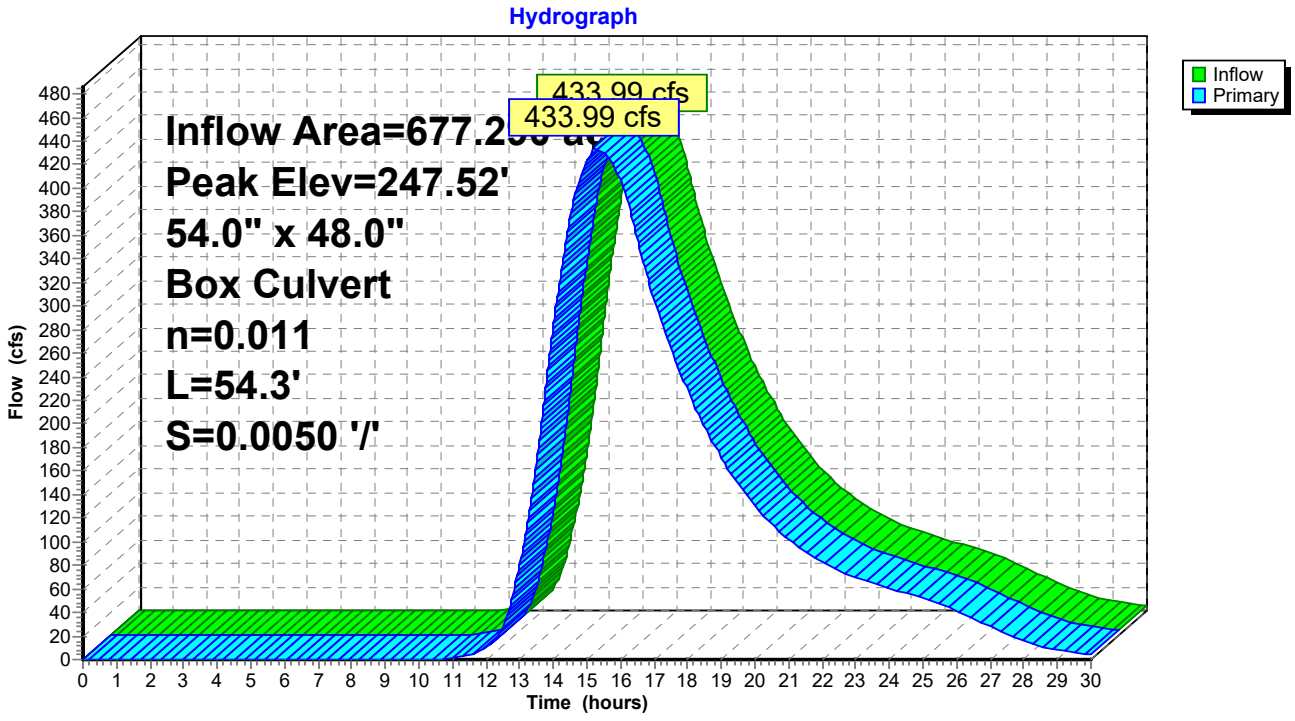
Inflow Area = 677.290 ac, 19.21% Impervious, Inflow Depth > 3.66" for 100-yr event
Inflow = 433.99 cfs @ 15.20 hrs, Volume= 206.415 af
Outflow = 433.99 cfs @ 15.20 hrs, Volume= 206.415 af, Atten= 0%, Lag= 0.0 min
Primary = 433.99 cfs @ 15.20 hrs, Volume= 206.415 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 247.52' @ 15.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	219.67'	**54.0" W x 48.0" H Box Culvert** L= 54.3' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 219.67' / 219.40' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 18.00 sf

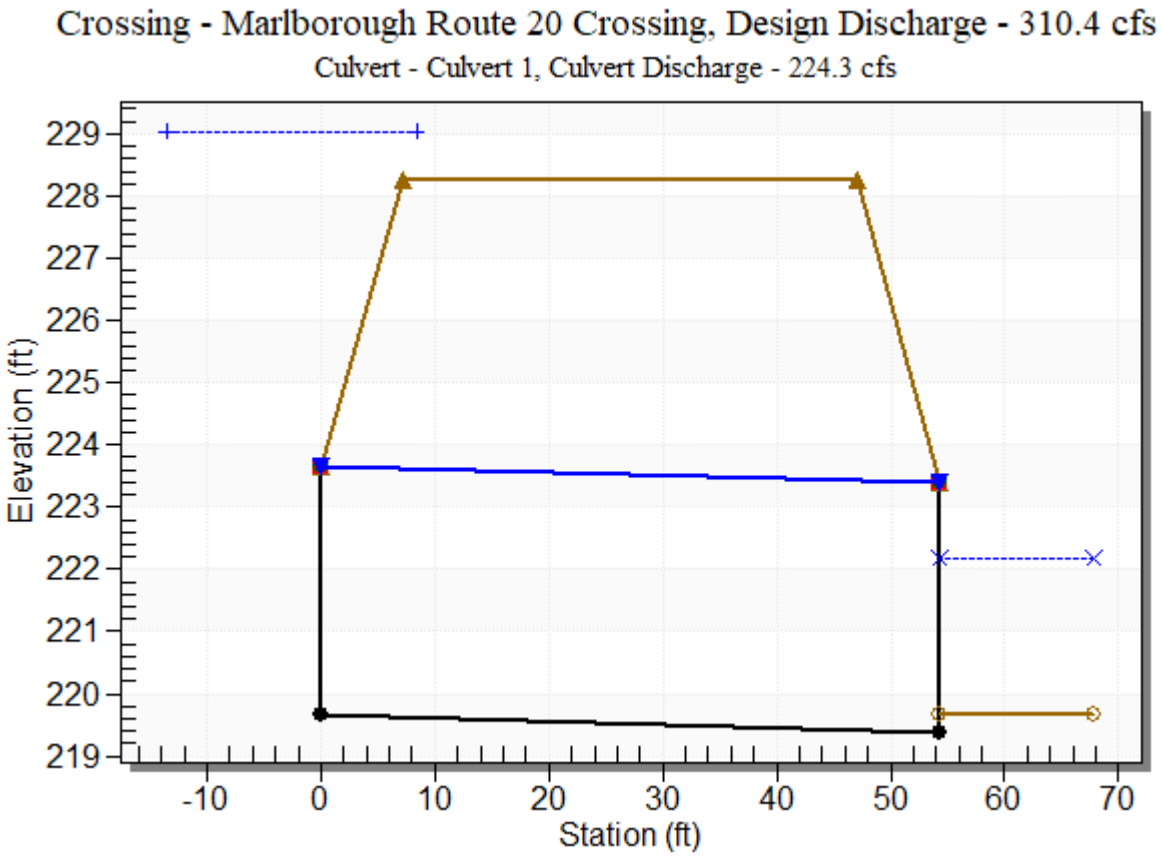
Primary OutFlow Max=433.93 cfs @ 15.20 hrs HW=247.51' TW=222.16' (Fixed TW Elev= 222.16')
1=Culvert (Inlet Controls 433.93 cfs @ 24.11 fps)

Pond 8P: (new Pond)



Appendix 3:
HY-8 Culvert Report

Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 219.67 ft

Outlet Station: 54.30 ft

Outlet Elevation: 219.39 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 4.50 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Tailwater Channel Data - Marlborough Route 20 Crossing

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 222.16 ft

Roadway Data for Crossing: Marlborough Route 20 Crossing

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 40.00 ft

Crest Elevation: 228.25 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 126.39 cfs

Design Flow: 310.38 cfs

Maximum Flow: 433.99 cfs

Table 1 - Summary of Culvert Flows at Crossing: Marlborough Route 20 Crossing

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
224.73	126.39	126.39	0.00	1
225.85	157.15	157.15	0.00	1
227.17	187.91	187.91	0.00	1
228.39	218.67	212.36	6.21	9
228.66	249.43	217.39	31.90	5
228.87	280.19	221.13	59.01	5
229.05	310.38	224.27	85.95	4
229.21	341.71	227.19	114.40	4
229.36	372.47	229.82	142.57	4
229.51	403.23	232.26	170.91	4
229.64	433.99	234.56	199.38	4
228.25	209.71	209.71	0.00	Overtopping

Rating Curve Plot for Crossing: Marlborough Route 20 Crossing

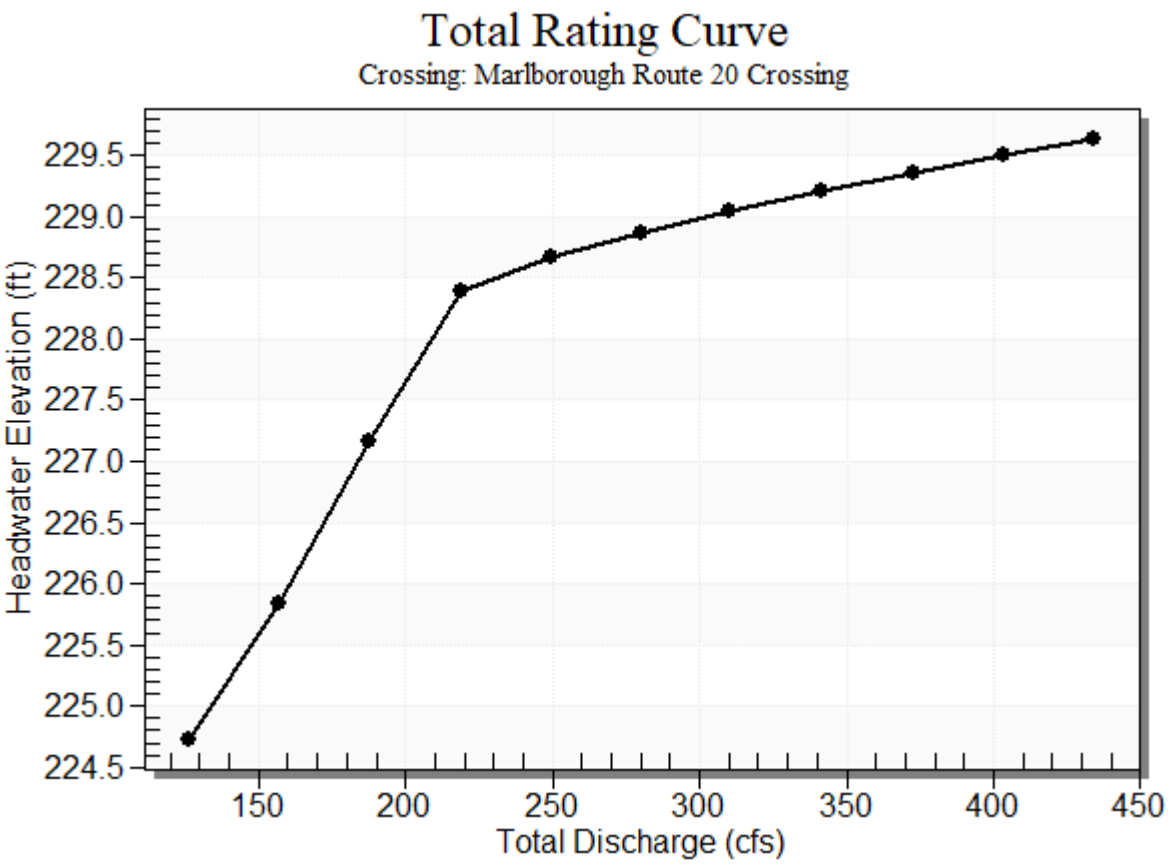


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
126.39	126.39	224.73	5.063	3.934	5-S2n	2.668	2.904	2.759	2.490	10.179	0.000
157.15	157.15	225.85	6.176	5.423	5-S2n	3.160	3.358	3.254	2.490	10.732	0.000
187.91	187.91	227.17	7.496	6.506	5-S2n	3.641	3.783	3.641	2.490	11.469	0.000
218.67	212.36	228.39	8.720	7.416	6-FFc	4.000	4.000	223.670	2.490	11.798	0.000
249.43	217.39	228.66	8.992	7.593	6-FFc	4.000	4.000	223.670	2.490	12.077	0.000
280.19	221.13	228.87	9.199	7.728	6-FFc	4.000	4.000	223.670	2.490	12.285	0.000
310.38	224.27	229.05	9.375	7.842	6-FFc	4.000	4.000	223.670	2.490	12.459	0.000
341.71	227.19	229.21	9.542	7.950	6-FFc	4.000	4.000	223.670	2.490	12.622	0.000
372.47	229.82	229.36	9.694	8.049	6-FFc	4.000	4.000	223.670	2.490	12.768	0.000
403.23	232.26	229.51	9.837	8.141	6-FFc	4.000	4.000	223.670	2.490	12.903	0.000
433.99	234.56	229.64	9.973	8.229	6-FFc	4.000	4.000	223.670	2.490	13.031	0.000

Culvert Performance Curve Plot: Culvert 1

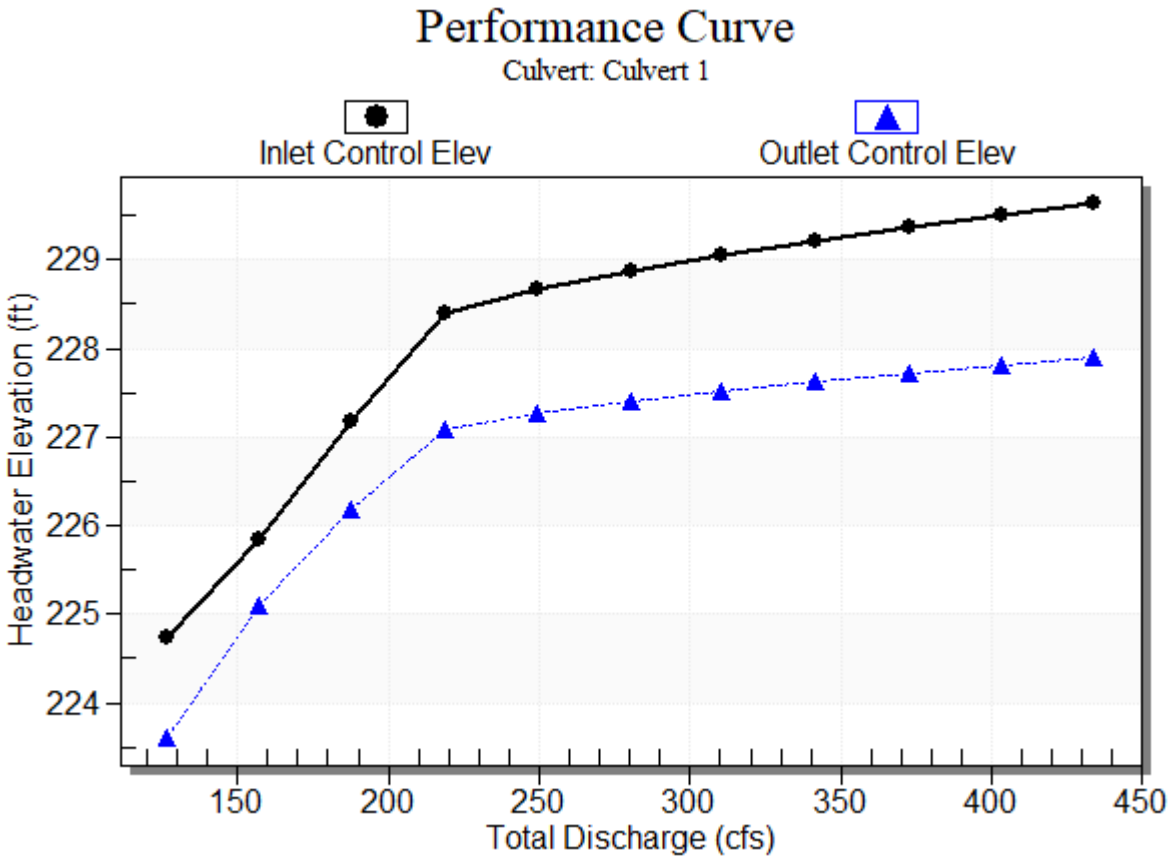
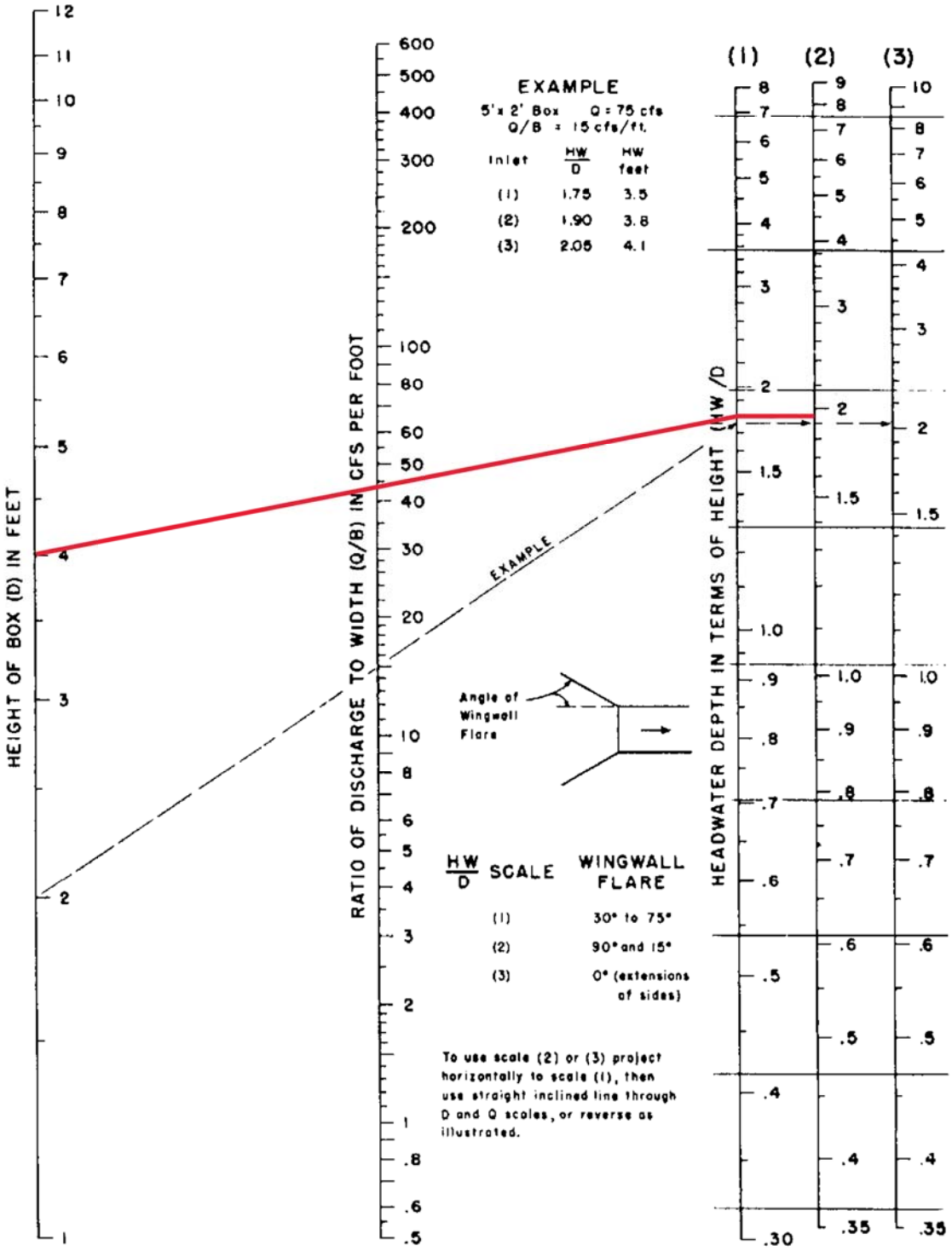


Table 3 - Downstream Channel Rating Curve (Crossing: Marlborough Route 20 Cross

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
126.39	222.16	2.49
157.15	222.16	2.49
187.91	222.16	2.49
218.67	222.16	2.49
249.43	222.16	2.49
280.19	222.16	2.49
310.38	222.16	2.49
341.71	222.16	2.49
372.47	222.16	2.49
403.23	222.16	2.49
433.99	222.16	2.49

CHART 8B



HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

Appendix 4:
HY-8 Scour Report

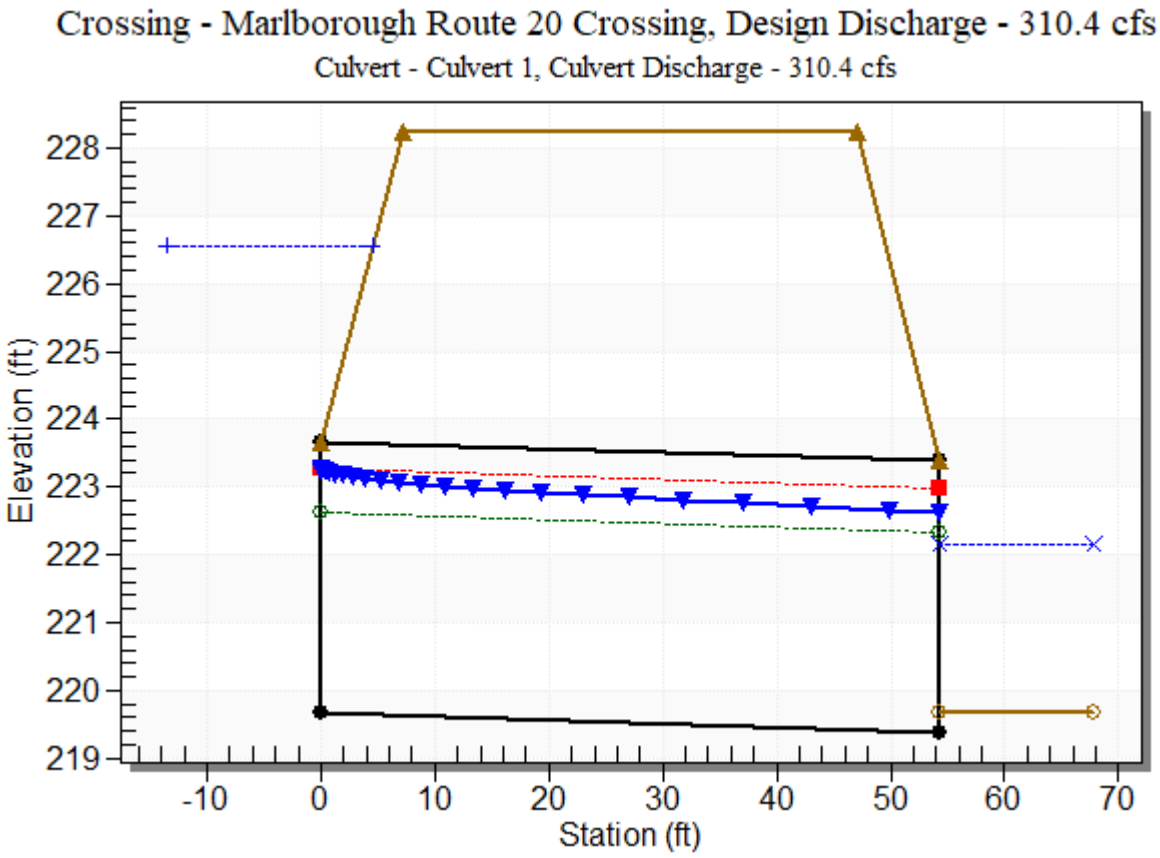
HY-8 Energy Dissipation Report

Scour Hole Geometry

Parameter	Value	Units
Select Culvert and Flow		
Crossing	Marlborough Route 20 Crossing	
Culvert	Culvert 1	
Flow	218.67	cfs
Culvert Data		
Culvert Width (including multiple barrels)	4.5	ft
Culvert Height	4.0	ft
Outlet Depth	223.67	ft
Outlet Velocity	11.80	ft/s
Froude Number	0.14	
Tailwater Depth	2.49	ft
Tailwater Velocity	0.00	ft/s
Tailwater Slope (SO)	0.0052	
Scour Data		
Time to Peak		
Note:	if Time to Peak is unknown, enter 30 min	
Time to Peak	900.00	min
Cohesion	Noncohesive	
D16 Value	0.50	mm
D84 Value	1.70	mm
Tailwater Flow Depth after Culvert Outlet	Normal Depth	
Results		
Assumptions		
Soil Sigma	1.84	
Scour Hole Dimensions		
Length	106.375	ft
Width	63.701	ft
Depth	7.840	ft
Volume	12699.672	ft^3
DS at .4(LS)	42.550	ft
Tailwater Depth (TW)	2.490	ft
Velocity with TW and WS	1.242	ft/s

Appendix 5:
HY-8 4' x 8' Culvert

Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 219.67 ft

Outlet Station: 54.30 ft

Outlet Elevation: 219.39 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 126.39 cfs

Design Flow: 310.38 cfs

Maximum Flow: 433.99 cfs

Table 1 - Summary of Culvert Flows at Crossing: Marlborough Route 20 Crossing

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
223.08	126.39	126.39	0.00	1
223.54	157.15	157.15	0.00	1
224.07	187.91	187.91	0.00	1
224.62	218.67	218.67	0.00	1
225.21	249.43	249.43	0.00	1
225.86	280.19	280.19	0.00	1
226.57	310.38	310.38	0.00	1
227.37	341.71	341.71	0.00	1
228.24	372.47	372.47	0.00	1
228.56	403.23	382.99	20.18	6
228.76	433.99	389.68	44.25	5
228.25	372.82	372.82	0.00	Overtopping

Rating Curve Plot for Crossing: Marlborough Route 20 Crossing

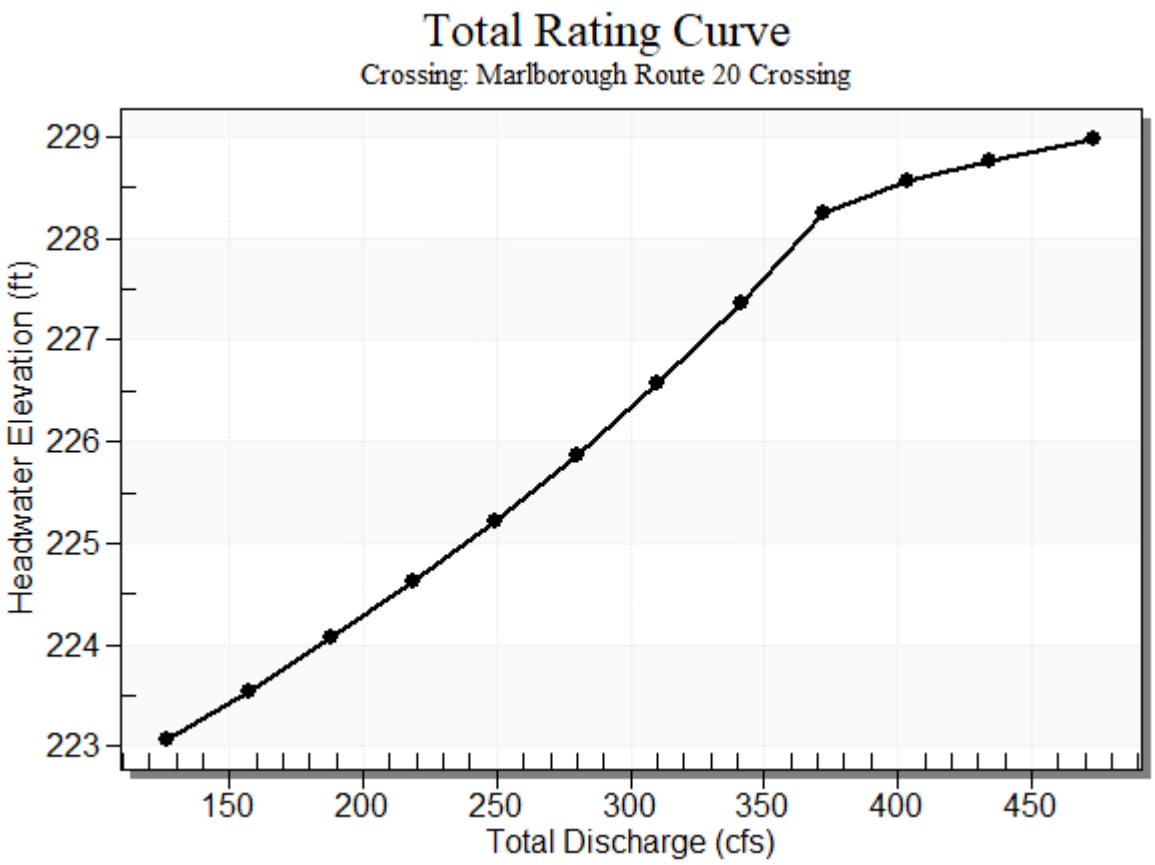


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
126.39	126.39	223.08	3.338	3.408	1-S1t	1.573	1.979	2.770	2.490	5.704	0.000
157.15	157.15	223.54	3.868	3.110	1-JS1t	1.826	2.288	2.770	2.490	7.092	0.000
187.91	187.91	224.07	4.398	3.376	5-S2n	2.066	2.578	2.264	2.490	10.375	0.000
218.67	218.67	224.62	4.951	3.772	5-S2n	2.298	2.852	2.522	2.490	10.839	0.000
249.43	249.43	225.21	5.545	4.838	5-S2n	2.522	3.114	2.770	2.490	11.256	0.000
280.19	280.19	225.86	6.194	5.372	5-S2n	2.741	3.365	3.010	2.490	11.637	0.000
310.38	310.38	226.57	6.896	5.938	5-S2n	2.951	3.602	3.238	2.490	11.981	0.000
341.71	341.71	227.37	7.700	6.570	5-S2n	3.165	3.841	3.469	2.490	12.312	0.000
372.47	372.47	228.24	8.569	7.201	5-S2n	3.372	4.000	3.692	2.490	12.611	0.000
403.23	382.99	228.56	8.885	7.400	5-S2n	3.442	4.000	3.771	2.490	12.693	0.000
433.99	389.68	228.76	9.091	7.530	5-S2n	3.486	4.000	3.995	2.490	12.193	0.000

Culvert Performance Curve Plot: Culvert 1

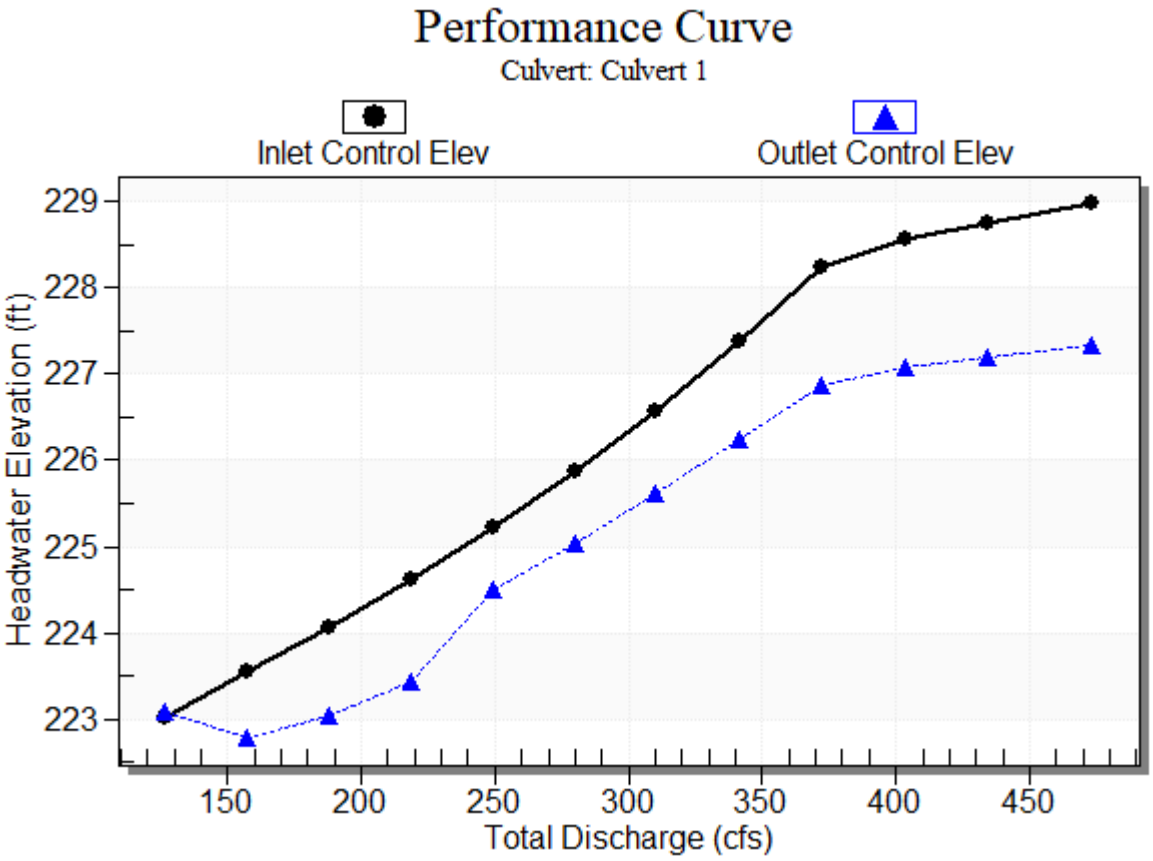


Table 3 - Downstream Channel Rating Curve (Crossing: Marlborough Route 20 Cross

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
126.39	222.16	2.49
157.15	222.16	2.49
187.91	222.16	2.49
218.67	222.16	2.49
249.43	222.16	2.49
280.19	222.16	2.49
310.38	222.16	2.49
341.71	222.16	2.49
372.47	222.16	2.49
403.23	222.16	2.49
433.99	222.16	2.49

Tailwater Channel Data - Marlborough Route 20 Crossing

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 222.16 ft

Roadway Data for Crossing: Marlborough Route 20 Crossing

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 40.00 ft

Crest Elevation: 228.25 ft

Roadway Surface: Paved

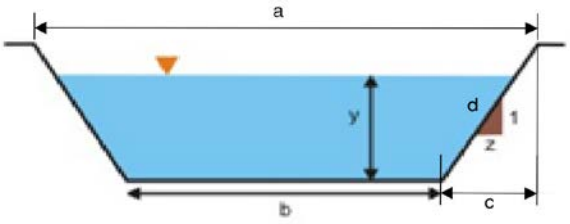
Roadway Top Width: 40.00 ft

Attachment C

Existing & Proposed Open Channel Flow Analysis

Trapezoidal Open Channel
Existing Condition - Design Point 3

Project: Route 20, Marlborough, MA
Proj. #: 13061.32
Date 5/27/2020
By: RJM
Chck'd By: JD



FORMULAS

$$Q=\frac{1.486}{n}AR^{2/3}S^{1/2}$$

WHERE Q=Flow(ft^3/sec)
n= Manning's roughness coefficient
A=Flow Area(ft^2)
R= hydraulic radius=A/Perimeter
s=slope(ft/ft)

R = A/P

$P = b + 2(1 + z^2)^{1/2}$

$$A=(\frac{a+b}{2})y$$

ASSUME

y = 2.5
n = 0.03

KNOWNS

b = 5
a = 15
c = 5
d = 5.6
z = 2
s = 0.0065

CALCULATIONS

Target Q = 132 cfs

* target flow rate is based on the existing conditions 100 year storm.

$$Q=\frac{1.486}{n}AR^{2/3}S^{1/2}$$

find A

$$A=(\frac{a+b}{2})y = =(\frac{15+5}{2})2.5 = 25$$

find P

P = b + 2d= 16.2

find R

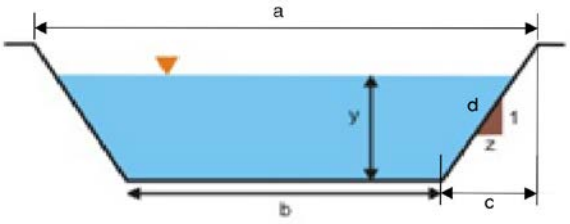
R = A/P = 1.55

find Q

$$Q=\frac{1.486}{n}AR^{2/3}S^{1/2}$$ **133.4 cfs** **2.5 ft Depth OK Assumption**

Trapezoidal Open Channel
Proposed Condition - Design Point 3

Project: Route 20, Marlborough, MA
Proj. #: 13061.32
Date 5/27/2020
By: RJM
Chck'd By: JD



FORMULAS

$$Q=\frac{1.486}{n}AR^{2/3}S^{1/2}$$

WHERE Q=Flow(ft^3/sec)
n= Manning's roughness coefficient
A=Flow Area(ft^2)
R= hydraulic radius=A/Perimeter
s=slope(ft/ft)

R = A/P

P = b + 2(1 + z^2)$^{1/2}$

$$A=(\frac{a+b}{2})y$$

ASSUME

y = 2.54
n = 0.03

KNOWNS

b = 5
a = 15.16
c = 5.08
d = 5.7
z = 2
s = 0.0065

CALCULATIONS

Target Q = 137 cfs

* target flow rate is based on the proposed conditions 100 year storm.

$$Q=\frac{1.486}{n}AR^{2/3}S^{1/2}$$

find A

$$A=(\frac{a+b}{2})y = =(\frac{15+5}{2})2.5 = 25.6032$$

find P

P = b + 2d= 16.4

find R

R = A/P = 1.57

find Q

$$Q=\frac{1.486}{n}AR^{2/3}S^{1/2}$$ **137.8 cfs** **2.54 ft Depth OK Assumption**

Attachment D

Special Provisions for Item 767.78 Composted Mulch Over Modified Rockfill and Item 799.775 Live Cuttings

ITEM 767.78 COMPOSTED MULCH OVER MODIFIED ROCK SQUARE YARD

GENERAL

The purpose of this item is to provide compost mulch for mixing with seed, to be placed on designated rock slopes in areas where establishment of vegetation in the rock slope is desired. This item shall conform to the requirements of Section 767 and 765 of the Standard Specifications and the following.

MATERIALS

Composted mulch

Composted Mulch shall be an aged organic substance meeting the requirements of M1.06.0 of the Supplemental Standard Specifications. No manure, bio-solids, kiln dried wood, or construction debris shall be allowed.

Organic matter content shall be between 20-100% (dry weight basis) as determined by ASTM D2974 (method A) Standard Test Methods for Moisture, Ash and Organic Matter of Peat and Other Organic Soils.

Moisture content shall be <15% by dry weight (<60% by wet weight) as measured by ASTM D2216 Standard Test Method for Laboratory Determination of Water Content of Soil and Rock and ASTM D2974 (cited above).

Particle size as measured by sieving shall be as follows:

Sieve Size	%Passing
2 in	100%
¾ in	70-100%
#4	30-75%
#20	20-40%

Soluble salts shall be <5.0 mmhos/cm (dS/m). The pH shall be between 5.5 and 8.0.

Seed

Seed shall be a native mix as specified under the native seed Item 765.421 Seeding - Mid-Height Upland Mix – Part Shade.

CONSTRUCTION METHODS

Methods of installation shall be reviewed and approved by the Engineer prior to placement of material.

Placement of compost mulch shall be as shown on the plans and as directed by the Engineer. Compost mulch material shall be applied pneumatically. Material shall be placed so that settled

material is at or slightly below the surface plane of the stone. Contractor shall ensure that there will be adequate quantity, including adjustment for settlement.

Seeding shall be done at the same time as compost topsoil is being applied and shall be by broadcast method as specified under the seeding item and such that a very thin blanket of material covers the seed.

COMPENSATION

Compost Mulch for Modified Rock will be measured and paid for at the Contract unit price per Square Yard which price shall include all labor, materials, equipment, site preparation, and all incidental costs required to complete the work.

Seed shall be compensated at the bid price per the seeding Item 765.421 Seeding - Mid-Height Upland Mix – Part Shade.

ITEM 799.775 LIVE CUTTING EACH

The work to be done under this Item shall conform to the relevant provisions of Section 771 supplemented with the following.

Live cuttings shall be used only if required for mitigation purposes along Hager Pond and other waterways. Locations shall be per the Engineer in coordination with the MassDOT Landscape Architect.

MATERIAL

A variety of plant species shall be used, depending on availability. Species shall be native and those most appropriate for conditions and for use as live cuttings. Species may include, but shall not be limited to: *Salix discolor* (Pussy Willow), *Salix nigra* (Black Willow), *Cornus sericea* (Redosier Dogwood), *Cornus amomum* (Silky Dogwood), *Viburnum dentatum* (Arrowwood viburnum), and *Sambucus canadensis* (Elderberry).

Live cuttings referred to herein shall be dormant stakes. The stakes shall be 3-4 feet or longer and a minimum of ½ inch in diameter. Stakes must be alive, with side branches removed and with bark intact. Any leaves and branches on stakes shall be removed prior to planting to prevent the stake from drying out.

Stakes shall be planted only during dormancy, prior to any growth or blooms (typically no later than March). Stakes must be fresh (no more than one day old) and must be kept moist after they have been prepared into appropriate lengths. They must be kept in cool, moist and shaded conditions and shall be wetted daily until planted. Dried stakes shall be rejected.

Tubelings (rooted cuttings) may be used in place of dormant stakes when outside of the dormant period. Tubelings shall be 5-inch deep plug cells and shall have a minimum of 12 inches stem height.

INSTALLATION

Stakes shall be driven into the ground with a rubber mallet. Pilot holes must be made in harder soils prior to inserting the stakes. Stakes shall be planted at least one foot deep, preferable more, with at least 2 to 3 nodes in the ground.

Spacing shall be with species mixed and two to four stakes per square yard. If planted in rows, plants shall be placed 3-4 feet, depending on species.

If tubelings are used in lieu of stakes, they shall be planted per MassDOT standard planting specifications with spacing at 24-36 inches apart or as directed by the Landscape Architect or Wetland Specialist.

COMPENSATION

Measurement and payment shall be at the Contract unit price for each cutting or tubeling planted.

ITEM 804.3 3-INCH ELECTRICAL CONDUIT TYPE NM PLASTIC (UL) FOOT

GENERAL

The work under this Item shall conform to the relevant provisions of Section 800 of the Standard Specifications and the following:

The work shall include the furnishing and installation of 3-inch non-metallic conduit for traffic signal and lighting systems in accordance with the plans and as directed by the Engineer. The conduit material shall be Schedule 80 polyvinyl chloride (PVC) plastic conduit. The conduit quanitity may be increased or decreased by the Engineer depending upon actual conditions encountered as provided for in Section 4.06 of the Standard Specifications.

Detectable warning tape shall be placed above conduit runs according to MassDOT's standard detail.

Conduit in Grass or in Planted Areas
Where new conduits are installed in grass and planted areas, no separate payment shall be made for the excavation, sand bedding, gravel backfill, including necessary compaction, or incidental materials, but all costs in connection therewith shall be included in the contract unit price for Item 804.3. Loam and seeding shall be measured and paid for under their respective items.

Conduit under Sidewalks, Medians, or Driveways
Where conduit is installed in a sidewalk, paved median or asphalt driveway areas, no separate payment shall be made for the saw-cutting, excavation, sand bedding, gravel backfill, including necessary compaction, or incidental materials, but all costs in connection therewith shall be included in the contract untit price for Item 804.3. Payment for cement concrete or asphalt pavement shall be paid for under the respective item.

Conduit Crossing Roadways
Trenched in existing bituminous concrete pavements not subject to full depth reconstruciton shall be sawcut to an 18 inch width. The existing pavements shall be sawcut through their full depth and the pavement removed.

After conduit instaltion, the trench shall be backfilled with controlled density –fill (CDF). CDF shall be Type 2E and shall be specified in Section M4.08.0 of the Standard Specifications. The finished grade of the CDF shall be below existing pavement surface as shown on the construction details.

Where conduit crosses roadway, no separate payment shall be made for the saw-cutting of pavement, excavation, sand bedding, control density fill, or incidental materials, but all cost in connection therewith shall be included in the contract unit price for Item 804.3.

BASIS OF PAYMENT

Measurement for this item shall be by the foot installed, approved, and maintained in place. Payment shall be the bid price and shall be compensation for all labor equipment and materials necessary to complete the work specified above.

PROPOSED SITE PLAN
OF
MAP 73, LOTS 14 & 15A FARM ROAD
MARLBOROUGH, MA

GENERAL NOTES:

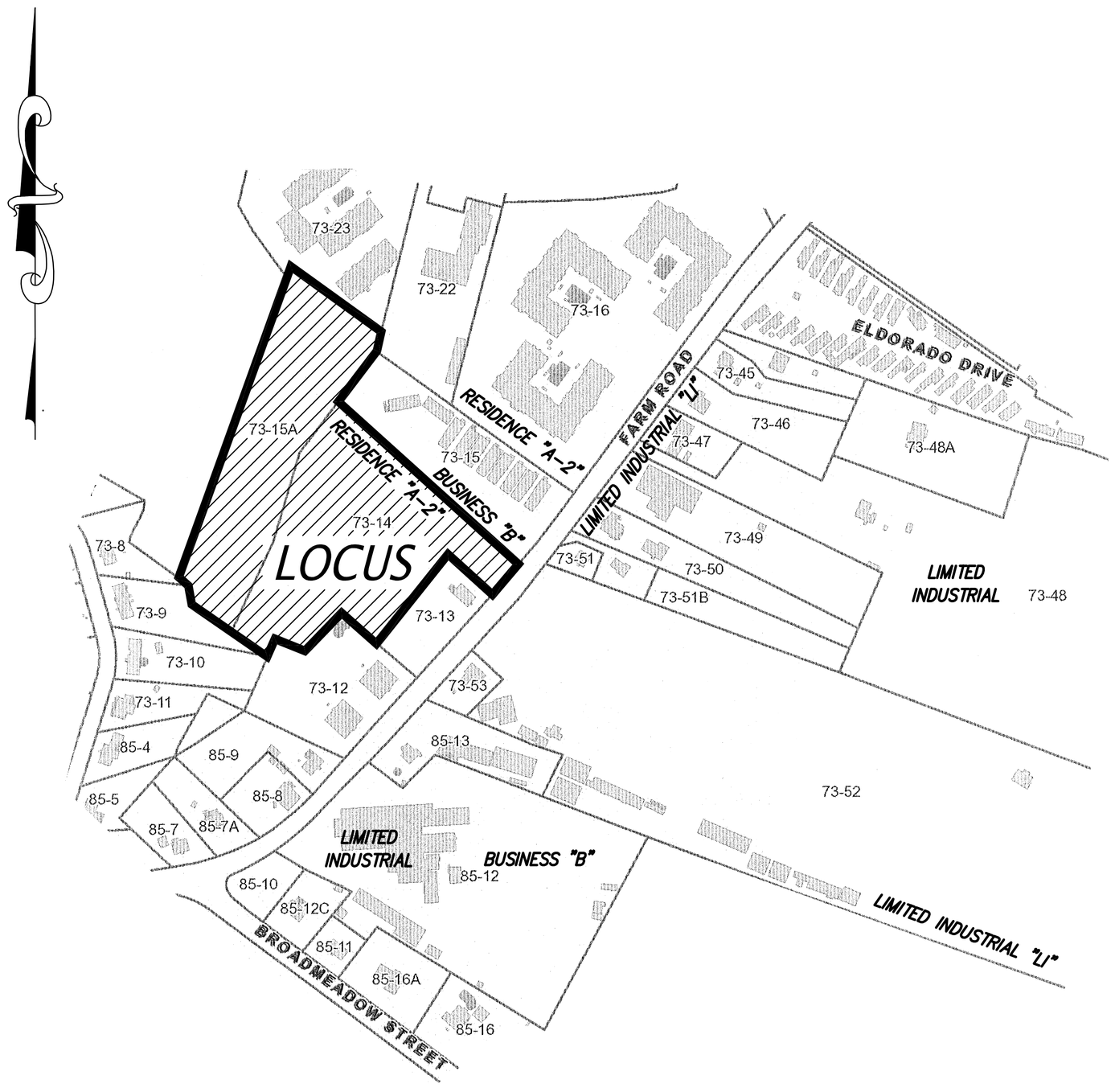
1. EXISTING BOUNDARY LINES AND TOPOGRAPHY IS BASED SURVEY AND TOPOGRAPHICAL SURVEY BY CONNORSTONE, INC. NOVEMBER 2019. ELEVATIONS ARE BASED UPON NGVD 1988 DATUM.
2. THE PARCEL IS SHOWN ON ASSESSORS MAP 73, PARCEL 14 & 15A.
3. EXISTING UTILITY LINES SHOWN ON THIS DRAWING ARE FROM AVAILABLE INFORMATION AND ARE APPROXIMATE LOCATIONS. THE ENGINEER DOES NOT GUARANTEE THEIR ACCURACY OR THAT ALL UTILITIES AND SUBSURFACE STRUCTURES ARE SHOWN. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION AND INVERT ELEVATIONS OF THE UTILITIES AND STRUCTURES, AS REQUIRED PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES WITH RECORD DATA SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. THE CONTRACTOR SHALL CONTACT DIG SAFE: 1-800-344-7233 (72 HOURS BEFORE DIGGING), AND TOWN DPW FOR UTILITY LOCATIONS PRIOR TO EXCAVATION. TEST PITS SHALL BE UTILIZED FOR UTILITY CONNECTIONS.

CONSTRUCTION NOTES:

1. ANY MINOR MODIFICATIONS (AS DETERMINED BY THE CITY ENGINEER) TO THE INFORMATION SHOWN ON THE APPROVED SITE PLANS SHALL BE SUBMITTED TO THE CITY ENGINEER AS A MINOR PLAN REVISION FOR APPROVAL PRIOR TO THE WORK BEING PERFORMED.
2. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
3. ALL MATERIALS AND CONSTRUCTION PRACTICES SHALL BE IN CONFORMANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE MARLBOROUGH DEPARTMENT OF PUBLIC WORKS, OR THE LATEST EDITION OF THE MASSACHUSETTS HIGHWAY DEPARTMENT (MHD) CONSTRUCTION STANDARDS AND THE MHD "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES", WHICHEVER IS MORE STRINGENT.
4. THE WATER SYSTEM SHALL BE INSTALLED IN COMPLIANCE WITH THE TOWN OF MARLBOROUGH DPW WATER DIVISION RULES AND REGULATIONS. CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH APPLICABLE PERMITS (TO BE OBTAINED BY THE CONTRACTOR) WITH REQUIRED INSPECTIONS. FINAL LOCATION AND SIZE OF WATER SERVICES, FIRE DEPARTMENT SPRINKLER CONNECTIONS, AND SPRINKLER CONTROL ROOMS SHALL BE COORDINATED WITH THE ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION.
5. THE SEWER SYSTEM SHALL BE INSTALLED IN COMPLIANCE WITH THE TOWN OF MARLBOROUGH DPW SEWER DIVISION RULES AND REGULATIONS. CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH APPLICABLE PERMITS (TO BE OBTAINED BY THE CONTRACTOR), WITH REQUIRED INSPECTIONS. INVERTS AT THE PROPOSED BUILDING SHALL BE COORDINATED WITH THE ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION.
6. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, TO KEEP ACCURATE AS-BUILT MEASUREMENTS / RECORDS OF ALL UNDERGROUND OR CONCEALED WORK.
7. THE LAYOUT AND INSTALLATION OF ELECTRIC, GAS, TELEPHONE AND CATV UTILITY CONNECTIONS AND SERVICES SHALL IN ACCORDANCE WITH THE REQUIREMENTS OF THE RESPECTIVE UTILITY.
8. THE CONTRACTOR SHALL UTILIZE ALL MEASURES AND MATERIALS NECESSARY TO ENSURE THE SAFETY OF ALL PERSONS AND PROPERTIES AT THE SITE DURING CONSTRUCTION. ALL EXCAVATIONS SHALL CONFORM TO CURRENT OSHA STANDARDS.
9. A STREET OPENING PERMIT SHALL BE OBTAINED FORM THE CITY OF MARLBOROUGH DEPARTMENT OF PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF ANY WORK IN THE PUBLIC WAY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE HIS WORK WITH THE APPROPRIATE HIGHWAY & UTILITY DEPARTMENTS.
10. UTILITY CONSTRUCTION IN CITY WAYS REQUIRES BACKFILL WITH CONTROLLED DENSITY FILL.
11. ALL CONSTRUCTION MATERIALS, STOCKPILES, STUMPS, ETC. ON SITE SHALL BE STORED IN A MANNER TO THE SATISFACTION OF THE CITY ENGINEER OR HIS DESIGNEE.
12. ALL SIGNS AND PAVEMENT MARKINGS SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC DEVICES" (MUTCD) AND THE OFFICE OF TRAFFIC OPERATIONS, FEDERAL HIGHWAY ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION.
13. ALL RAMPS, CURB CUTS, SIDEWALKS, AND ACCESSIBLE SPACES SHALL COMPLY WITH THE AMERICANS WITH DISABILITIES ACT REGULATIONS AND WITH ARCHITECTURAL ACCESS BOARD REGULATIONS (521 CMR 1-47).
14. JOINTS BETWEEN PROPOSED BITUMINOUS CONCRETE PAVEMENT AND EXISTING PAVEMENT TO REMAIN SHALL BE SAWCUT AND SEALED WITH HOT POURED RUBBERIZED ASPHALT SEALER.

COORDINATION WITH PLANS BY OTHERS:

15. SEE SEPARATE PLANS PREPARED BY OTHERS FOR LANDSCAPING AND SIGNAGE.
16. COORDINATE PROPOSED UTILITY LOCATIONS, SIZES, ELEVATIONS, AND MATERIALS WITH ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION.
17. ANY CONFLICT BETWEEN THESE PLANS AND PLANS BY OTHERS SHALL BE REPORTED TO THE ENGINEER AND OWNER IMMEDIATELY.



LOCUS MAP: MAP 73, LOTS 14 & 15A FARM ROAD

SCALE: 1"=300'

ZONING : RESIDENCE A-2

LOT REQUIREMENTS	REQUIRED	PROPOSED
AREA	18,000 s.f.	332,742 s.f.
FRONTAGE	120 FEET	101.15 FEET
FRONT YARD	15 FEET	228.6 FEET
SIDE YARD	30 FEET	69.7 FEET
REAR YARD	40 FEET	310 FEET
BUILDING HEIGHT	2 1/2 STORIES	2 STORIES
MAXIMUM LOT COVERAGE = 30%		16.6%

LOT COVERAGE TABULATION:

LOT AREA = 332,742± S.F.
EXISTING IMPERVIOUS AREA = 0 (0%)
PROPOSED IMPERVIOUS AREA = 55,240 S.F.
(BUILDING, DRIVEWAY, SIDEWALK)
PROPOSED LOT COVERAGE = 16.6%
ALLOWED LOT COVERAGE = 30%

PARKING TABULATION:

DESIGN: 1 SPACE/2 STUDENTS
PLUS 1 SPACE PER 4 EMPLOYEES ON LARGEST SHIFT
PROPOSED STUDENTS = 27
EMPLOYEES ON LARGEST SHIFT = 27
TOTAL SPACES REQUIRED = 21
TOTAL SPACES PROVIDED = 75

SHEET INDEX:

APPROVED
SITE PLAN REVIEW COMMITTEE

DATE: _____

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
6-15-20

PREPARED FOR:

NEW ENGLAND CENTER FOR CHILDREN
33 TURNPIKE ROAD
SOUTHBOROUGH, MA

OWNER:

MARLBOROUGH INDUSTRIAL, LLC
259 TURNPIKE ROAD, SUITE 100
SOUTHBOROUGH, MA

MAP 73, PARCELS 14 & 15A

CONNORSTONE ENGINEERING INC.
CIVIL ENGINEERS AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508-393-9727 FAX: 508-393-5242

PROPOSED SITE PLAN
COVER SHEET
704 FARM ROAD
MARLBOROUGH, MA
(MAP 73, LOTS 14 & 15A)

REVISED:	DESCRIPTION:
6/16/2020	SNOW STORAGE AREAS
6/15/2020	REAR FIRE LANE
5/20/2020	MassDEP COMMENTS
4/20/2020	UTILITY COORD. & C. COMM ITEMS

DRAWN BY: REM | CHECK BY: VC
DATE: FEBRUARY 28, 2020
SCALE: 1"= 10' | SHEET 1 OF 6.

DTH-1 (12-30-19)		
0-10"	Ap	SANDY LOAM 10YR3/2
10-24"	Bw	SANDY LOAM 10YR5/6
24-48"	C1	FINE SAND 2.5Y5/4
48-120"	C2	CRS. S&G 2.5Y5/6
NO MOTTLES NO WATER		NO REFUSAL

DTH-2 (12-30-19)		
0-10"	Ap	SANDY LOAM 10YR3/2
10-24"	Bw	SANDY LOAM 10YR5/6
24-48"	C1	FINE SAND 2.5Y5/4
48-120"	C2	CRS. S&G 2.5Y5/6
NO MOTTLES NO WATER		NO REFUSAL

DTH-3 (12-30-19)		
0-10"	Ap	SANDY LOAM 10YR3/2
10-24"	Bw	SANDY LOAM 10YR5/6
24-48"	C1	FINE SAND 2.5Y5/4
48-120"	C2	CRS. S&G 2.5Y5/6
NO MOTTLES NO WATER		NO REFUSAL

DTH-4 (12-30-19)		
0-12"		FILL
12-40"	C1	FINE SAND 2.5Y5/4
40-146"	C2	CRS. S&G 2.5Y5/6
NO WATER, NO MOTTLES NO REFUSAL		

DTH-5 (12-30-19)		
0-4"	Ap	LOAMY SAND 10YR3/2
4-42"	C1	FINE SAND 2.5Y5/4
42-144"	C2	CRS. S&G 2.5Y5/6
NO WATER, NO MOTTLES NO REFUSAL		

SYMBOLS & ABBREVIATIONS LEGEND

- PROP. DRAIN LINE/MANHOLE
- EXISTING SEWER LINE/MANHOLE
- EXISTING DRAIN LINE/MANHOLE
- CATCH BASIN
- FLARED END
- HEAD WALL
- HYDRANT
- GAS LINE/GATE
- WATER LINE/GATE
- TELEPHONE LINE/MANHOLE
- ELECTRIC LINE/MANHOLE
- ELECTRIC TRANSFORMER
- OVERHEAD WIRE
- FINISH GRADE CONTOUR
- MINOR CONTOUR
- MAJOR CONTOUR
- UTILITY POLE
- SIGN
- CHAIN LINK FENCE
- CONCRETE CURB
- VERTICAL GRANITE CURB
- SLOPED GRANITE CURB
- BITUMINOUS CONCRETE BERM
- MODIFIED CAPE COD BERM
- TREE LINE
- STONE WALL
- RETAINING WALL
- RIPRAP
- HDPE — HIGH DENSITY POLYETHYLENE

N/F
HERITAGE FARM LLC
MAP 73, PARCEL 24
DEED BK. 41574, PG. 231

N/F
FARM COMMONS CONDOMINIUM
MAP 73, PARCEL 15
DEED BK. 57278, PG. 185

MA COORD SYSTEM

IP Fnd.

739.04'
N20°59'51"E
44.55'
N38°53'33"E
S47°59'37"E
100' BUFFER
20' BUFFER
210.00'
N18°13'14"E
557.82'
EX. FENCE

MAP 73, LOT 15A
AREA=142,096 S.F.
(3.26± ACRES)

100 YEAR FLOOD PLAIN
EL.=259.0 TAKEN FROM
F.I.R.M. PANEL

MAP 73, LOT 14
AREA=190,646 S.F.
(4.38± ACRES)

WETLAND DELINEATION BY:
THREE OAKS ENVIRONMENTAL, LLC
NOVEMBER 15, 2019

234.54'
N25°48'41"E
N55°45'10"W
107.67'
210.94'
S21°01'50"W
43.73'
N68°58'10"W
91.00'
S37°46'30"W
115.33'
N50°37'00"W
185.45'
100' BUFFER
S39°31'01"W
239.82'
N54°21'50"W
139.20'

IP Fnd.
CBDH Fnd.
DTH-1
DTH-2
DTH-3
DTH-4
DTH-5

BENCHMARK
NAIL-S, 16"OAK
ELEV.=276.71
(NAVD 1988)

DCB
RIM=279.17
INV(A)=274.5
INV(B)=272.8
INV(C)=272.5

SBDH Fnd.
SMH
RIM=279.08
INV.=270.49 (PLAN)
SMH
RIM=279.50
INV.=269.72 (PLAN)
SMH
RIM=279.06
DCB
RIM=279.16
INV.=276.12
S41°59'59"W
35.01'
R=2150.00'
L=68.24'
Δ=1°49'
SIDEWALK
EX. FENCE

BENCHMARK
CHISEL SQUARE
ELEV.=279.70
(NAVD 1988)

FARM ROAD
(50' WIDE - PUBLIC WAY)
AIRPORT BOULEVARD
(UNDER CONSTRUCTION)
DRIVEWAY

N/F
STEPHEN & EDITH JANIAK
MAP 73, PARCEL 10
DEED BK. 19492, PG. 52

N/F
SHILLINGTON COURT CONDOMINIUM
MAP 73, PARCEL 12
DEED BK. 12518, PG. 580

N/F
JENNIFER BRODEUR
MAP 73, PARCEL 13
DEED BK. 32623, PG. 555

GRAPHIC SCALE: 1"=30'
0 10 20 30 40 50 75 100 125 150 FEET
0 5 10 15 20 25 30 35 40 45 METERS

DIG SAFE 1-888-344-7233

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
6-15-20

PREPARED FOR:
NEW ENGLAND CENTER FOR CHILDREN
33 TURNPIKE ROAD
SOUTHBOROUGH, MA

CONNORSTONE ENGINEERING INC.
CIVIL ENGINEERS AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508-393-9727 FAX: 508-393-5242

EXISTING CONDITIONS PLAN OF 704 FARM ROAD MARLBOROUGH, MA (MAP 73, LOTS 14 & 15A)

REVISED:	DESCRIPTION:
6/16/2020	SNOW STORAGE AREAS
6/15/2020	REAR FIRE LANE
5/20/2020	MassDEP COMMENTS
4/20/2020	UTILITY COORD. & C. COMM ITEMS

DRAWN BY: REM | CHECK BY: VC
DATE: FEBRUARY 28, 2020
SCALE: 1"=30' | SHEET 2 OF 6.

DRAINAGE TABULATION

FE-1
8" IN=276.0

CB-1
RIM=277.0
12" OUT=274.2

CB-4
RIM=277.75
12" OUT=274.85

CB-2
RIM=277.4
12" OUT=274.1

DMH-1
RIM=276.8 (W/GRATED COVER)
2-12" IN=274.1
12" OUT=274.0

DMH-2
RIM=277.55
2-12" IN=273.75
12" OUT=273.65

CB-3-DOUBLE GRATE
RIM=276.0
12" OUT=272.8

STC-1
STORMCEPTOR 900
RIM=276.8
12" IN=272.2-DMH
12" IN=272.2-CB
15" OUT=271.95

OCS-1
OUTLET CONTROL STRUCTURE
RIM=276.95
12" IN=271.8-STC-1
15" OUT=270.6
15" OVERFLOW=272.5

FE-2
12" OUT=268.0

SUBSURFACE DRYWELL-1
66 CULTEC CHAMBERS
(MODEL 330XLHD)
31'X80'X3.5' STONE BED
BOTTOM STONE=269.0
BOTTOM CHAMBERS=269.5
15" IN=270.50 (OCS-1)
8" IN=271.50 (ROOF DRAIN)
FOUR CLEANOUTS TO GRADE

CB-3-DOUBLE GRATE
RIM=276.0
12" OUT=272.8

STC-2
STORMCEPTOR 450i
W/ DOUBLE GRATE
RIM=275.00
12" OUT=271.8

OCS-2
OUTLET CONTROL STRUCTURE
RIM=275.3
12" IN=271.5-STC-2
12" OUT=269.7
12" OVERFLOW=271.5

FE-3
12" OUT=271.0

SUBSURFACE DRYWELL-2
20 CULTEC CHAMBERS
(MODEL 330XLHD)
39'X22'X3.5' STONE BED
BOTTOM STONE=268.0
BOTTOM CHAMBERS=268.5
12" IN=269.5 (OCS-2)
EIGHT CLEANOUTS TO GRADE

STC-3
STORMCEPTOR 450i
RIM=275.5
12" OUT=272.0

SUBSURFACE DRYWELL-3
16 CULTEC CHAMBERS
(MODEL 330XLHD)
23.5'X33'X3.5' STONE BED
BOTTOM STONE=269.0
BOTTOM CHAMBERS=269.5
12" IN=271.0
FOUR CLEANOUTS TO GRADE

ROOF DRYWELL-1
6 CULTEC CHAMBERS
(MODEL 330XLHD)
26'X13'X3.5' STONE BED
BOTTOM STONE=270.0
BOTTOM CHAMBERS=270.5
6"IN=272.50
TWO CLEANOUTS TO GRADE

ROOF DRAIN CLEAN OUT MH-1
6"IN=272.25
8"OUT=272.0

SYMBOLS & ABBREVIATIONS LEGEND

	PROP. DRAIN LINE/MANHOLE
S S	EXISTING SEWER LINE/MANHOLE
D D	EXISTING DRAIN LINE/MANHOLE
D	CATCH BASIN
	FLARED END
HW	HEAD WALL
HYD	HYDRANT
G GG	GAS LINE/GATE
W WG	WATER LINE/GATE
T TMH	TELEPHONE LINE/MANHOLE
E EMH	ELECTRIC LINE/MANHOLE
T	ELECTRIC TRANSFORMER
	OVERHEAD WIRE
136	FINISH GRADE CONTOUR
124	MINOR CONTOUR
130	MAJOR CONTOUR
UP	UTILITY POLE
	SIGN
	CHAIN LINK FENCE
VCC	CONCRETE CURB
VGC	VERTICAL GRANITE CURB
SGC	SLOPED GRANITE CURB
BCB	BITUMINOUS CONCRETE BERM
MCCB	MODIFIED CAPE COD BERM
	TREE LINE
	STONE WALL
RET. WALL	RETAINING WALL
	RIPRAP
HDPE	HIGH DENSITY POLYETHYLENE

CONSTRUCTION NOTES:

1. ANY MINOR MODIFICATIONS (AS DETERMINED BY THE CITY ENGINEER) TO THE INFORMATION SHOWN ON THE APPROVED SITE PLANS SHALL BE SUBMITTED TO THE CITY ENGINEER AS A MINOR PLAN REVISION FOR APPROVAL PRIOR TO THE WORK BEING PERFORMED.

2. ANY WORK AND MATERIAL WITHIN THE CITY RIGHT-OF-WAY SHALL CONFORM TO THE CITY OF MARLBOROUGH REQUIREMENTS.

3. ALL HANDICAP PARKING, RAMPS, AND ACCESS SHALL CONFORM TO AAB REQUIREMENTS.

4. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION. EROSION CONTROL SHALL CONFORM TO THE CITY OF MARLBOROUGH CONSERVATION COMMISSION REQUIREMENTS.

5. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO "MUTCD" REQUIREMENTS.

6. A STREET OPENING PERMIT SHALL BE OBTAINED FORM THE CITY OF MARLBOROUGH DEPARTMENT OF PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF ANY WORK IN THE PUBLIC WAY.

7. ALL CONSTRUCTION MATERIALS, STOCKPILES, STUMPS, ETC. ON SITE SHALL BE STORED IN A MANNER TO THE SATISFACTION OF THE CITY ENGINEER OR HIS DESIGNEE.

8. UTILITY CONSTRUCTION IN CITY WAYS REQUIRES BACKFILL WITH CONTROLLED DENSITY FILL.

N/F
HERITAGE FARM LLC
MAP 73, PARCEL 24
DEED BK. 41574, PG. 231

N/F
FARM COMMONS CONDOMINIUM
MAP 73, PARCEL 15
DEED BK. 57278, PG. 185

MAP 73, LOT 15A
AREA=142,096 S.F.
(3.26± ACRES)

MAP 73, LOT 14
AREA=190,646 S.F.
(4.38± ACRES)

N/F
STEPHEN & EDITH JANIAK
MAP 73, PARCEL 10
DEED BK. 19492, PG. 52

N/F
SHILLINGTON COURT CONDOMINIUM
MAP 73, PARCEL 12
DEED BK. 12518, PG. 580

N/F
JENNIFER BRODEUR
MAP 73, PARCEL 13
DEED BK. 32623, PG. 555

FARM ROAD
(50' WIDE - PUBLIC WAY)

AIRPORT BOULEVARD
(UNDER CONSTRUCTION)

PROPOSED BUILDING
CELLAR FLR.=263.0 FIRST FLR.=279.0

BENCHMARK
NAIL-S, 16"OAK
ELEV.=276.71
(NAVD 1988)

BENCHMARK
CHISEL SQUARE
ELEV.=279.70
(NAVD 1988)

100 YEAR FLOOD PLAIN
EL.=259.0 TAKEN FROM
F.I.R.M. PANEL

WETLAND DELINEATION BY:
THREE OAKS ENVIRONMENTAL, LLC
NOVEMBER 15, 2019

PROPOSED RETAINING WALL
W/ GUARD RAIL
TOP WALL=278.0
BOT. WALL=273.0

1:1 RIPRAP SLOPE

12" FLARED END = 271.0
W/ RIPRAP PAD
MIN. LENGTH=8 FT.

15" FLARED END = 268.0
W/ RIPRAP PAD
MIN. LENGTH=14 FT.

DUMPSTER
PAD 10'x10'
W/ ENCLOSURE

PROPOSED LIGHT POLE (TYP.)
(SEE SITE ELEC. DRAWINGS FOR DETAILS)

SNOW STORAGE AREA
WITHIN PAVED PARKING
SPACES

PROPOSED WATTLES W/ SILT
FENCE DURING CONSTRUCTION

PROP. SIGNS(2)
FIRE LANE
DO NOT ENTER

PROPOSED FENCE
PROVIDE GATE
LOCATION PER OWNER

PROPOSED HYDRANT

PROPOSED FENCE
PROVIDE GATE
LOCATION PER OWNER

PROP. SIGN
FIRE LANE
DO NOT ENTER

SNOW STORAGE AREA
WITHIN PAVED PARKING
SPACES

PROVIDE HANDICAP RAMPS &
VERT. GRANITE CURB AT
ENTRANCE

MILL AND OVERLAY CURB TO
CURB BETWEEN DRIVEWAY
ROUNDINGS OR 10 FEET BEYOND
UTILITY TRENCHES, WHICHEVER
IS FURTHER.

CONFIRM INVERT PRIOR TO CONSTRUCTION

CONNECT TO UTILITY POLE (TBD)

PROPOSED SEWER CONNECTION
INV. MAIN=269.7±
INV. AT SERVICE=270.7

CONNECT TO EXISTING 8" MAIN
WITH TAPPING SLEEVE AND
GATE VALVE

MILL AND OVERLAY CURB TO
CURB BETWEEN DRIVEWAY
ROUNDINGS OR 10 FEET BEYOND
UTILITY TRENCHES, WHICHEVER
IS FURTHER.

GRAPHIC SCALE: 1"=30'
0 10 20 30 40 50 75 100 125 150 FEET
0 5 10 15 20 25 30 35 40 45 METERS

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
6-15-20

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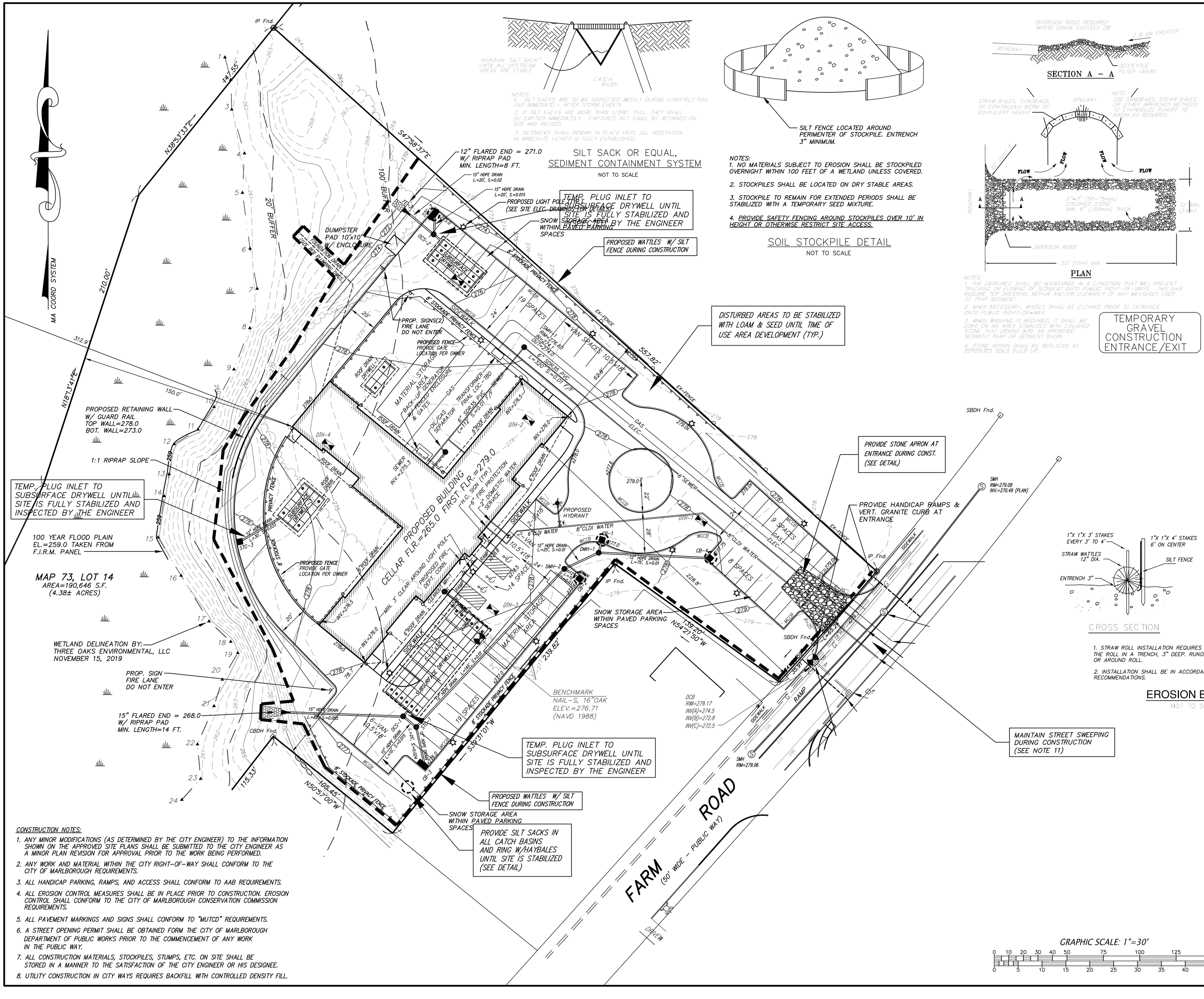
PHONE: 508-393-9727 FAX: 508-393-5242

SITE PLAN
OF
704 FARM ROAD
MARLBOROUGH, MA
(MAP 73, LOTS 14 & 15A)

REVISED:	DESCRIPTION:
6/16/2020	SNOW STORAGE AREAS
6/15/2020	REAR FIRE LANE
5/20/2020	MassDEP COMMENTS
4/20/2020	UTILITY COORD. & C. COMM ITEMS

DRAWN BY: REM | CHECK BY: VC
DATE: FEBRUARY 28, 2020
SCALE: 1"=30' | SHEET 3 OF 6.

DIGSAFE 1-888-344-7233



MAINTAIN "SILT SACK" UNTIL ALL UPSTREAM AREAS ARE STABLE

CATCH BASIN

NOTES:
1. SILT SACKS ARE TO BE INSPECTED WEEKLY DURING CONSTRUCTION AND IMMEDIATELY AFTER STORM EVENTS.
2. IF SILT SACKS ARE MORE THAN 1/3RD FULL, THEY SHALL BE EMPTIED IMMEDIATELY. CAPTURES SILT SHALL BE RETAINED ON SITE AND REUSED.
3. SILTSACKS SHALL REMAIN IN PLACE UNTIL ALL VEGETATION IN IMMEDIATE VICINITY IS FULLY ESTABLISHED.

SILT SACK OR EQUAL, SEDIMENT CONTAINMENT SYSTEM

NOT TO SCALE

NOTES:
1. NO MATERIALS SUBJECT TO EROSION SHALL BE STOCKPILED OVERNIGHT WITHIN 100 FEET OF A WETLAND UNLESS COVERED.
2. STOCKPILES SHALL BE LOCATED ON DRY STABLE AREAS.
3. STOCKPILE TO REMAIN FOR EXTENDED PERIODS SHALL BE STABILIZED WITH A TEMPORARY SEED MIXTURE.
4. PROVIDE SAFETY FENCING AROUND STOCKPILES OVER 10' IN HEIGHT OR OTHERWISE RESTRICT SITE ACCESS.

SOIL STOCKPILE DETAIL

NOT TO SCALE

NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
4. STONE APRON SHALL BE REPLACED AS DEPOSITED SOILS BUILD UP.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3" DEEP. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.
2. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

EROSION BARRIER

NOT TO SCALE

EROSION AND SEDIMENTATION CONTROL NOTES:

1. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION.
2. EROSION CONTROL SHALL CONFORM TO THE CITY OF MARLBOROUGH REQUIREMENTS AS CONDITIONED IN THE SITE PLAN APPROVAL AND ORDER OF CONDITIONS CONDITIONS.
3. PRIOR TO INITIATING CONSTRUCTION, ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND DETAIL DRAWINGS.
4. THIS PLAN DEPICTS THE MINIMUM REQUIRED SEDIMENTATION AND EROSION CONTROLS. THE CONTRACTOR SHALL EMPLOY ADDITIONAL SEDIMENTATION AND EROSION CONTROL MEASURES AS NECESSITATED BY SITE CONDITIONS, OR AS DIRECTED BY THE OWNER, THE OWNER'S REPRESENTATIVE, OR THE CONSERVATION COMMISSION TO ENSURE PROTECTION OF ALL WETLAND RESOURCES AND CONTROL SEDIMENT TRANSPORT. IF SEDIMENTATION PLUMES OCCUR, THE CONTRACTOR SHALL STOP WORK AND INSTALL ADDITIONAL SEDIMENTATION CONTROL DEVICES IMMEDIATELY TO PREVENT FURTHER SEDIMENTATION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT SEDIMENTATION AND EROSION CONTROLS UNTIL WORK IS COMPLETE AND ALL AREAS HAVE BEEN PERMANENTLY STABILIZED. AT SUCH TIME THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL SEDIMENTATION AND EROSION CONTROL MEASURES.
6. THE CONTRACTOR SHALL INSPECT SEDIMENTATION AND EROSION CONTROLS ON A DAILY BASIS AND IMMEDIATELY AFTER EACH RAINFALL; REPAIRS SHALL BE MADE BY THE END OF THE WORKING DAY. ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR WHEN THE VOLUME REACHES 1/4 TO 1/2 THE HEIGHT OF HAY BALE OR SEDIMENT TRAP, OR AS DIRECTED BY THE LOCAL AUTHORITY.
7. SOIL STOCKPILES SHALL BE STABILIZED TO PREVENT EROSION, AND A PERIMETER SEDIMENT CONTROL SYSTEM SHALL BE INSTALLED. FENCING SHALL BE INSTALLED AROUND STOCKPILES IN EXCESS OF 10 FEET IN HEIGHT.
8. DISTURBED AREAS SHALL BE STABILIZED BY LOAMING AND SEEDING, OR BY ANOTHER APPROVED METHOD, AS SOON AS POSSIBLE AFTER THE FINISHED GRADE HAS BEEN MET. DISTURBED AREAS WITH SLOPES 3:1 (H:V) OR GREATER SHALL BE COVERED WITH LOAM AND STABILIZED WITH HYDROSEED AND SOIL TACKIFIER. IF FINAL GRADING DOES NOT OCCUR DURING THE GROWING SEASON, THESE AREAS SHALL BE MULCHED WITH HAY SECURED.
9. DE-WATERING OPERATIONS, IF REQUIRED, SHALL DISCHARGE ONTO STABILIZED AREAS, AND ALL DISCHARGE WATER IS TO PASS THROUGH SEDIMENTATION CONTROL DEVICES TO PREVENT IMPACTS UPON WATER BODIES, BORDERING VEGETATED WETLANDS, DRAINAGE SYSTEMS AND ABUTTING PROPERTIES. AT A MINIMUM ALL DISCHARGES SHALL BE INTERCEPTED BY HAY BALE CORRAL AND HAY BALE CHECK DAMS SPACED 10' APART.
10. STAKED HAY BALES AND SILT FENCE SHALL BE INSTALLED ALONG THE EDGE OF PROPOSED DEVELOPMENT OR AS INDICATED ON THE PLANS. ADDITIONAL HAY BALES AND SILT FENCE SHALL BE LOCATED AS CONDITIONS WARRANT, AND IN SOME AREAS HAYBALE/SILT FENCING STRUCTURES MAY HAVE TO BE DUPLICATED AT REGULAR INTERVALS UP GRADIENT OF WETLANDS.
11. STREET SWEEPING IN THE VICINITY OF THE PROJECT AREA SHALL BE PERFORMED AS NEEDED UNTIL THE PROJECT LIMITS HAVE BEEN STABILIZED. ALL SEDIMENT TRACKED ONTO PUBLIC RIGHT-OF-WAYS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.
12. ALL EXISTING AND PROPOSED DRAINAGE SYSTEM INLETS, WHICH MAY RECEIVE STORM WATER FLOW FROM DISTURBED AREAS, SHALL BE PROVIDED WITH INLET PROTECTION (CATCH BASIN INSERTS, STREAMGUARD - MODEL 3003, OR APPROVED EQUAL). THE CONTRACTOR SHALL MAINTAIN THESE DEVICES PER THE MANUFACTURERS RECOMMENDATIONS UNTIL ALL WORK IS COMPLETED AND ALL AREAS HAVE BEEN ADEQUATELY STABILIZED.
13. DUST CONTROL MEASURES SHALL BE IMPLEMENTED AND MAINTAINED PROPERLY THROUGHOUT DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED. METHODS FOR DUST CONTROL SHALL INCLUDE WATER SPRINKLING AND/OR OTHER METHODS APPROVED BY THE ENGINEER.
14. ALL VEHICLES SHALL ENTER AND EXIT THE SIT VIA THE STABILIZED CONSTRUCTION ENTRANCE CONSISTING OF 3/4"-1 1/2" INCH CRUSHED STONE TO A DEPTH OF 12" FOR THE FIRST 50 FEET FROM EXISTING PAVED STREETS. IF THE SITE CONDITIONS ARE SUCH THAT THE GRAVEL PAD DOES NOT REMOVE THE MAJORITY OF THE MUD AND DEBRIS, THEN THE TIRES SHALL BE WASHED BEFORE ANY VEHICLES ENTER ADJACENT ROADWAYS. ALL WATER USED FOR TIRE WASHING SHALL BE COLLECTED AND TREATED PRIOR TO ENTERING THE DRAINAGE SYSTEM. THE CONTRACTOR SHALL INSPECT THE CONSTRUCTION ENTRANCE DAILY AND AFTER HEAVY USE.
15. EQUIPMENT SHALL NOT BE PARKED WITHIN WETLANDS.

CONSTRUCTION NOTES:

1. ANY MINOR MODIFICATIONS (AS DETERMINED BY THE CITY ENGINEER) TO THE INFORMATION SHOWN ON THE APPROVED SITE PLANS SHALL BE SUBMITTED TO THE CITY ENGINEER AS A MINOR PLAN REVISION FOR APPROVAL PRIOR TO THE WORK BEING PERFORMED.
2. ANY WORK AND MATERIAL WITHIN THE CITY RIGHT-OF-WAY SHALL CONFORM TO THE CITY OF MARLBOROUGH REQUIREMENTS.
3. ALL HANDICAP PARKING, RAMPS, AND ACCESS SHALL CONFORM TO AAB REQUIREMENTS.
4. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION. EROSION CONTROL SHALL CONFORM TO THE CITY OF MARLBOROUGH CONSERVATION COMMISSION REQUIREMENTS.
5. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO "MUTCD" REQUIREMENTS.
6. A STREET OPENING PERMIT SHALL BE OBTAINED FORM THE CITY OF MARLBOROUGH DEPARTMENT OF PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF ANY WORK IN THE PUBLIC WAY.
7. ALL CONSTRUCTION MATERIALS, STOCKPILES, STUMPS, ETC. ON SITE SHALL BE STORED IN A MANNER TO THE SATISFACTION OF THE CITY ENGINEER OR HIS DESIGNEE.
8. UTILITY CONSTRUCTION IN CITY WAYS REQUIRES BACKFILL WITH CONTROLLED DENSITY FILL.

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
6-15-20

PREPARED FOR:
NEW ENGLAND CENTER FOR CHILDREN
33 TURNPIKE ROAD
SOUTHBOROUGH, MA

CONNORSTONE ENGINEERING INC.
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10 SOUTHWEST CUTOFF, SUITE 7
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PHONE: 508-393-9727 FAX: 508-393-5242

EROSION CONTROL PLAN
OF
704 FARM ROAD
MARLBOROUGH, MA
(MAP 73, LOTS 14 & 15A)

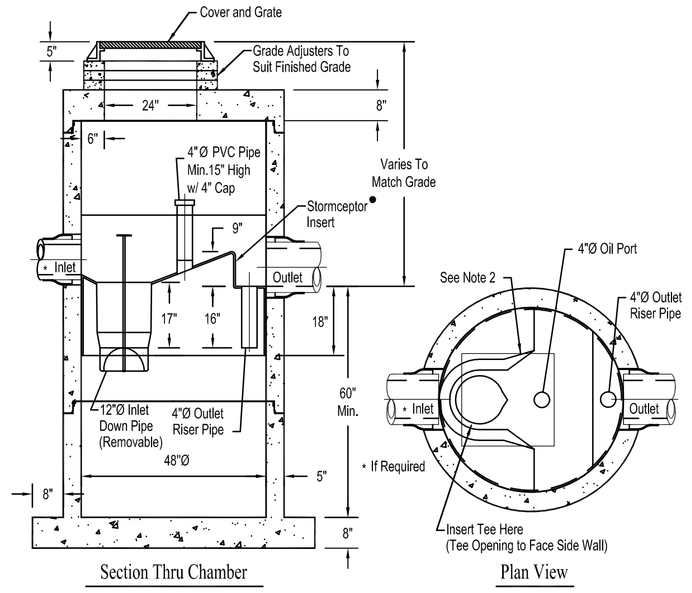
6/16/2020	SNOW STORAGE AREAS
6/15/2020	REAR FIRE LANE
5/20/2020	MassDEP COMMENTS
4/20/2020	UTILITY COORD. & C. COMM ITEMS
REVISED:	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VC
DATE: FEBRUARY 28, 2020	
SCALE: 1"=30'	SHEET 4 OF 6

DIG SAFE 1-888-344-7233

Rinker MATERIALS

Concrete Pipe Division

STC 450i Precast Concrete Stormceptor®
(450 U.S. Gallon Capacity)



Section Thru Chamber

Plan View

Notes:
1. The Use Of Flexible Connection is Recommended at The Inlet and Outlet Where Applicable.
2. The Cover Should be Positioned Over The Inlet Drop Pipe and The Oil Port.
3. The Stormceptor System is protected by one or more of the following U.S. Patents: #4985148, #5498331, #5725760, #5753115, #5849181, #6068765, #6371690.
4. Contact a Concrete Pipe Division representative for further details not listed on this drawing.

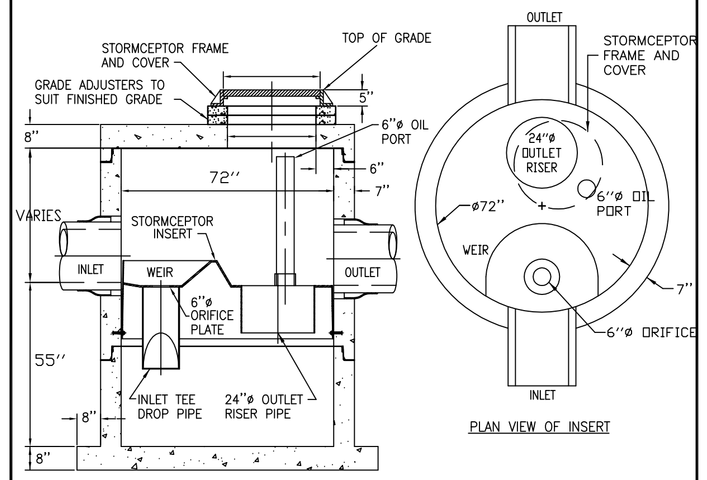
Rinker 027

Hydro Conduit

STC 900 Precast Concrete Stormceptor
(900 US Gallon Capacity)

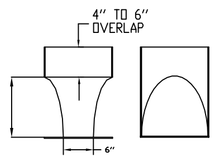
PROJECT:
LOCATION:

DR. BY: N. BALDWIN
CK. BY:
DATE: FEB. 13, 2001
SCALE: N.T.S.
DWG.#



SECTION THRU CHAMBER

PLAN VIEW OF INSERT



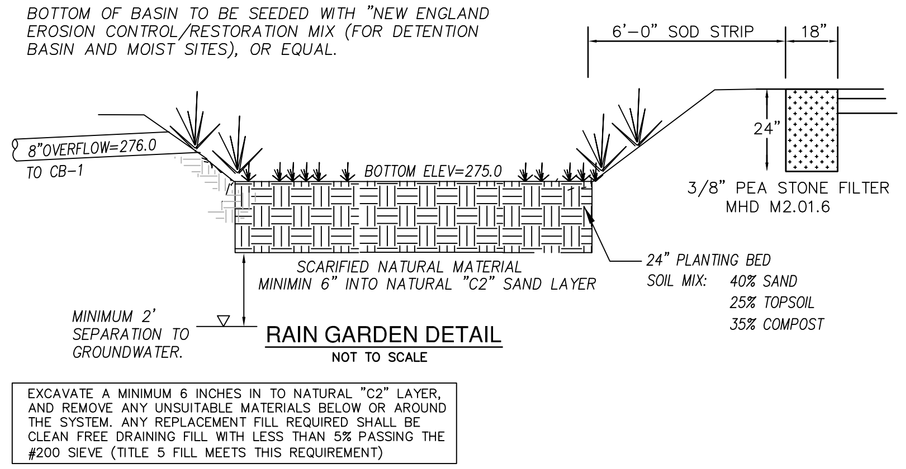
ENLARGED INLET TEE DROP PIPE

NOTE :
1. THE USE OF FLEXIBLE CONNECTIONS IS RECOMMENDED AT THE INLET AND OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE 24"ø OUTLET RISER PIPE AND THE 6"ø OIL PORT.
3. THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: #4985148, #5498331, #5725760, #5753115, #5849181.

REV.	DESCRIPTION	BY:	DATE

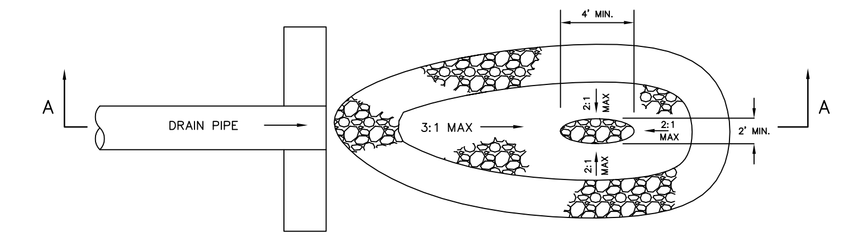
PLANT BASIN PERIMETER WITH
16 – INKBERRY (ILEX GLABRA)
16 – WINTERBERRY (ILEX VERTICLLATA)
PLANTED AT 6 FEET O.C.
(OR AS SHOWN ON FINAL LANDSCAPE PLANS)

BOTTOM OF BASIN TO BE SEEDED WITH "NEW ENGLAND EROSION CONTROL/RESTORATION MIX (FOR DETENTION BASIN AND MOIST SITES), OR EQUAL.

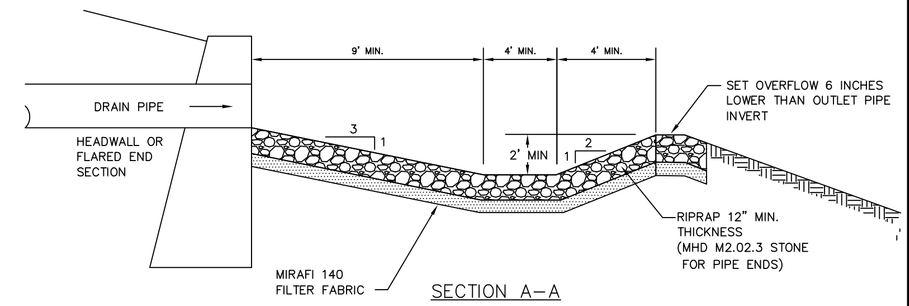


RAIN GARDEN DETAIL
NOT TO SCALE

EXCAVATE A MINIMUM 6 INCHES IN TO NATURAL "C2" LAYER, AND REMOVE ANY UNSUITABLE MATERIALS BELOW OR AROUND THE SYSTEM. ANY REPLACEMENT FILL REQUIRED SHALL BE CLEAN FREE DRAINING FILL WITH LESS THAN 5% PASSING THE #200 SIEVE (TITLE 5 FILL MEETS THIS REQUIREMENT)

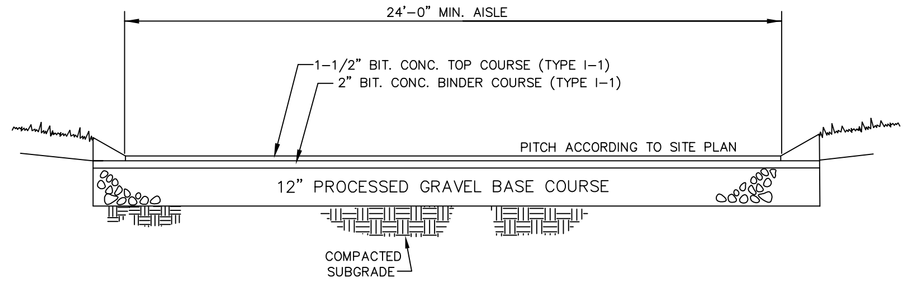


PLAN VIEW

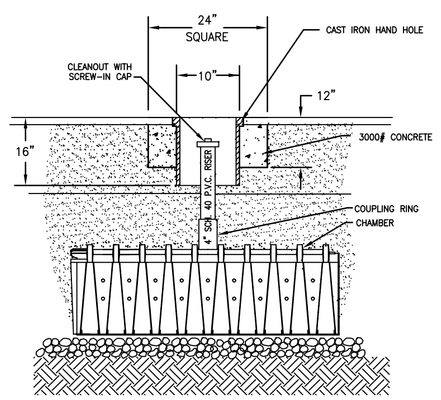


SECTION A–A

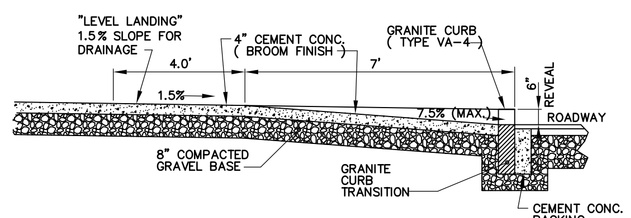
RIRAP STILLING BASIN
NOT TO SCALE



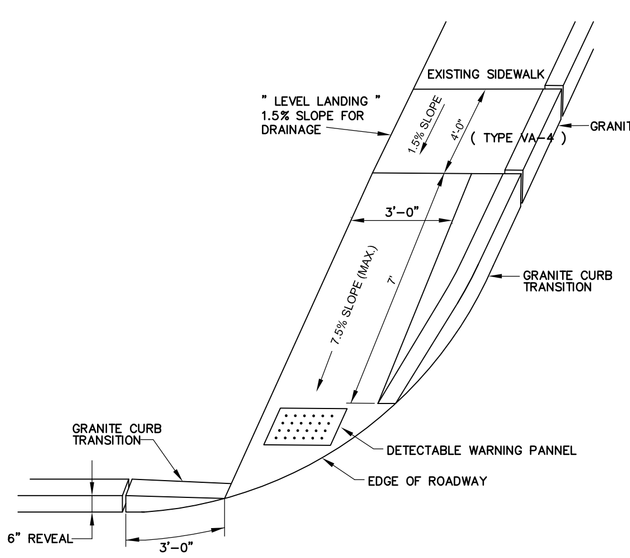
TYPICAL PARKING AISLE/DRIVEWAY PAVEMENT CROSS SECTION



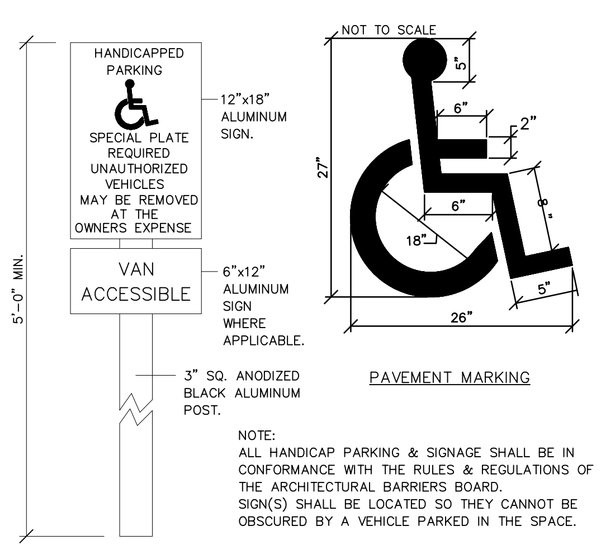
INSPECTION PORT DETAIL
NOT TO SCALE



TYPICAL SECTION



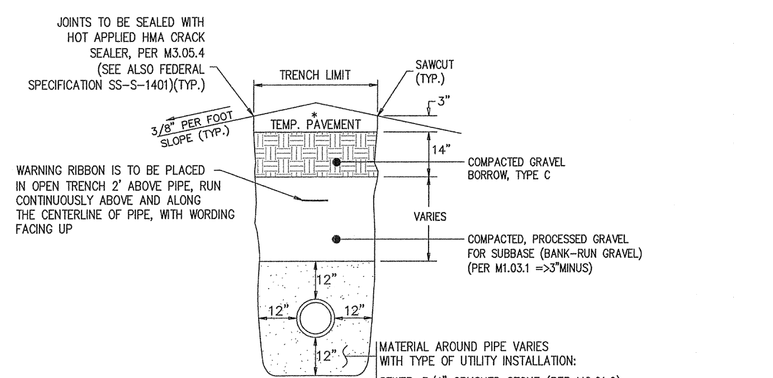
CONCRETE WHEELCHAIR CURB-CUT RAMP -1
NOT TO SCALE



PAVEMENT MARKING

NOTE:
ALL HANDICAP PARKING & SIGNAGE SHALL BE IN CONFORMANCE WITH THE RULES & REGULATIONS OF THE ARCHITECTURAL BARRIERS BOARD. SIGN(S) SHALL BE LOCATED SO THEY CANNOT BE OBSCURED BY A VEHICLE PARKED IN THE SPACE.

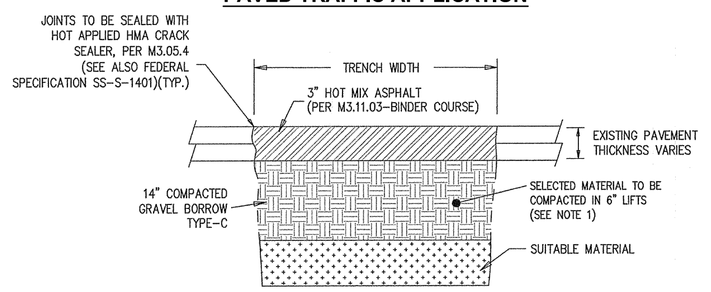
HANDICAP SIGN & PAVEMENT MARKING DETAIL
NOT TO SCALE



NOTE:
1. TEMPORARY PAVEMENT TO REMAIN IN PLACE FOR A MINIMUM OF 65 DAYS MAXIMUM OF 90 DAYS, TO BE COMPLETELY REMOVED DURING FINAL PAVING.
2. WATER MAIN PIPE IS TO HAVE MINIMUM COVER DEPTH OF 5 FEET FROM FINISHED SURFACE.

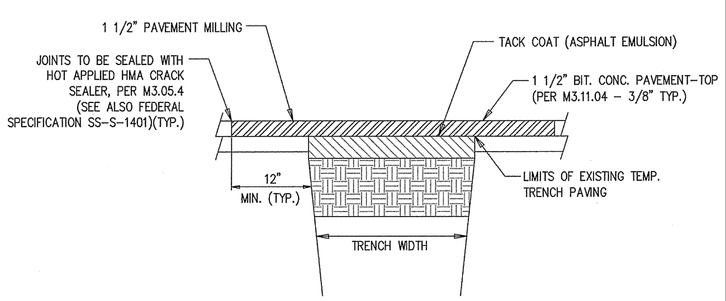
TYPICAL EXCAVATION TRENCH
N.T.S.

CULTEC RECHARGER 330XLHD CHAMBER
PAVED TRAFFIC APPLICATION



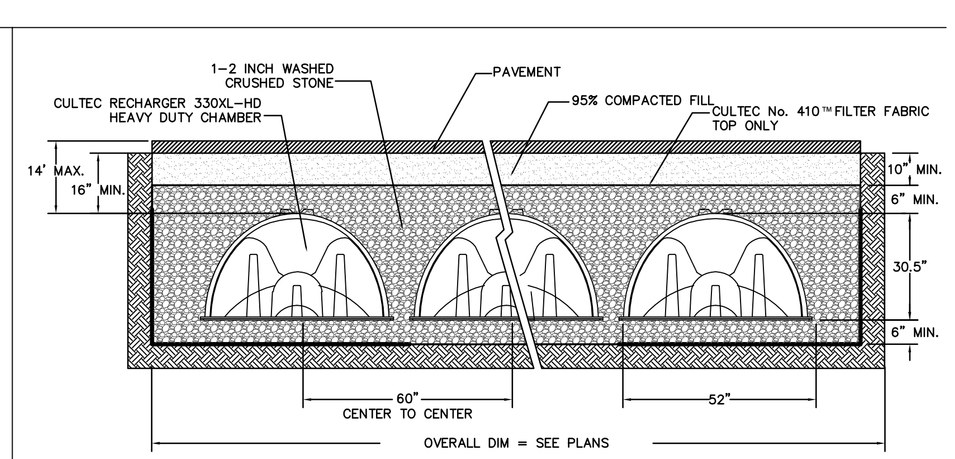
NOTE:
1. COMPACTION EQUIPMENT AND LIFT THICKNESS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.

TEMPORARY TRENCH PAVING
TYPICAL SECTION
N.T.S



NOTE:
1. COMPACTION EQUIPMENT AND LIFT THICKNESS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.

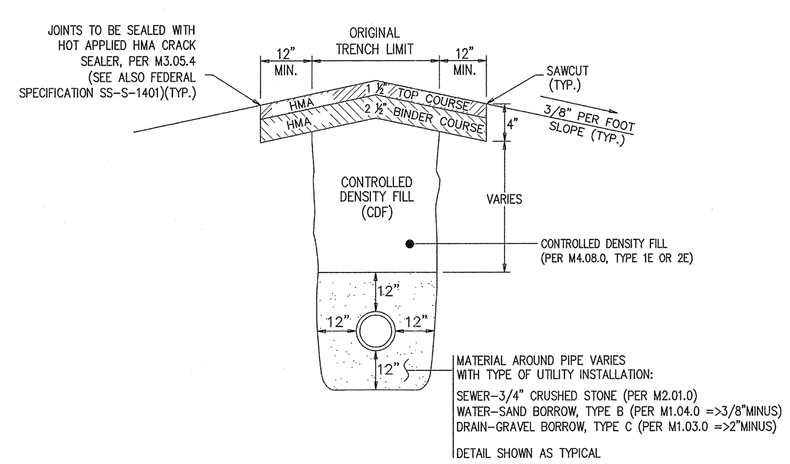
TYPICAL FINAL TRENCH PAVING
N.T.S



GENERAL NOTES
RECHARGER 280HD BY CULTEC, INC. OF BROOKFIELD, CT.
ALL RECHARGER 280HD CHAMBERS MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

REFER TO CULTEC, INC'S CURRENT RECOMMENDED INSTALLATION GUIDELINES.
ALL RECHARGER 330 XL HEAVY DUTY UNITS ARE MARKED WITH A COLOR STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.

CULTEC RECHARGER 330 XLHD CHAMBER SYSTEM
PAVED TRAFFIC APPLICATION
TYPICAL CROSS SECTION DETAIL



TYPICAL FLOWABLE FILL TRENCH
N.T.S.

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
6-15-20

PREPARED FOR:

NEW ENGLAND CENTER FOR CHILDREN
33 TURNPIKE ROAD
SOUTHBOROUGH, MA

OWNER:

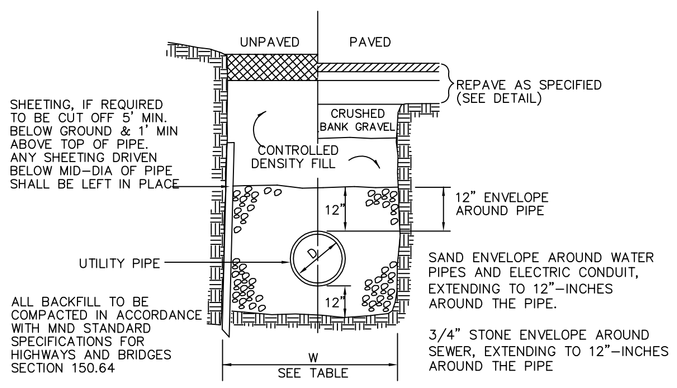
MARLBOROUGH INDUSTRIAL, LLC
259 TURNPIKE ROAD, SUITE 100
SOUTHBOROUGH, MA

CONNORSTONE ENGINEERING INC.
CIVIL ENGINEERS AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508-393-9727 FAX: 508-393-5242

CONSTRUCTION DETAILS
MAP 73, LOTS 14 & 15A
FARM ROAD
IN
MARLBOROUGH, MA

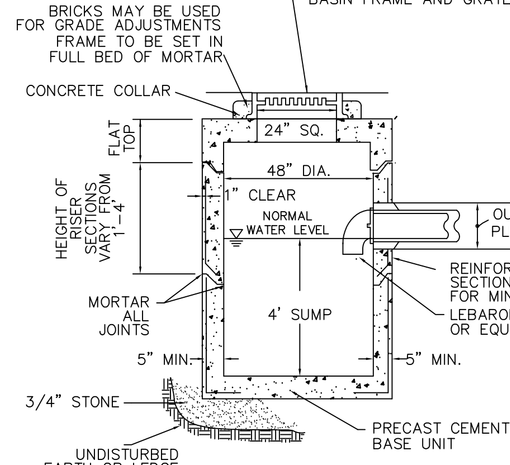
6/16/2020	SNOW STORAGE AREAS
6/15/2020	REAR FIRE LANE
4/20/2020	UTILITY COORD. & C. COMM ITEMS
REVISED:	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VC
DATE: FEBRUARY 28, 2020	
SCALE: NONE	SHEET 5 OF 6.

TRENCH WIDTH (W)		
D DIAMETER OF PIPE	W UNSHEETED	W SHEETED
TO 12"	3'	4'
14" TO 24"	4'	5'
30" TO 36"	5'	6'



TYPICAL TRENCH SECTION

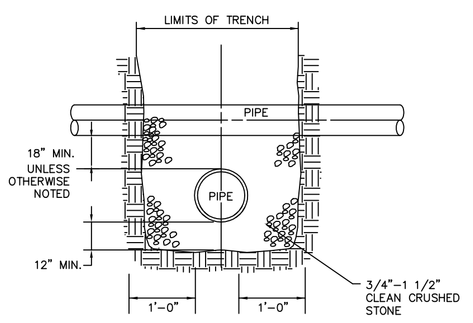
NOT TO SCALE



NOTE: SAW CUT LIMITS SHALL BE SEALED ON PERMANENT PATCHES.

PERMANENT TRENCH PAVING

NOT TO SCALE



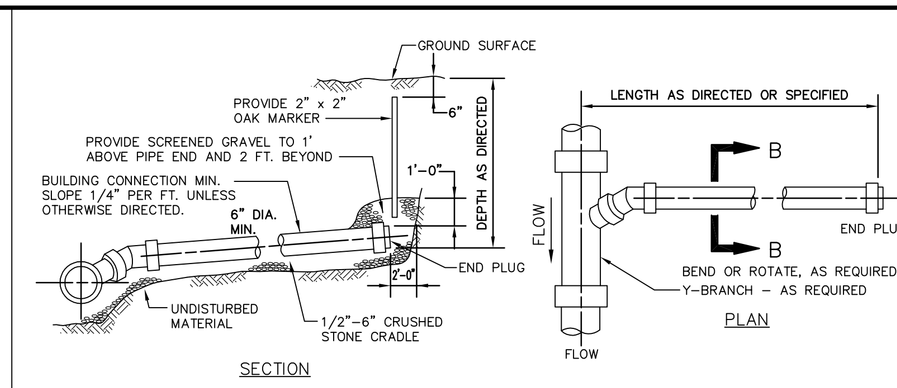
UTILITY CROSSING DETAIL

NOT TO SCALE

NOTE: FOR WATER AND SEWER CROSSINGS MAINTAIN 18 INCHES OF SEPERATION BETWEEN PIPES. LAY PIPES SUCH THAT CONNECTION JOINTS ARE 10 FEET EITHER SIDE OF THE CROSSING. ALL WATER PIPES LAID OVER SEWER PIPES.

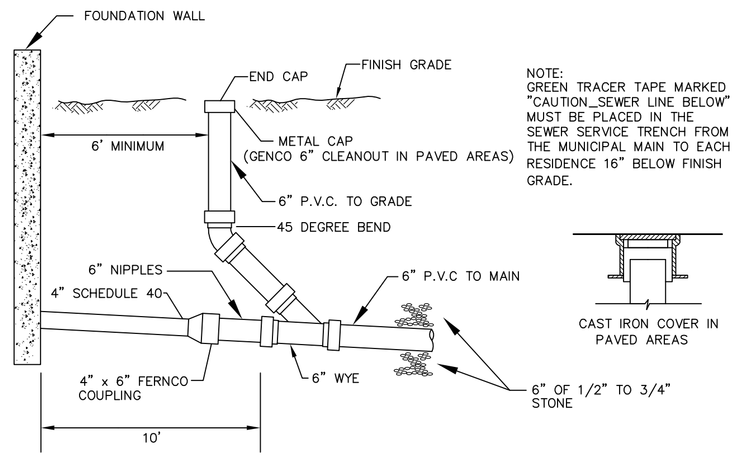
PRECAST CONCRETE CATCH BASIN

WITH GRANITE CURB INLET
NOT TO SCALE



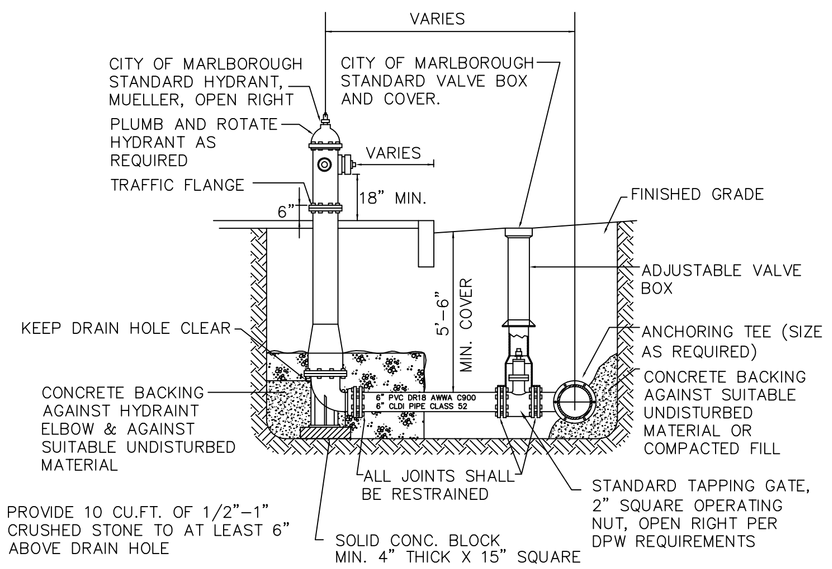
TYPICAL BUILDING CONNECTION

NOT TO SCALE



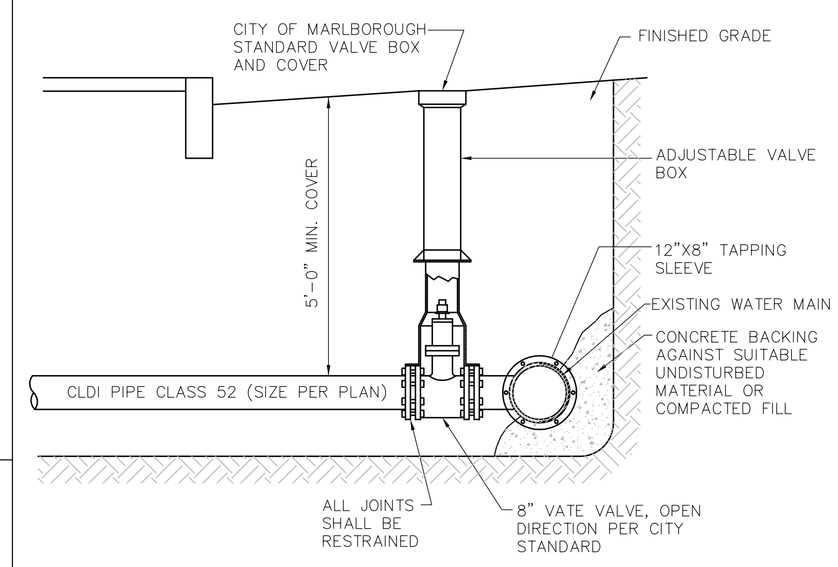
SEWER SERVICE LINES CLEANOUT & FITTINGS

NOT TO SCALE



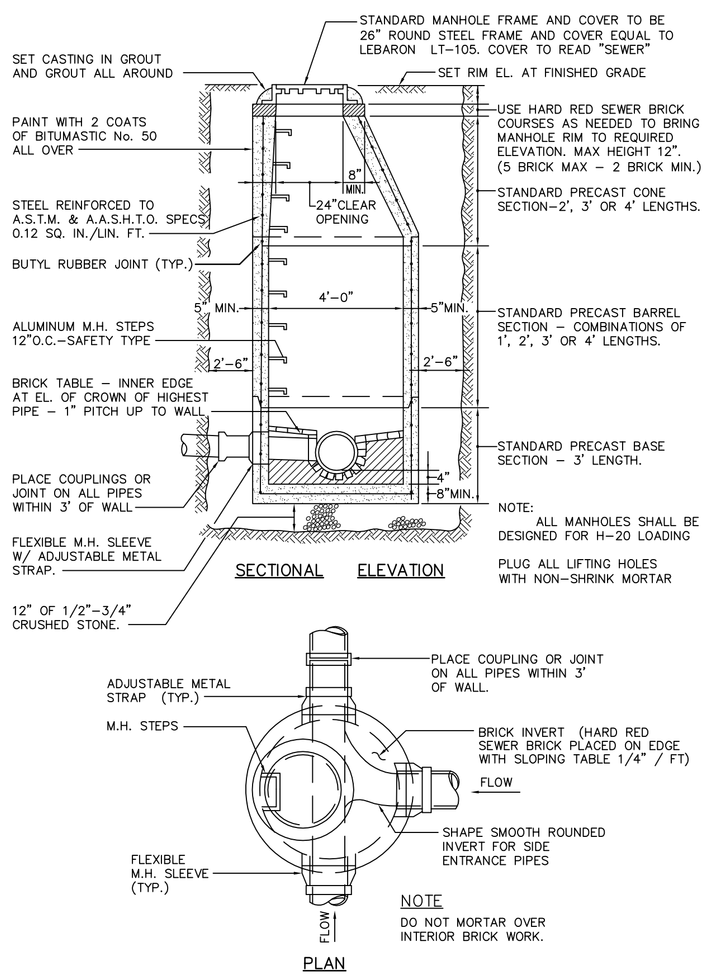
TYPICAL HYDRANT & VALVE DETAIL

NOT TO SCALE



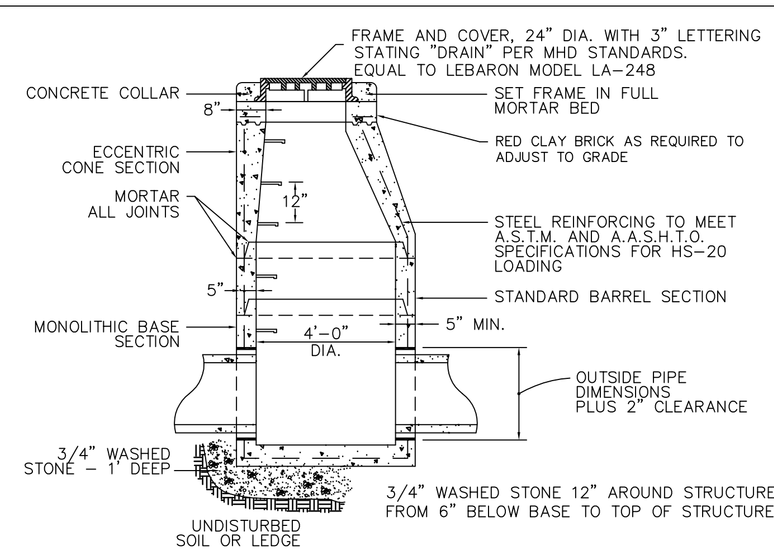
TYPICAL WATER CONNECTION

NOT TO SCALE



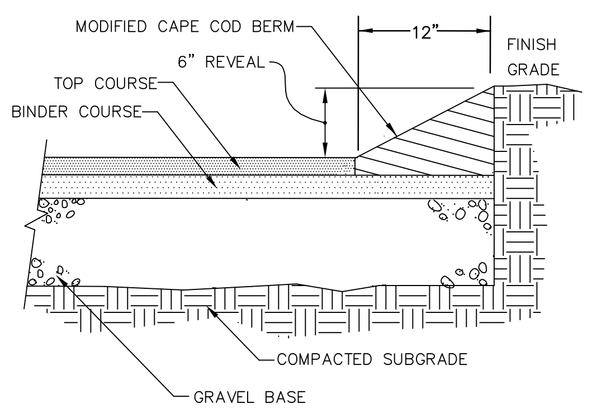
TYPICAL PRECAST CONCRETE MANHOLE DETAIL

NOT TO SCALE



PRECAST CONCRETE DRAIN MANHOLE

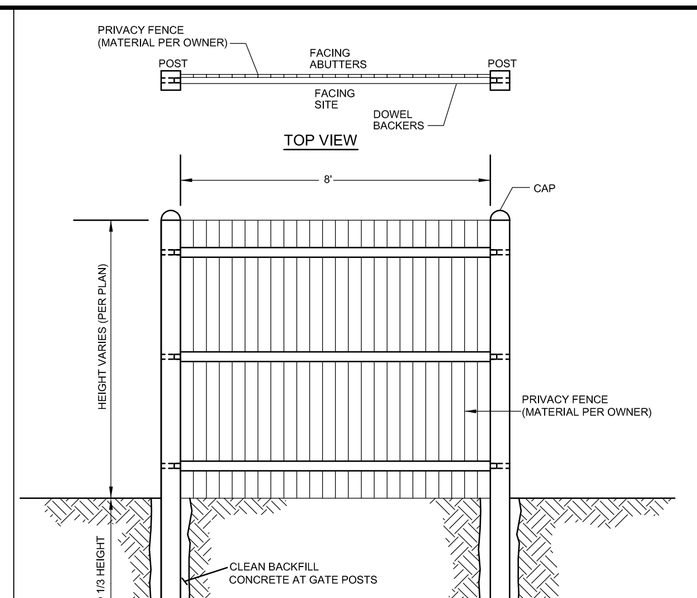
NOT TO SCALE



THROUGHOUT PARKING LOT UNLESS OTHERWISE SPECIFIED

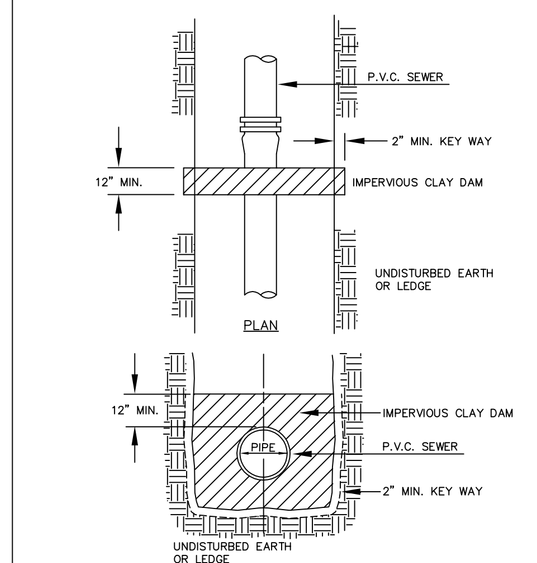
MODIFIED CAPE COD BERM

NOT TO SCALE



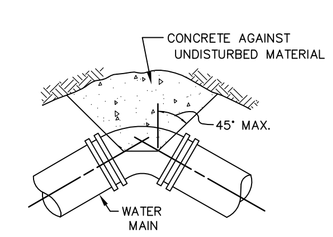
FENCE DETAIL

NOT TO SCALE

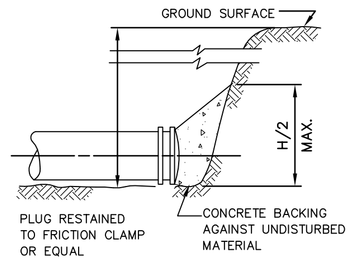


PIPE TRENCH DAM DETAIL

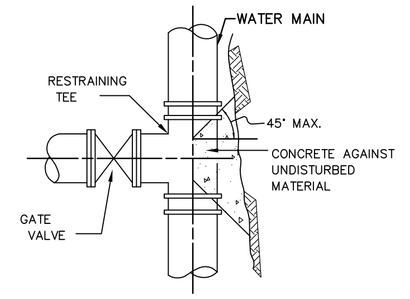
NOT TO SCALE



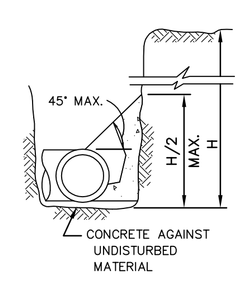
TYPICAL BEND



TYPICAL PLUG



TYPICAL TEE & VALVE



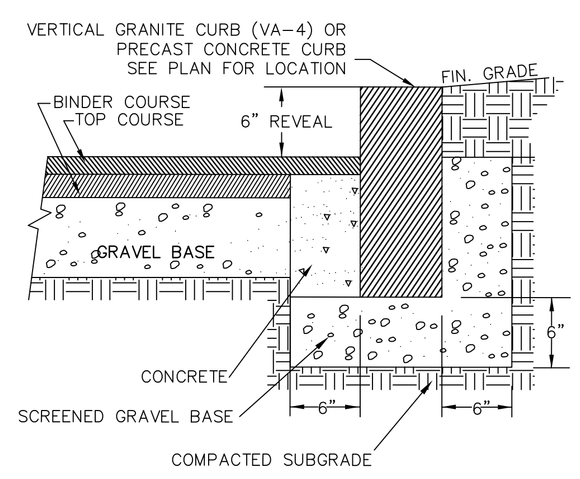
TYPICAL SECTION

NOTE: CONCRETE FOR THRUST BLOCKS SHALL BE NO LONGER THAN THE RATIO OF 2 1/2 : 5 1/2 AND SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 2000 PSI (SO THAT FLANGES AND BOLTS ARE ACCESSIBLE.)

BEARING AREAS OF THRUST BLOCKS (BEARING AREA IN SQUARE FT.)				
PIPE SIZE INCHES	1/4 BEND	1/8 BEND	1/16 BEND OR LESS	PLUG TEES
6 AND 8	8	8		8
10 AND 12	22	13	8	16

TYPICAL THRUST BLOCK DETAIL

NOT TO SCALE



VERTICAL CURB DETAIL

NOT TO SCALE

VERTICAL CONCRETE AT ENTRANCE ROUNDINGS AT FARM ROAD (SEE PLAN)

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
REGISTERED PROFESSIONAL ENGINEER
6-15-20

PREPARED FOR:

NEW ENGLAND CENTER FOR CHILDREN
33 TURNPIKE ROAD
SOUTHBOROUGH, MA

OWNER:

MARLBOROUGH INDUSTRIAL, LLC
259 TURNPIKE ROAD, SUITE 100
SOUTHBOROUGH, MA

CONNORSTONE ENGINEERING INC.
CIVIL ENGINEERS AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508-393-9727 FAX: 508-393-5242

CONSTRUCTION DETAILS
MAP 73, LOTS 14 & 15A
FARM ROAD
IN
MARLBOROUGH, MA

6/16/2020	SNOW STORAGE AREAS
6/15/2020	REAR FIRE LANE
4/20/2020	UTILITY COORD. & C. COMM ITEMS
REVISED:	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VC
DATE: FEBRUARY 28, 2020	
SCALE: NONE	SHEET 6 OF 6.

SITE PLAN FOR
MULTI-FAMILY REDEVELOPMENT
447 BOSTON POST ROAD EAST
MARLBOROUGH, MA.

GENERAL NOTES

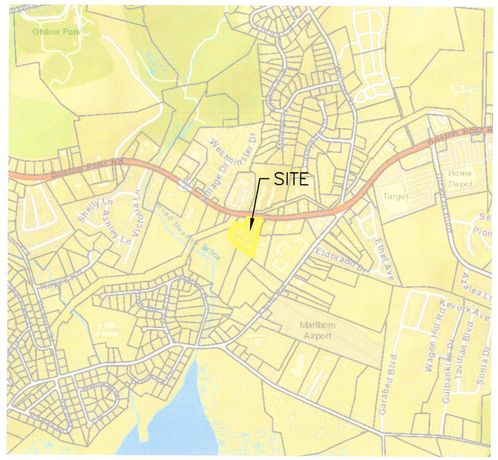
1. EXISTING PROPERTY LINE AND UTILITY INFORMATION SHOWN IS BASED ON AN EXISTING SURVEY CONDUCTED BY MISTRY ASSOCIATES, INC. DATED FEBRUARY 5, 2020.
2. THE ACCURACY AND COMPLETENESS OF THE UNDERGROUND UTILITIES AS SHOWN ON THE PLANS ARE NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION, SIZE, TYPE, ETC. OF ALL UNDERGROUND UTILITIES THAT MAY BE AFFECTED BY BY THE WORK. AT LEAST 72 HOURS BEFORE EXCAVATION, THE CONTRACTOR SHALL BE REQUIRED TO CONTACT DIGSAFE AT 1-888-344-7233.
3. THE CONTRACTOR SHALL FIELD VERIFY CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE APPROPRIATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION.
5. ALL UTILITY COMPANIES, PUBLIC AND PRIVATE, MUST BE NOTIFIED, INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN, PRIOR TO EXCAVATING, BLASTING, INSTALLING, BACKFILLING, GRADING, PAVEMENT RESTORATION OR REPAVING.
6. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES EXCEPT THOSE NOTED TO BE ABANDONED, REMOVED AND DISPOSED.
7. THE CONTRACTOR SHALL DISPOSE OF ALL WASTE MATERIAL IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS AT HIS/HER OWN EXPENSE, OUTSIDE OF THE PROJECT LIMITS.

SHEET INDEX

PLANS ALSO INCLUDED:
EXISTING CONDITIONS PLAN

SITE PLAN REVIEW COMMITTEE
REVIEW COMMITTEE SIGNATURE BLOCK

NAME	DATE
NAME	DATE
NAME	DATE
NAME	DATE
NAME	DATE
NAME	DATE
NAME	DATE



LOCUS MAP
1"=1,000'

PROJECT TEAM

DEVELOPER:
TRUE NORTH CAPITAL PARTNERS
396 LINDSAY POND ROAD
CONCORD, MA 01742

ENGINEER:
HOWARD STEIN HUDSON
114 TURNPIKE ROAD, SUITE 2C
CHELMSFORD, MA 01824

SURVEYOR:
MISTRY ASSOCIATES, INC.
315 MAIN STREET
READING, MA 01867

LANDSCAPE ARCHITECT:
JAMES K. EMMANUEL
22 CARLTON ROAD
MARBLEHEAD, MA 01945

OWNER

WAYSIDE APARTMENTS, LLC.
369 LINDSAY POND ROAD
CONCORD, MA 01742

ASSESSORS INFORMATION

ASSESSORS MAP 73 LOT 23

REFERENCES

EXISTING CONDITIONS PLAN BY MISTRY ASSOCIATES, INC. DATED FEBRUARY 5, 2020.

ZONING REQUIREMENTS

B – BUSINESS
DIMENSIONAL REQUIREMENTS

	REQUIREMENT	PROPOSED – (EXISTING)
MINIMUM LOT AREA	5,000 S.F.	U – (143,609 SF)
MINIMUM LOT FRONTAGE	50 FT	U – (200'±)
MINIMUM FRONT YARD	50 FT	U – (11.79')
MINIMUM SIDE YARD	0* FT	U – (10.83')
MINIMUM REAR YARD	0 FT	U – (10.10')
MAXIMUM BUILDING HEIGHT	52 FT	U – (29'±)
MAXIMUM LOT COVERAGE	30%	
EXISTING LOT COVERAGE	69.7% (100,163 SF / 143,609 SF)	
PROPOSED LOT COVERAGE	71.3% (102,366 SF / 143,609 SF)	

*BASED ON NOTE 3 PER MARLBOROUGH ZONING DIMENSIONAL TABLE
U=UNCHANGED BY APPLICATION

PARKING REQUIREMENTS

109 DWELLING UNITS EXISTING; 109 DWELLING UNITS PROPOSED

MULTIFAMILY DWELLING	= 2 PER DWELLING UNIT
TOTAL PARKING REQUIRED	= 109 * 2 = 218 SPACES
EXISTING PARKING ONSITE	= 148 SPACES
REQUIRED ADDITIONAL SPACES	= 218 – 148 = 70 SPACES
TOTAL PROPOSED SPACES	= 164 SPACES
TOTAL COMPACT SPACES	= 55 SPACES
RATIO OF COMPACT SPACES	= 55 / 164 = 0.34
EXISTING HANDICAP SPACES	= 0
REQUIRED HANDICAP SPACES	= 6 (1 OF WHICH IS VAN ACCESSIBLE)
PROPOSED HANDICAP SPACES	= 6 (3 OF WHICH ARE VAN ACCESSIBLE)

DUE TO THE SITE LAYOUT AND TOPOGRAPHIC CONSTRAINTS IT IS NOT FEASIBLE TO INCREASE PARKING PAST THIS POINT. THERE IS A NET GAIN OF 17 SPACES ONSITE, AN IMPROVEMENT OVER THE EXISTING CONDITIONS.

SITE PLAN AND SPECIAL PERMITS REQUIRED

PER MARLBOROUGH CODE 650-11 THROUGH 13 (ALSO KNOWN AS MARLBOROUGH ZONING ARTICLE IV) ALL NON-CONFORMING REGULATIONS OR REQUIREMENTS ARE EITHER REMAINING THE SAME AS EXISTING OR IMPROVING APART FROM LOT COVERAGE. THIS PROJECT REQUESTS A VARIANCE THROUGH THE ZBA.

HOWARD STEIN HUDSON
114 Turnpike Road, Suite 2C
Chelmsford, MA 01824
www.hshassoc.com

PREPARED FOR:
TRUE NORTH CAPITAL PARTNERS
396 LINDSAY POND ROAD
CONCORD, MA 01742

MULTI-FAMILY
RE-DEVELOPMENT
447 BOSTON POST ROAD EAST
MARLBOROUGH, MA, 01752
MIDDLESEX COUNTY

REVISIONS:

NO	BY	DATE	DESCRIPTION
1	PB	6/9/20	REV. PARKING LAYOUT

COMMONWEALTH OF MASSACHUSETTS
KATIE L. ENRIGHT
CIVIL
No. 46811
REGISTERED PROFESSIONAL ENGINEER
6/9/20

SITE PLAN

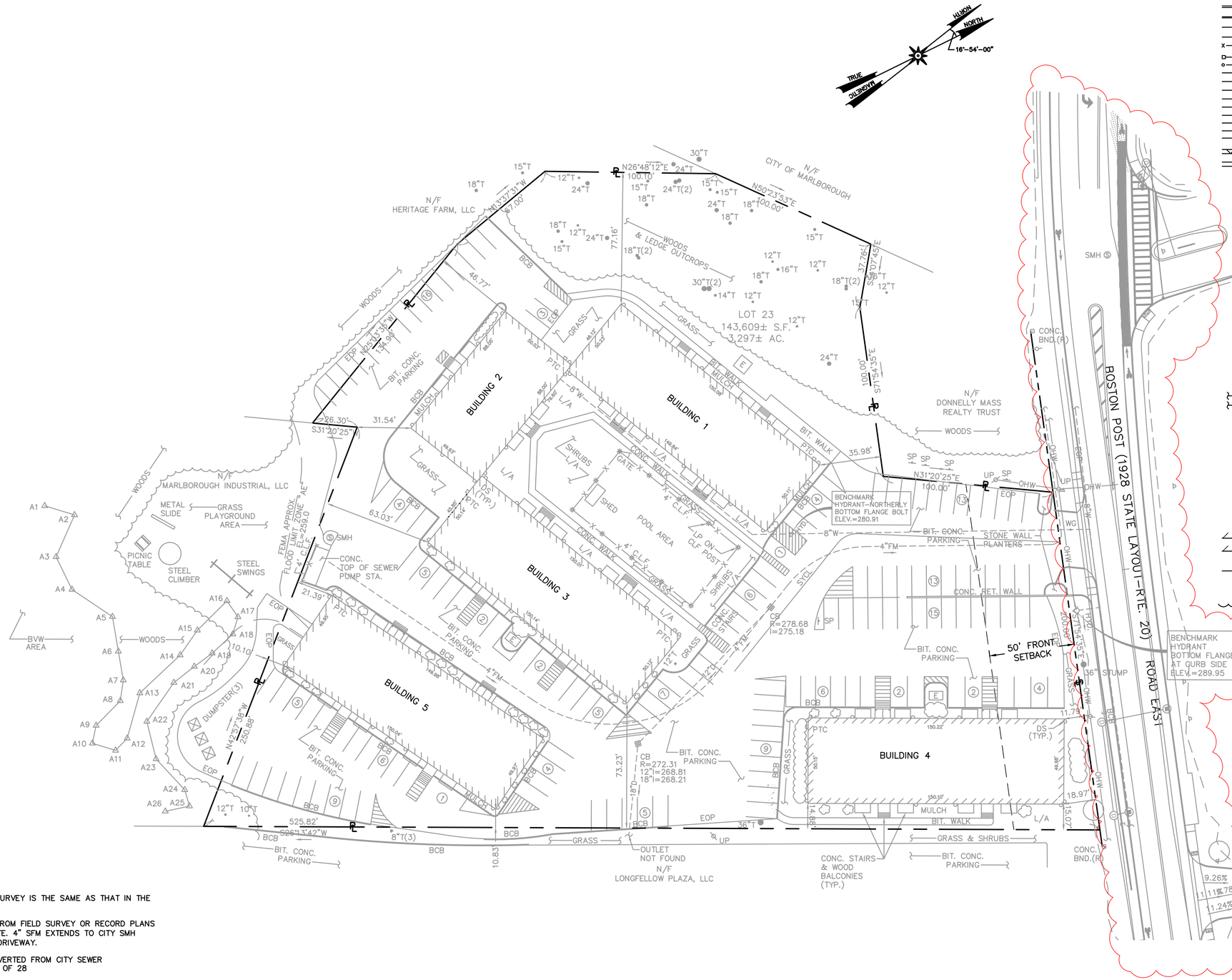
COVER SHEET

DATE: 05-13-2020
PROJECT NUMBER: 19176
DESIGNED BY: ND
DRAWN BY: ND
CHECKED BY: KE

1

REFERENCES

EXISTING CONDITIONS PLAN BY MISTRY ASSOCIATES, INC. DATED FEBRUARY 5, 2020.



LEGEND

- PROPERTY LINE
- STREET LINE
- EASEMENT LINE
- BUILDING LINE
- CC — CONCRETE CURB
- VGC — VERTICAL GRANITE CURB
- EOP — EDGE OF PAVEMENT
- EOG — EDGE OF GRASS
- CLF — CHAIN LINK FENCE
- PVC — PLASTIC FENCE
- WOOD FENCE
- S — SANITARY SEWER
- D — STORM DRAIN
- RD — ROOF DRAIN LINE
- W — WATER LINE
- FP — FIRE PROTECTION LINE
- G — GAS LINE
- E — ELECTRIC LINE
- T — TELEPHONE LINE
- OHW — OVERHEAD WIRE
- CRW — CONC. RETAINING WALL
- GBRW — GRANITE BLOCK RETAINING WALL
- SMH — SEWER MANHOLE
- DMH — DRAIN MANHOLE
- RD — ROOF DRAIN
- WMH — WATER MANHOLE
- TMH — TELEPHONE MANHOLE
- HH — HAND HOLE
- PTC — PLASTIC TELECOM CABINET
- CB — CATCH BASIN
- GW — GUY WIRE
- UP — UTILITY POLE
- TCS — TRAFFIC CONTROL SIGNAL
- TSCB — TRAFFIC SIGNAL CONTROL BOX
- E — ELECT. TRANSF. ON CONC. PAD
- LP — LIGHT POLE
- WG — WATER GATE
- HYD. — HYDRANT
- PIV — POST INDICATOR VALVE
- AD — AREA DRAIN
- FA — FIRE ALARM BOX
- GG — GAS GATE
- GM — GAS METER
- SP — SIGN POST
- BLLDS — BOLLARDS
- SB — STONE BOUND
- MB — MAIL BOX
- HH — HAND HOLE
- L/A — LANDSCAPED AREA W/ PLANTINGS
- C/S — CRUSHED STONE
- LCC — LAND COURT CASE
- P.O.B. — POINT OF BEGINNING
- SHRUBS/SMALL TREES
- 8"T — TREE
- AW — ASPHALT WALK
- ECB — ELECTRICAL CONTROL BOX
- DUMPSTER
- BLDR. — BOULDER
- (R) — RECORD PLAN
- (FND) — FOUND
- EN — BLDG. ENTRY
- DS — GUTTER DOWNSPOUT
- SYCL — SOLID YELLOW CENTER LINE
- SHRUB
- EDGE OF WOODS

NOTES:

1. THE PROPERTY SHOWN ON THE SURVEY IS THE SAME AS THAT IN THE LEGAL DESCRIPTION HEREON.
2. UTILITIES SHOWN ON PLAN ARE FROM FIELD SURVEY OR RECORD PLANS AND LOCATIONS ARE APPROXIMATE. 4" SFM EXTENDS TO CITY SMH 200'± NORTHWESTERLY OF SITE DRIVEWAY.
3. ELEVATION DATUM NAVD 88 CONVERTED FROM CITY SEWER PLAN-CONTRACT 1965-3 SHT. 6 OF 28
4. PREMISES LOCATED IN ZONE "X" NO FLOOD HAZARD. LOCATION OF "AE" FLOOD ZONE REAR OF BLDG. 5 IS SHOWN PER FEMA COMMUNITY MAP 25017C0486F, DATED 7/7/2014 (ELEV. 259.0). LOWEST ELEV. SURVEYED ALONG REAR SITE BOUNDARY EL. 261.90.
5. ASSESSOR'S PARCEL ID: 0073-0023
6. FRONT ENTRY STAIRS COVERED WITH WOOD CANOPY.
7. UNLESS NOTED OTHERWISE, AREAS OF SHRUBS AND L/A ARE MULCHED.
8. BASED ON DEED RESEARCH THERE ARE NO PLOTTABLE EASEMENTS ON THE PREMISES OR WITHIN 50 FT. OF THE BOUNDARIES.

DEED REFERENCES:

BOOK 17726, PAGE 541
PLAN 1408 OF 1969

OWNER OF RECORD

WAYSIDE APARTMENTS, LLC.
369 LINDSAY POND
CONCORD, MA 01742

30 0 30 60
SCALE IN FEET

HOWARD STEIN HUDSON
114 Turnpike Road, Suite 2C
Chelmsford, MA 01824
www.hshassoc.com

PREPARED FOR:
TRUE NORTH CAPITAL PARTNERS
369 LINDSAY POND ROAD
CONCORD, MA 01742

MULTI-FAMILY RE-DEVELOPMENT

447 BOSTON POST ROAD EAST
MARLBOROUGH, MA, 01752
MIDDLESEX COUNTY

REVISIONS:

NO	BY	DATE	DESCRIPTION
1	PB	6/9/20	REV. PARKING LAYOUT

SITE PLAN

LOCUS PLAN

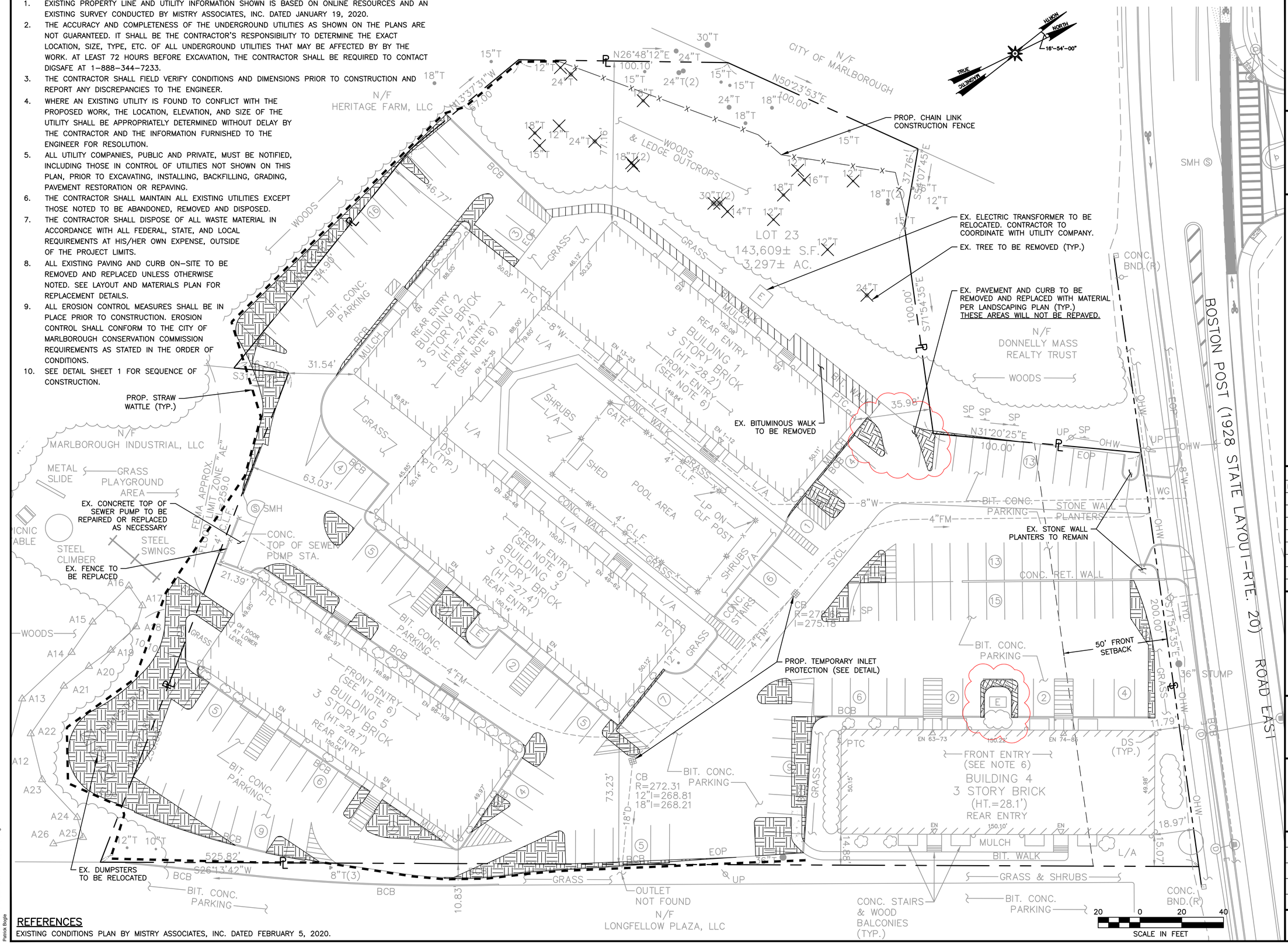
DATE:	05-13-2020
PROJECT NUMBER:	19176
DESIGNED BY:	ND
DRAWN BY:	ND
CHECKED BY:	KE

2

6/8/2020 M:\19176\CURRENT\19176 - Site Plan.dwg
Robert Bolger

EROSION, SEDIMENT CONTROL AND DEMOLITION NOTES:

1. EXISTING PROPERTY LINE AND UTILITY INFORMATION SHOWN IS BASED ON ONLINE RESOURCES AND AN EXISTING SURVEY CONDUCTED BY MISTRY ASSOCIATES, INC. DATED JANUARY 19, 2020.
2. THE ACCURACY AND COMPLETENESS OF THE UNDERGROUND UTILITIES AS SHOWN ON THE PLANS ARE NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION, SIZE, TYPE, ETC. OF ALL UNDERGROUND UTILITIES THAT MAY BE AFFECTED BY BY THE WORK. AT LEAST 72 HOURS BEFORE EXCAVATION, THE CONTRACTOR SHALL BE REQUIRED TO CONTACT DIGSAFE AT 1-888-344-7233.
3. THE CONTRACTOR SHALL FIELD VERIFY CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE APPROPRIATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION.
5. ALL UTILITY COMPANIES, PUBLIC AND PRIVATE, MUST BE NOTIFIED, INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN, PRIOR TO EXCAVATING, INSTALLING, BACKFILLING, GRADING, PAVEMENT RESTORATION OR REPAVING.
6. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES EXCEPT THOSE NOTED TO BE ABANDONED, REMOVED AND DISPOSED.
7. THE CONTRACTOR SHALL DISPOSE OF ALL WASTE MATERIAL IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS AT HIS/HER OWN EXPENSE, OUTSIDE OF THE PROJECT LIMITS.
8. ALL EXISTING PAVING AND CURB ON-SITE TO BE REMOVED AND REPLACED UNLESS OTHERWISE NOTED. SEE LAYOUT AND MATERIALS PLAN FOR REPLACEMENT DETAILS.
9. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION. EROSION CONTROL SHALL CONFORM TO THE CITY OF MARLBOROUGH CONSERVATION COMMISSION REQUIREMENTS AS STATED IN THE ORDER OF CONDITIONS.
10. SEE DETAIL SHEET 1 FOR SEQUENCE OF CONSTRUCTION.



REFERENCES

EXISTING CONDITIONS PLAN BY MISTRY ASSOCIATES, INC. DATED FEBRUARY 5, 2020.

HOWARD STEIN HUDSON
114 Turnpike Road, Suite 2C
Chelmsford, MA 01824
www.hshassoc.com

PREPARED FOR:
TRUE NORTH CAPITAL PARTNERS
369 LINDSAY POND ROAD
CONCORD, MA 01742

MULTI-FAMILY RE-DEVELOPMENT
447 BOSTON POST ROAD EAST
MARLBOROUGH, MA, 01752
MIDDLESEX COUNTY

REVISIONS:

NO	BY	DATE	DESCRIPTION
1	PB	6/9/20	REV. PARKING LAYOUT

SITE PLAN

EROSION, SEDIMENT CONTROL AND DEMOLITION PLAN

DATE:	05-13-2020
PROJECT NUMBER:	19176
DESIGNED BY:	ND
DRAWN BY:	ND
CHECKED BY:	KE

3

SHEET 3 OF 9

6/9/2020, M:\19176\CURRENT\19176 - Site Plan.dwg
Patrick Bigda

LAYOUT AND MATERIALS NOTES:

1. ANY MINOR MODIFICATIONS (AS DETERMINED BY THE CITY ENGINEER) TO THE INFORMATION SHOWN ON THE APPROVED SITE PLANS SHALL BE SUBMITTED TO THE CITY ENGINEER AS A MINOR PLAN REVISION FOR APPROVAL PRIOR TO THE WORK BEING PERFORMED.
2. ANY WORK AND MATERIAL WITHIN THE CITY RIGHT–OF–WAY SHALL CONFORM TO THE CITY OF MARLBOROUGH REQUIREMENTS.
3. ALL HANDICAP PARKING, RAMPS, AND ACCESS SHALL CONFORM TO AAB REQUIREMENTS.
4. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION. EROSION CONTROL SHALL CONFORM TOT HE CITY OF MARLBOROUGH CONSERVATION COMMISSION REQUIREMENTS AS STATED IN THE ORDER OF CONDITIONS.
5. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO MUTCD REQUIREMENTS.

PARKING SPACES:

89 PERPENDICULAR 9'x18' PARKING SPACES
12 45° 9'x18' PARKING SPACES
8 PARALLEL 9'x20' PARKING SPACES
55 PERPENDICULAR 8'x16' COMPACT PARKING SPACES

164 TOTAL PARKING SPACES PROPOSED
(INCLUDING 6 HANDICAP SPACES)

PROP. CAPE COD BERM TO HAVE REVEAL ON BOTH SIDES AS REQUIRED FOR GRADING PURPOSES

PROP. 1' MAX RETAINING WALL INTEGRATED WITH CAPE COD BERM AS REQUIRED FOR GRADING PURPOSES

PROP. WOODS LINE

45° PARKING SPACES

PROP. CAPE COD BERM (TYP.) (SEE DETAIL)

PROP. SIGN "ONE WAY" SEE DETAIL

PROP. SNOW STORAGE

PROP. PAVEMENT MARKING (TYP.)

PROP. CAPE COD BERM (TYP.) (SEE DETAIL)

PROP. SNOW STORAGE

PROP. SIGN "ONE WAY DO NOT ENTER" SEE DETAIL

6" DIAMETER BOLLARD (TYP.)

100' WETLAND BUFFER

PROP. SIGN "ONE WAY DO NOT ENTER"

PROP. SIGN "LEFT TURN ONLY"

PROP. DUMPSTER AREA

PROP. 4' CHAIN LINK FENCE

20' NO DISTURB

PROPOSED SECTION OF GUARDRAIL

"NO STORAGE OF SNOW" SIGNS

DOORWAY TO BE CLOSED/REMOVED (DETAILS BY OTHERS)

PROP. RETAINING WALL (TO BE DESIGNED BY OTHERS)

PROP. SIGN "ONE WAY DO NOT ENTER" "LEFT TURN ONLY" ON REVERSE SIDE

TRANSITION CURB

PROP. 25' CURB CUT

PROP. WOODS LINE

PROP. PAVEMENT MARKING (TYP.)

PROP. CAPE COD BERM (TYP.) (SEE DETAIL)

PROP. SIGN "DEAD END"

LIMIT OF WORK (TYP.)

PROP. 5' WIDE SIDEWALK EXTENSION

PROP. STOP BAR

PROP. SIGN "STOP SIGN" SEE DETAIL

CONC. STAIRS & WOOD BALCONIES (TYP.)

SCALE IN FEET: 20 0 20 40

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MIDDLESEX COUNTY

REVISIONS:

NO	BY	DATE	DESCRIPTION
1	PB	6/9/20	REV. PARKING LAYOUT

SITE PLAN

LAYOUT AND MATERIALS PLAN

DATE:	05-13-2020
PROJECT NUMBER:	19176
DESIGNED BY:	ND
DRAWN BY:	ND
CHECKED BY:	KE

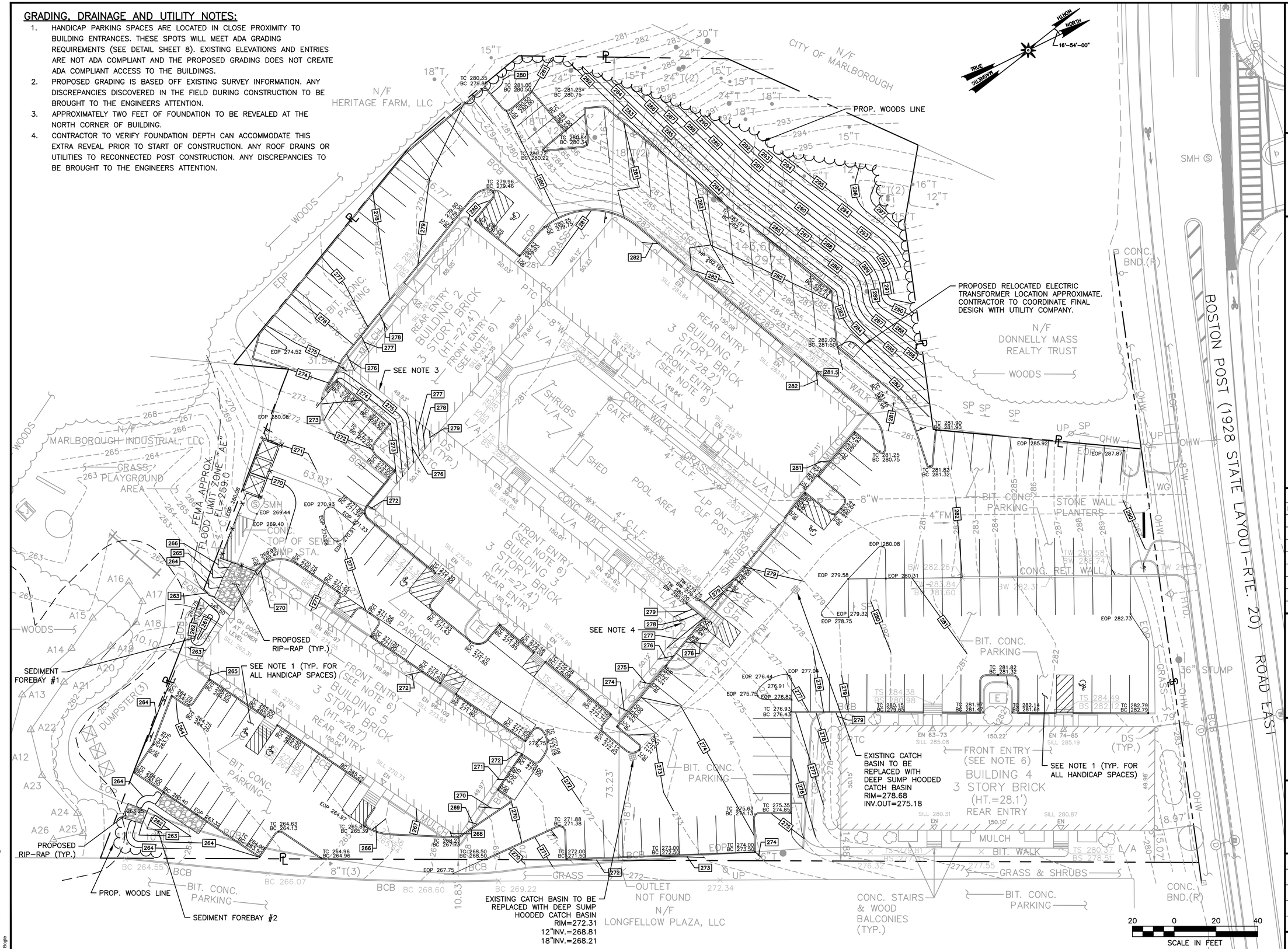
4

SHEET 4 OF 9

6/9/2020, M:\19176\CURRENT\19176 - Site Plan.dwg
Patrick Bogle

GRADING, DRAINAGE AND UTILITY NOTES:

1. HANDICAP PARKING SPACES ARE LOCATED IN CLOSE PROXIMITY TO BUILDING ENTRANCES. THESE SPOTS WILL MEET ADA GRADING REQUIREMENTS (SEE DETAIL SHEET 8). EXISTING ELEVATIONS AND ENTRIES ARE NOT ADA COMPLIANT AND THE PROPOSED GRADING DOES NOT CREATE ADA COMPLIANT ACCESS TO THE BUILDINGS.
2. PROPOSED GRADING IS BASED OFF EXISTING SURVEY INFORMATION. ANY DISCREPANCIES DISCOVERED IN THE FIELD DURING CONSTRUCTION TO BE BROUGHT TO THE ENGINEERS ATTENTION.
3. APPROXIMATELY TWO FEET OF FOUNDATION TO BE REVEALED AT THE NORTH CORNER OF BUILDING.
4. CONTRACTOR TO VERIFY FOUNDATION DEPTH CAN ACCOMMODATE THIS EXTRA REVEAL PRIOR TO START OF CONSTRUCTION. ANY ROOF DRAINS OR UTILITIES TO RECONNECTED POST CONSTRUCTION. ANY DISCREPANCIES TO BE BROUGHT TO THE ENGINEERS ATTENTION.



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REVISIONS:

NO	BY	DATE	DESCRIPTION
1	PB	6/9/20	REV. PARKING LAYOUT

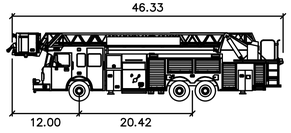
SITE PLAN

GRADING, DRAINAGE AND UTILITY PLAN

DATE:	05-13-2020
PROJECT NUMBER:	19176
DESIGNED BY:	ND
DRAWN BY:	ND
CHECKED BY:	KE

5

6/9/2020, M:\19176\CURRENT\19176 - Site Plan.dwg
Patrick Riggle



Fire–Marlborough

	feet
Width	: 8.33
Track	: 8.33
Lock to Lock Time	: 6.0
Steering Angle	: 40.9

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REVISIONS:

NO	BY	DATE	DESCRIPTION
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SITE PLAN

FIRE TRUCK PLAN

DATE:	05-13-2020
PROJECT NUMBER:	19176
DESIGNED BY:	ND
DRAWN BY:	ND
CHECKED BY:	KE

7

SHEET 7 OF 9

SCALE IN FEET: 20 0 20 40

6/9/2020 M:\19176\CURRENT\19176 - Site Plan.dwg
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Plant Schedule

Qty	Key	Botanical Name	Common Name	Size
TREES:				
3	ELM	Ulmus americana 'Princeton'	Princeton Elm	3"cal
3	GIN	Ginkgo biloba 'Princeton Sentry'	Princeton Sentry Maindehair Tree	3"cal
4	HB	Betula nigra 'Heritage'	Heritage Birch	3"cal
1	JTL	Syringa reticulata 'Ivory Silk'	Ivory Silk Japanese Tree Lilac	3"cal
3	LPT	Platanus x acerfolia	London Planetree	3"cal
6	RM	Acer rubrum 'Red Sunset'	Red Sunset Maple	3"cal
2	TIL	Tilia cordata 'Greenspire'	Greenspire Littleleaf Linden	3"cal
1	ZEL	Zelkova serrata 'Green Vase'	Green Vase Zelkova	3"cal
SHRUBS:				
2	AHO	ilex opaca	American Holly	3-3.5'
10	BAY	Myrica pensylvanicum	Northern Bayberry	2-3'
6	CL	Clethra alnifolia	Sweet Pepper	2-3'
15	EML	Kalmia latifolia 'Elf'	Elf Mountain Laurel	18-24"
8	ERC	Juniperus virginiana	Eastern Red Cedar	6-7'
19	FOTH	Fothergilla gardenii	Dwarf Fothergilla	18-24"
45	GLS	Rhus aromatica 'Gro-Low'	Gro-Low Sumac	18-24"
27	IG	Ilex glabra 'Shamrock'	Shamrock Inkberry	2-2.5'
6	ML	Kalmia latifolia	Mountain Laurel	2-2.5'
10	POT	Potentilla 'Abbotswood'	Abbotswood Potentilla	18-24"
10	RTD	Cornus alba 'Elegantissima'	Varigated Red Twig Dogwood	2-3'
22	SJ	Juniperus chinensis 'sargentii'	Sargent's Juniper	18-24"
7	VID	Viburnum dentatum	Arrowwood	3-4'
GRASSES:				
10	FG	Pennisetum alopecuriodes	Fountain Grass	1gal
6	MG	Miscanthus sinensis	Maiden Grass	2gal
15	PAN	Panicum virgatum	Switchgrass	2gal

EROSION CONTROL SEED MIX:

Creeping Red Fescue, (Festuca rubra), Canada Wild Rye, (Elymus canadensis), Annual Ryegrass, (Lolium multiflorum), Perennial Ryegrass, (Lolium perenne), Blue Grama, (Bouteloua gracilis), Little Bluestem, (Schizachyrium scoparium), Indian Grass, (Sorghastrum nutans), Rough Bentgrass, (Agrostis scabra), Upland Bentgrass, (Agrostis perennans

APPLICATION RATE: 35 lb/acre | 1250 sq ft/lb

PROP. CAPE COD BERM TO HAVE REVEAL ON BOTH SIDES AS REQUIRED FOR GRADING PURPOSES

PROP. 1' MAX RETAINING WALL INTEGRATED WITH CAPE COD BERM AS REQUIRED FOR GRADING PURPOSES

PROP. WOODS LINE

45 PARKING SPACES

PROP. CAPE COD BERM (TYP.) (SEE DETAIL)

PROP. SNOW STORAGE

PROP. SIGN "ONE WAY DO NOT ENTER" SEE DETAIL

PROP. SIGN "ONE WAY" SEE DETAIL

PROP. SNOW STORAGE

PROP. PAVEMENT MARKING (TYP.)

PROP. STOP BAR

PROP. SIGN "STOP SIGN" SEE DETAIL

PROP. SNOW STORAGE

BIT. CONC. PARKING

STONE WALL PLANTERS

CONC. RET. WALL

BIT. CONC. PARKING

PROP. CAPE COD BERM (TYP.) (SEE DETAIL)

BIT. CONC. PARKING

PROP. SIGN "ONE WAY DO NOT ENTER" "LEFT TURN ONLY" ON REVERSE SIDE

TRANSITION CURB

PROP. 25' CURB CUT

PROP. WOODS LINE

PROP. PAVEMENT MARKING (TYP.)

PROP. CAPE COD BERM (TYP.) (SEE DETAIL)

PROP. SIGN "DEAD END"

LIMIT OF WORK (TYP.)

PROP. RETAINING WALL (TO BE DESIGNED BY OTHERS)

PROP. 5' WIDE SIDEWALK EXTENSION

CONC. STAIRS & WOOD BALCONIES (TYP.)

BIT. CONC. PARKING

CONC. BND.(R)

PROP. SIGN "LEFT TURN ONLY"

PROP. DUMPSTER AREA

PROP. 4' CHAIN LINK FENCE

6" DIAMETER BOLLARD (TYP.)

100' WETLAND BUFFER

PROP. SIGN "ONE WAY DO NOT ENTER"

20' NO DISTURB

DOORWAY TO BE CLOSED/REMOVED (DETAILS BY OTHERS)

BIT. CONC. PARKING

BIT. CONC. PARKING

BIT. CONC. PARKING

BUILDING 1 3 STORY BRICK (HT.=28.2') REAR ENTRY (SEE NOTE 6)

BUILDING 2 3 STORY BRICK (HT.=27.4') REAR ENTRY (SEE NOTE 6)

BUILDING 3 3 STORY BRICK (HT.=27.4') REAR ENTRY (SEE NOTE 6)

BUILDING 4 3 STORY BRICK (HT.=28.1') REAR ENTRY (SEE NOTE 6)

BUILDING 5 3 STORY BRICK (HT.=28.7') REAR ENTRY (SEE NOTE 6)

POOL AREA

SHED

OUTLET NOT FOUND

N/F HERITAGE FARM, LLC

N/F MARLBOROUGH INDUSTRIAL, LLC

N/F DONNELLY MASS REALTY TRUST

N/F LONGFELLOW PLAZA, LLC

GRASS PLAYGROUND AREA

FEMA APPROX. FLOOD LIMIT 250.0' ±

ROSTON POST (1928 STATE LAYOUT-RTE. 20) ROAD EAST

SCALE IN FEET

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MIDDLESEX COUNTY

REVISIONS:

NO	BY	DATE	DESCRIPTION
1	PB	6/9/20	REV. PARKING LAYOUT

SITE PLAN

LANDSCAPE PLAN

DATE:	05-13-2020
PROJECT NUMBER:	19176
DESIGNED BY:	ND
DRAWN BY:	ND
CHECKED BY:	KE

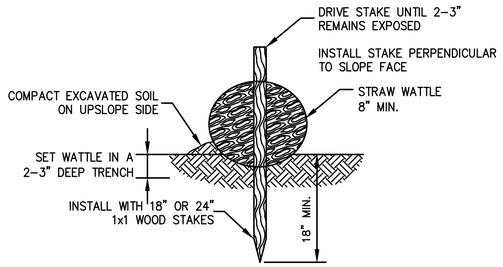
6

SHEET 6 OF 9

6/9/2020, M:\19176\CURRENT\19176 - Site Plan.dwg
Patrick Bogle

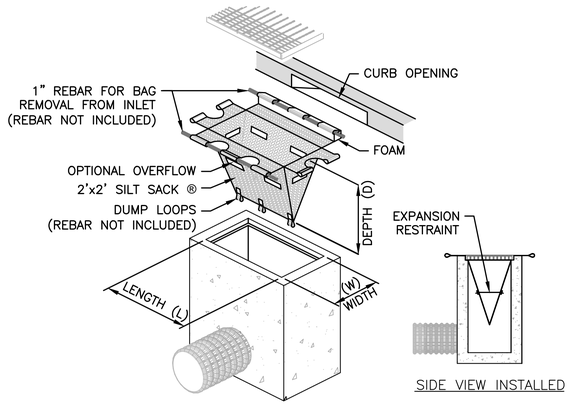
SEQUENCE OF OPERATIONS:

1. INSTALL STRAW WATTLE TO MAXIMUM EXTENT PRACTICABLE.
2. INSTALL TEMPORARY INLET CONTROL MEASURES AT EXISTING CATCH BASINS.
3. INSTALL STABILIZED CONTROL ENTRANCE.
4. DEMOLISH EXISTING IMPROVEMENTS PER PLAN AND REMOVE FROM SITE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
5. AS SOON AS FEASIBLE STABILIZE ANY AREAS OUTSIDE THE PROPERTY BUT WITHIN THE STRAW WATTLE LIMITS. ONCE PROPERLY STABILIZED MOVE STRAW WATTLE TO THE PROPERTY LINE.
6. BEGIN CLEARING AND GRUBBING.
7. INSTALL STORMWATER MANAGEMENT SYSTEM.
8. INSTALL SITE FURNISHINGS.
9. INSTALL PAVEMENT.
10. INSTALL LANDSCAPING.
11. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT COVER IS ESTABLISHED.

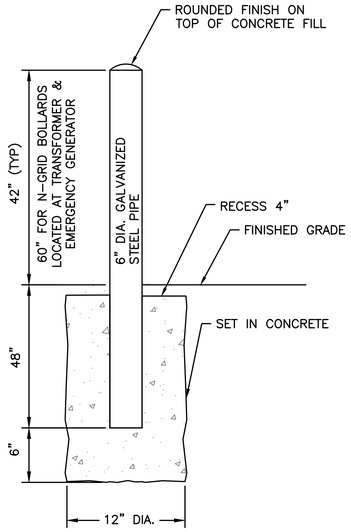


NOTES:
1. BEGIN AT THE LOCATION WHERE THE WATTLE IS TO BE INSTALLED BY EXCAVATING A 2–3"(5–7.5 CM) DEEP X 9"(22.9 CM) WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UP–SLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE WATTLE IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT SOIL FROM THE EXCAVATED TRENCH AGAINST THE WATTLE ON THE UPHILL SIDE. ADJACENT WATTLES SHOULD TIGHTLY ABUT.
3. SECURE THE WATTLE WITH 18–24" (45.7–61 CM) STAKES EVERY 3–4' (0.9 – 1.2 M) AND WITH A STAKE ON EACH END. (STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE WATTLE LEAVING AT LEAST 2–3" (5–7.5 CM) OF STAKE EXTENDING ABOVE THE WATTLE. STAKES SHOULD BE DRIVEN PERPENDICULAR TO SLOPE FACE.

STRAW WATTLE DETAIL
NOT TO SCALE

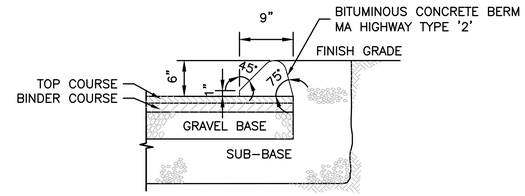


TEMPORARY INLET PROTECTION
NOT TO SCALE



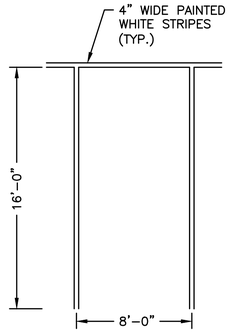
BOLLARD
NOTE: NOT TO SCALE

1. DIG POST HOLE FOR BOLLARD, PARTIALLY FILL HOLE WITH CONCRETE MIX, INSTALL PIPE, FILL HOLE, AND FILL PIPE W/CONCRETE MIX.
2. SUPPORT BOLLARD AND PROTECT FROM DAMAGE WHILE CONCRETE CURES. THEN PAINT WITH APPROPRIATE PAINT. COLOR AS REQUIRED BY OWNER.

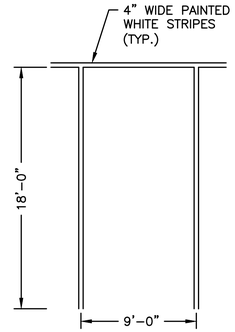


CAPE COD BERM/CURB
NOT TO SCALE

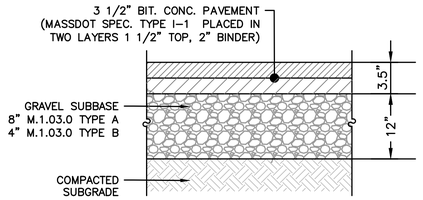
NOTE:
DETAIL DEVELOPED FROM MA HIGHWAY CONSTRUCTION STANDARDS DRAWING NUMBER 106.2.0 "BITUMINOUS CONCRETE BERM – TYPE '2'



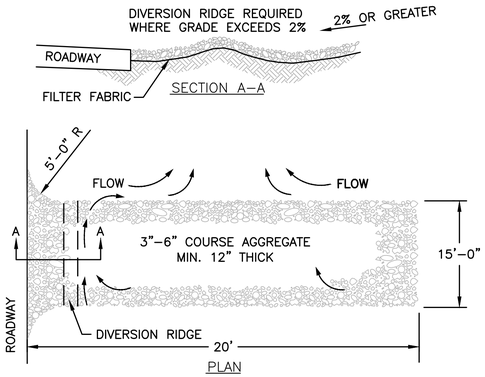
TYPICAL COMPACT PERPENDICULAR PARKING SPACE
NOT TO SCALE



TYPICAL PERPENDICULAR PARKING SPACE
NOT TO SCALE

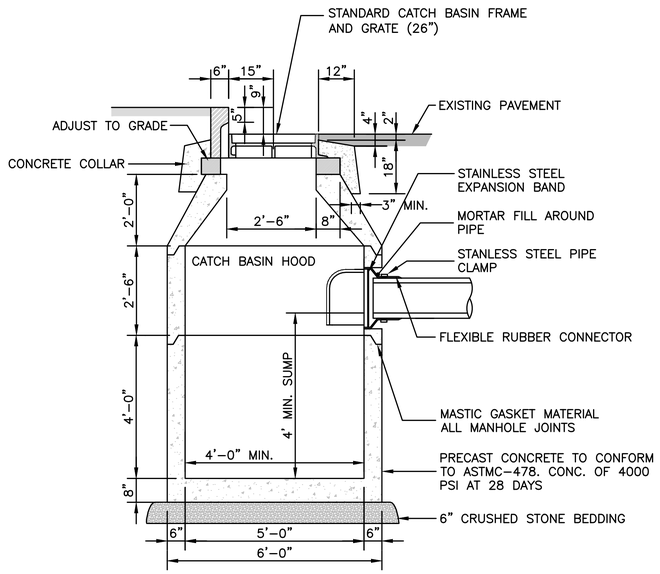


FULL DEPTH PARKING LOT SECTION DETAIL
NOT TO SCALE



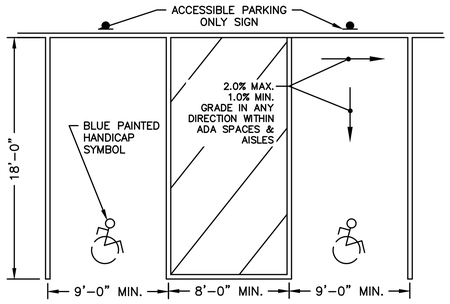
NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.
3. TEMPORARY CONSTRUCTION ENTRANCE SHALL BE APPLIED WHERE NECESSARY TO KEEP PUBLIC WAYS FREE OF SEDIMENT INCLUDING STAGING AREAS.
4. CONTRACTOR ACCESS ACROSS EXISTING SIDEWALK SHALL BE COORDINATED WITH CITY OF MELROSE DEPARTMENT OF PUBLIC WORKS.

STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



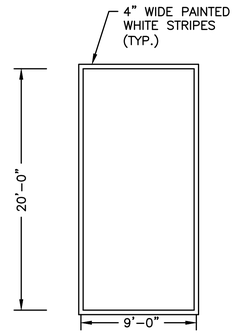
NOTES:
1. ADEQUATE FOR H–20 MINIMUM LOADING.

CATCH BASIN
NOT TO SCALE



NOTE:
* GRADING WITHIN THE HANDICAP PARKING SPACE SHALL NOT EXCEED 2.0% IN ANY DIRECTION.

TYPICAL HANDICAP PARKING SPACE
NOT TO SCALE



TYPICAL PARALLEL PARKING SPACE
NOT TO SCALE

HOWARD STEIN HUDSON
114 Turnpike Road, Suite 2C
Chelmsford, MA 01824
www.hshassoc.com

PREPARED FOR:
TRUE NORTH CAPITAL PARTNERS
369 LINDSAY POND ROAD
CONCORD, MA 01742

MULTI-FAMILY RE-DEVELOPMENT
447 BOSTON POST ROAD EAST
MARLBOROUGH, MA, 01752
MIDDLESEX COUNTY

REVISIONS:

NO	BY	DATE	DESCRIPTION
1	PB	6/9/20	REV. PARKING LAYOUT

SITE PLAN

DETAIL SHEET
1 OF 2

DATE:	05-13-2020
PROJECT NUMBER:	19176
DESIGNED BY:	ND
DRAWN BY:	ND
CHECKED BY:	KE

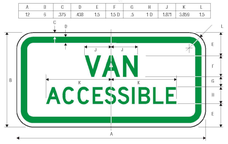
8

SHEET 8 OF 9

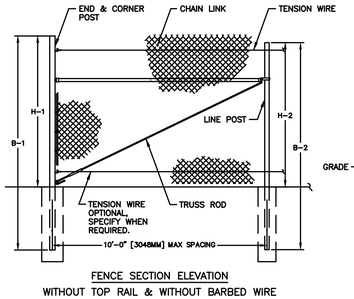
6/8/2020 M:\19176\CURRENT\19176 - Site Plan.dwg
Patrick Sigler

R7-8 NO PARKING

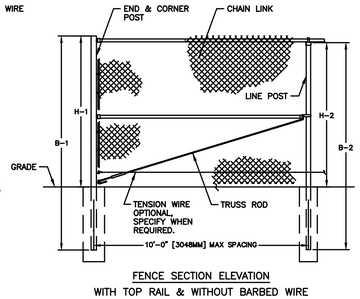
LEGEND – GREEN (RETROREFL), WHITE SYMBOL ON BLUE (RETROREFL)
BACKGROUND – WHITE (RETROREFL)



HANDICAP & VAN ACCESSIBLE SIGNS DETAIL
NOT TO SCALE



FENCE SECTION ELEVATION
WITHOUT TOP RAIL & WITHOUT BARBED WIRE

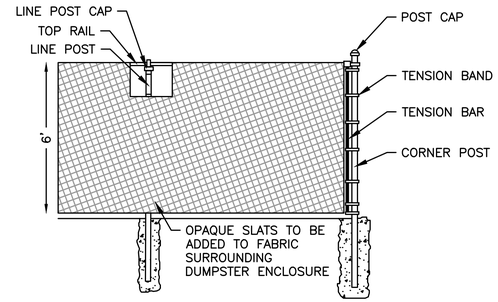


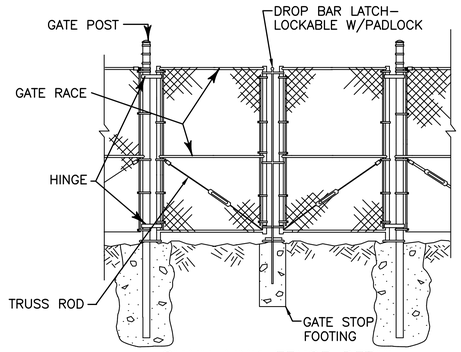
FENCE SECTION ELEVATION
WITH TOP RAIL & WITHOUT BARBED WIRE

FENCE HEIGHT	END & CORNER POSTS		LINE POSTS	
NOMINAL HEIGHT	B–1 BAR LENGTH	H–1 HEIGHT ABOVE GRADE	B–2 BAR LENGTH	H–2 HEIGHT ABOVE GRADE
5'–0" [1524MM]	8'–0" [2438MM]	5'–0 5/8" [1540MM]	7'–8" [2337MM]	4'–8 7/8" [1445MM]
6'–0" [1829MM]	9'–0" [2743MM]	6'–0 5/8" [1845MM]	8'–8" [2642MM]	5'–8 7/8" [1749MM]
7'–0" [2134MM]	10'–0" [3048MM]	7'–0 5/8" [2150MM]	9'–8" [2946MM]	6'–8 7/8" [2054MM]
8'–0" [2438MM]	11'–0" [3353MM]	8'–0 5/8" [2454MM]	10'–8" [3251MM]	7'–8 7/8" [2359MM]
9'–0" [2743MM]	12'–0" [3658MM]	9'–0 5/8" [2759MM]	11'–8" [3556MM]	8'–8 7/8" [2664MM]
10'–0" [3048MM]	13'–0" [3962MM]	10'–0 5/8" [3064MM]	12'–8" [3861MM]	9'–8 7/8" [2969MM]
11'–0" [3353MM]	14'–0" [4267MM]	11'–0 5/8" [3369MM]	13'–8" [4166MM]	10'–8 7/8" [3273MM]
12'–0" [3658MM]	15'–0" [4572MM]	12'–0 5/8" [3674MM]	14'–8" [4470MM]	11'–8 7/8" [3578MM]

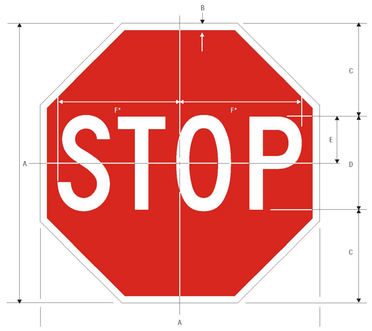
CHAIN–LINK FENCE DETAIL
NOT TO SCALE

COMPACT PARKING SPACE SIGNS DETAIL
NOT TO SCALE

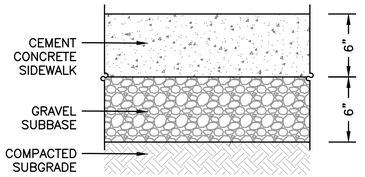




CHAIN LINK FENCE DETAIL
NOT TO SCALE



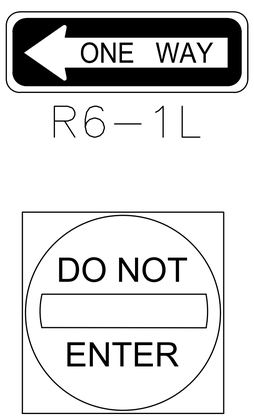
STOP SIGN DETAIL
NOT TO SCALE



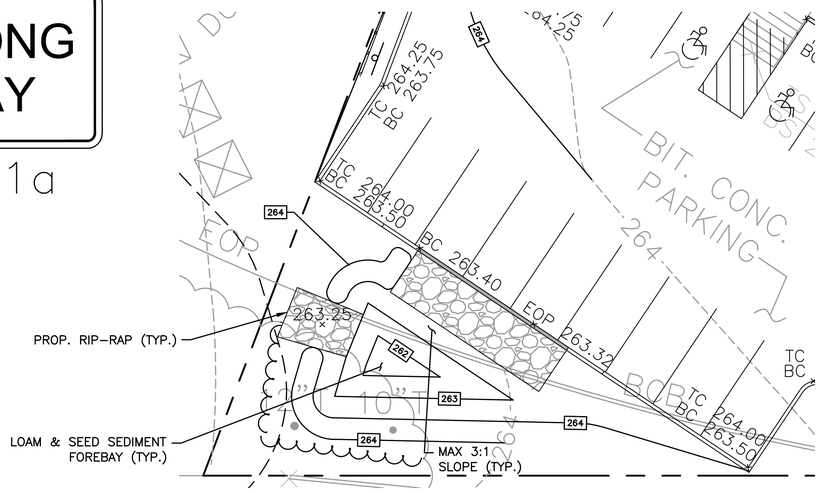
NOTES:

1. CONCRETE SIDEWALK DETAIL AND NOTES APPLY TO SIDEWALK WITHIN THE RIGHT–OF–WAY.
2. CONCRETE SHALL BE 4,000 PSI.
3. SIDEWALKS ARE TO BE RAKED FINISH WITH 3/8 INCH TROWEL JOINTS.

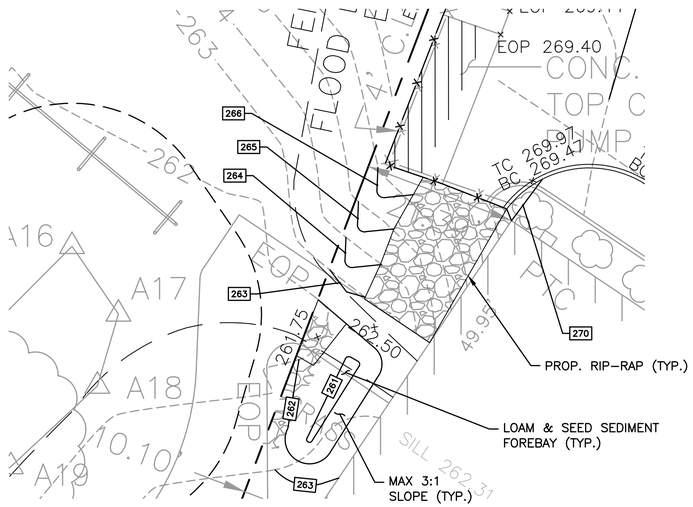
CEM CONC SIDEWALK SECTION DETAIL
NOT TO SCALE



ONE WAY, DO NOT ENTER & DEAD END MUTCD SIGNS DETAIL
NOT TO SCALE



SEDIMENT FOREBAY #1 DETAIL
NOT TO SCALE



SEDIMENT FOREBAY #2 DETAIL
NOT TO SCALE

HOWARD STEIN HUDSON
114 Turnpike Road, Suite 2C
Chelmsford, MA 01824
www.hshassoc.com

PREPARED FOR:
TRUE NORTH CAPITAL PARTNERS
369 LINDSAY POND ROAD
CONCORD, MA 01742

MULTI-FAMILY RE-DEVELOPMENT
447 BOSTON POST ROAD EAST
MARLBOROUGH, MA, 01752
MIDDLESEX COUNTY

REVISIONS:

NO	BY	DATE	DESCRIPTION
1	PB	6/9/20	REV. PARKING LAYOUT

SITE PLAN

DETAIL SHEET
2 OF 2

DATE:	05-13-2020
PROJECT NUMBER:	19176
DESIGNED BY:	ND
DRAWN BY:	ND
CHECKED BY:	KE

9

SHEET 9 OF 9

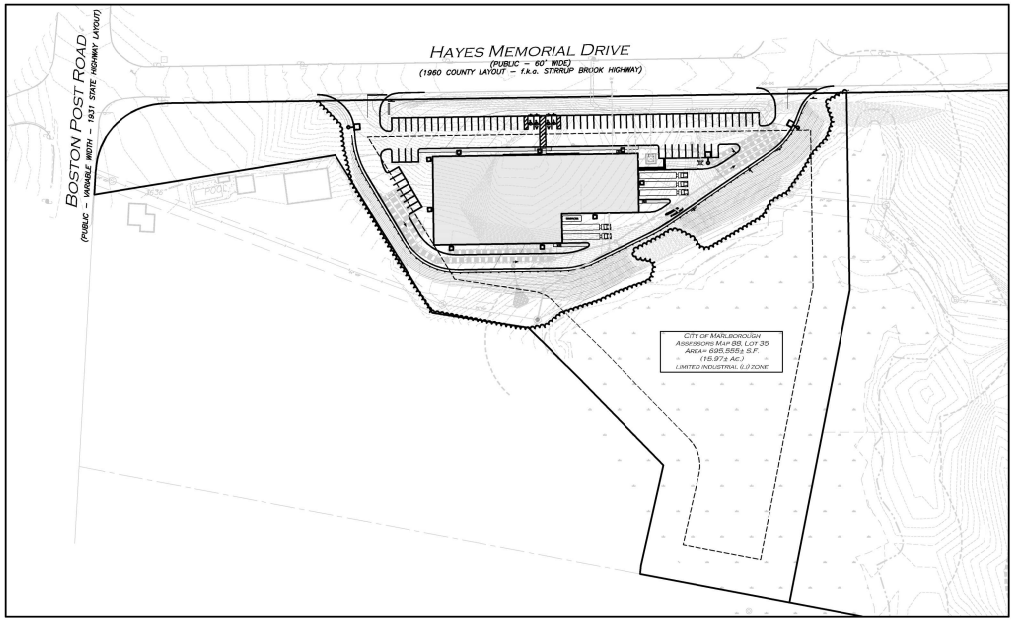
ALLEN & MAJOR ASSOCIATES, INC.

Multifamily Development
339 Boston Post Road
Marlborough, Massachusetts

GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.

SITE DEVELOPMENT PLANS FOR
PARCEL "K" DEVELOPMENT
MAP 88, LOT 35, HAYES MEMORIAL DRIVE
MARLBOROUGH, MA

LOCUS MAP
(NOT TO SCALE)



GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

APPLICANT/OWNER:

THE GUTIERREZ COMPANY
200 SUMMIT DRIVE, SUITE 400
BURLINGTON, MA 01803
781.272.7000

LAND SURVEYOR, SITE ENGINEER LANDSCAPE ARCHITECT:

ALLEN & MAJOR ASSOCIATES, INC.
100 COMMERCE WAY, SUITE 5
WOBURN, MA 01801
TEL.: 781.935.6889
FAX.: 781.935.2896

ENVIRONMENTAL CONSULTANT:

GODDARD CONSULTING, LLC
291 MAIN STREET, SUITE 8
NORTHBOROUGH, MA 01532
508.393.3784

LIST OF DRAWINGS

DRAWING TITLE	SHEET NO.	ISSUED	REVISED
CIVIL DRAWINGS			
EXISTING CONDITIONS KEY SHEET	V-101	06-04-2020	-
EXISTING CONDITIONS	V-102	06-04-2020	-
ABBREVIATIONS AND NOTES	C-001	06-04-2020	-
ABBREVIATIONS AND NOTES	C-002	06-04-2020	-
LOCUS PLAN	C-100	06-04-2020	-
EROSION CONTROL PLAN	C-101	06-04-2020	-
LAYOUT & MATERIALS PLAN	C-102	06-04-2020	-
GRADING & DRAINAGE PLAN	C-103	06-04-2020	-
UTILITIES PLAN	C-104	06-04-2020	-
FIRE TRUCK TURNING PLAN	C-105	06-04-2020	-
TRUCK TURNING PLAN	C-106	06-04-2020	-
LIGHTING PLAN	C-107	06-04-2020	-
SNOW STORAGE PLAN	C-108	06-04-2020	-
CIVIL DETAILS	C-501	06-04-2020	-
CIVIL DETAILS	C-502	06-04-2020	-
CIVIL DETAILS	C-503	06-04-2020	-
CIVIL DETAILS	C-504	06-04-2020	-
CIVIL DETAILS	C-505	06-04-2020	-
CIVIL DETAILS	C-506	06-04-2020	-
CIVIL DETAILS	C-507	06-04-2020	-
LANDSCAPE DRAWINGS			
LANDSCAPE PLAN	L-101	06-04-2020	-
LANDSCAPE DETAILS	L-102	06-04-2020	-

COMMONWEALTH OF MASSACHUSETTS
CARLTON M. QUINN
CIVIL
No. 49923
REGISTERED PROFESSIONAL ENGINEER
6.5.20
PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

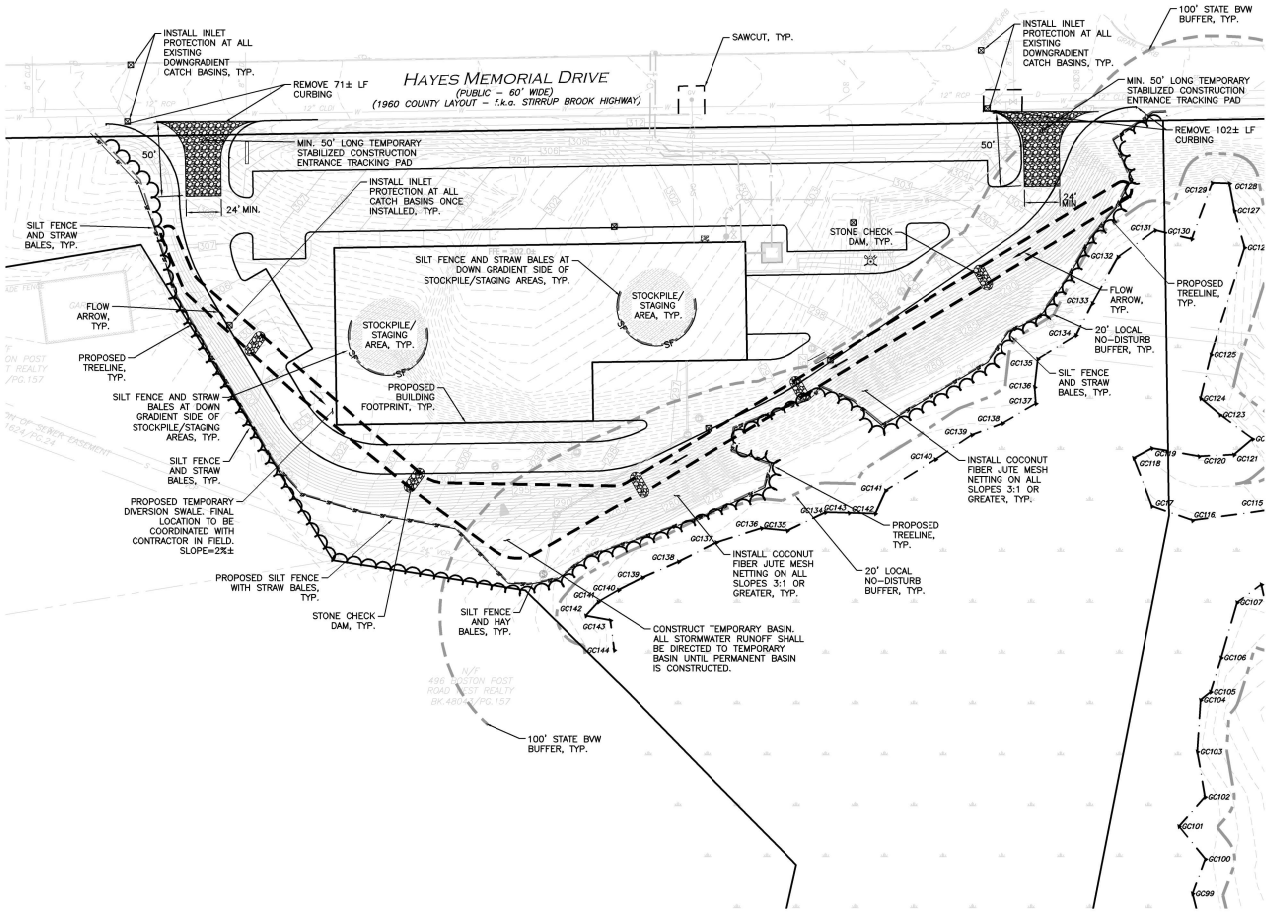
CITY OF MARLBOROUGH, MA
SITE PLAN REVIEW COMMITTEE APPROVAL
MAJOR SITE PLAN APPROVAL
SIGNATURE DATE

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil & structural engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY
WOBURN MA 0 801-8501
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DIG SAFE
BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

SUBMITTED FOR LOCAL APPROVAL: APRIL 17, 2020
SUBMITTED FOR CONSERVATION COMMISSION: JUNE 4, 2020

N:\PROJECTS\1145-10A\CIVIL\DRAWINGS\CURRENT\LOT K\C-1145-10-K_COVER.DWG



LEGEND

SILT FENCE	SF
TUBULAR BARRIER	
EROSION CONTROL FABRIC	
CATCH BASIN FILTER	
STONE CHECK DAM	
STABILIZED ENTRANCE	
STOCKPILE/STAGING AREA	

NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR IT'S REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL CONTACT "DIGSAFE" AND THE CITY OF MARLBOROUGH DEPARTMENT OF PUBLIC WORKS AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST THE LOCATION OF THE EXISTING UTILITIES.

   DIGSAFE: 1-800-344-7233
   MARLBOROUGH DEPT. OF PUBLIC WORKS: (508) 624-6910
3. SEE THE ABBREVIATIONS AND NOTES PLAN AND DETAILS FOR FURTHER INFORMATION.
4. ALL ELEVATIONS REFER TO NAVD88 DATUM.
5. ALTHOUGH CERTAIN ITEMS HAVE BEEN NOTED ON THIS DRAWING FOR DEMOLITION, NO ATTEMPT HAS BEEN MADE TO DELINEATE EACH AND EVERY ITEM THAT REQUIRES DEMOLITION FOR THE COMPLETION OF THE PROJECT. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL NECESSARY DEMOLITION WORK TO COMPLETE THE PROJECT. ALLEN & MAJOR ASSOCIATES, INC. IS NOT RESPONSIBLE FOR SITE DEMOLITION ITEMS NOT SHOWN ON THE SURVEY, OR SPECIFICALLY NOTED. THE DEMOLITION NOTES AND ARROWS ON THIS PLAN ARE TYPICAL AND DO NOT REFLECT QUANTITY.
6. ALL CATCH BASINS WITHIN THE PROJECT AREA SHALL BE EQUIPPED WITH SILT SACKS (OR APPROVED EQUAL).
7. CONTRACTOR SHALL PROVIDE WHEEL WASH STATIONS AS NECESSARY TO MITIGATE SEDIMENT TRACK-OUT TO BARTLETT STREET.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY CONSTRUCTION CONTROLS. ALL STORMWATER RUNOFF SHALL BE DIRECTED TO TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION UNTIL SLOPES ARE STABILIZED.
9. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO START OF CONSTRUCTION. EROSION CONTROL SHALL CONFORM TO THE CITY OF MARLBOROUGH CONSERVATION COMMISSION REQUIREMENTS AS STATED IN THE ORDER OF CONDITIONS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

DIG SAFE
BEFORE YOU DIG CALL 811 OR 1-888-DIG-SAFE 1-888-344-7233

COMMONWEALTH OF MASSACHUSETTS
CARLTON M QUINN
CIVIL
No. 49123
REGISTERED PROFESSIONAL ENGINEER
6.6.20
PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	2020-06-04	REVISED PER CITY COMMENTS

APPLICANT\OWNER:
THE GUTIERREZ COMPANY
200 SUMMIT DRIVE, SUITE 400
BURLINGTON, MA 01803

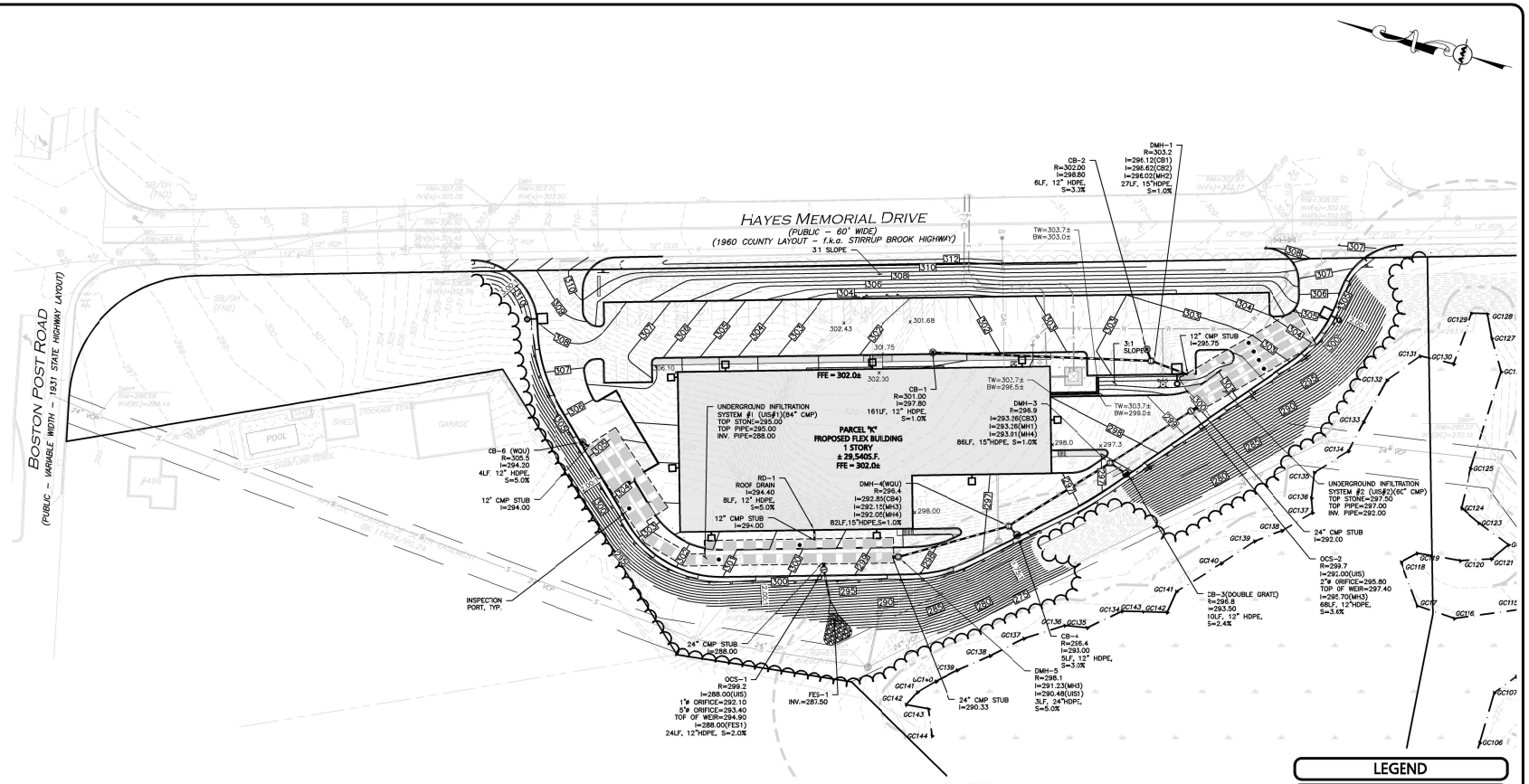
PROJECT:
PARCEL K DEVELOPMENT
HAYES MEMORIAL DRIVE
MARLBOROUGH, MA

PROJECT NO.	1145-10A	DATE:	4/17/2020
SCALE:	1" = 40'	DWG. NAME:	C-1145-10A
DESIGNED BY:	DMR/SJL	CHECKED BY:	CMQ

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: EROSION CONTROL PLAN
SHEET No. C-101

N:\PROJECTS\1145-10A\CIVIL\DRAWINGS\CURRENT\LOT K\C-1145-10-K_EROSION CONTROL.DWG



NOTES:

1. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. IT'S INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.
2. THIS PLAN WAS PREPARED USING AVAILABLE SITE INFORMATION FROM SEVERAL SOURCES, SOME OF WHICH IS UNCONFIRMED. THE EXISTING CONDITIONS SURVEY BASE WAS TAKEN FROM A PLAN ENTITLED "EXISTING CONDITIONS" PREPARED BY ALLEN & MAJOR ASSOCIATES, INC. DATED APRIL 17, 2020.
3. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR IT'S REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
4. ALL ELEVATIONS REFER TO NAVD 88.
5. PROFESSIONAL GEOTECHNICAL ENGINEER SHALL CONFIRM GLOBAL STABILITY OF ALL SLOPES STEEPER THAN 3:1
6. INFILTRATION RATES HAVE BEEN ASSUMED FOR THIS SITE BASED ON AVAILABLE SITE DATA. INFILTRATION RATES SHALL BE CONFIRMED PRIOR TO CONSTRUCTION.

LEGEND

- DRAIN MANHOLE
- CATCH BASIN
- CATCH BASIN – DOUBLE GRATE
- OUTLET CONTROL
- DIVERSION WEIR
- WATER QUALITY UNIT (WQ)
- AREA DRAIN
- FLARED END SECTION
- DRAIN LINE
- RIPRAP OUTFALL
- HEADWALL
- 5' CONTOUR (300)
- 1' CONTOUR (287)
- SPOT GRADE ×299.50
- INFILTRATION SYSTEM
- INFILTRATION PIPE
- UNDERDRAIN (UD)
- FLOW DIRECTION

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

DIG SAFE

BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

N:\PROJECTS\1145-10A\CIVIL\DRAWINGS\CURRENT\LOT K\C-1145-10-K_GRADING & DRAINAGE.DWG

COMMONWEALTH OF MASSACHUSETTS
CARLTON M. QUINN
CIVIL
No. 49123
REGISTERED PROFESSIONAL ENGINEER
6.5.20

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	2020-06-04	REVISED PER CITY COMMENTS

APPLICANT\OWNER:

THE GUTIERREZ COMPANY
200 SUMMIT DRIVE, SUITE 400
BURLINGTON, MA 01803

PROJECT:

PARCEL K DEVELOPMENT
HAYES MEMORIAL DRIVE
MARLBOROUGH, MA

PROJECT NO.	1145-10A	DATE:	4/17/2020
SCALE:	1"=40'	DWG. NAME:	C-1145-10A
DESIGNED BY:	DMR/SJL	CHECKED BY:	CMQ

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:	SHEET No.
GRADING & DRAINAGE PLAN	C-103

LOCUS MAP
(NOT TO SCALE)

SITE DEVELOPMENT PLANS FOR
PARCEL "L" DEVELOPMENT
MAP 88, LOT 35 & MAP 99, LOT 1
HAYES MEMORIAL DRIVE
MARLBOROUGH, MA

APPLICANT:

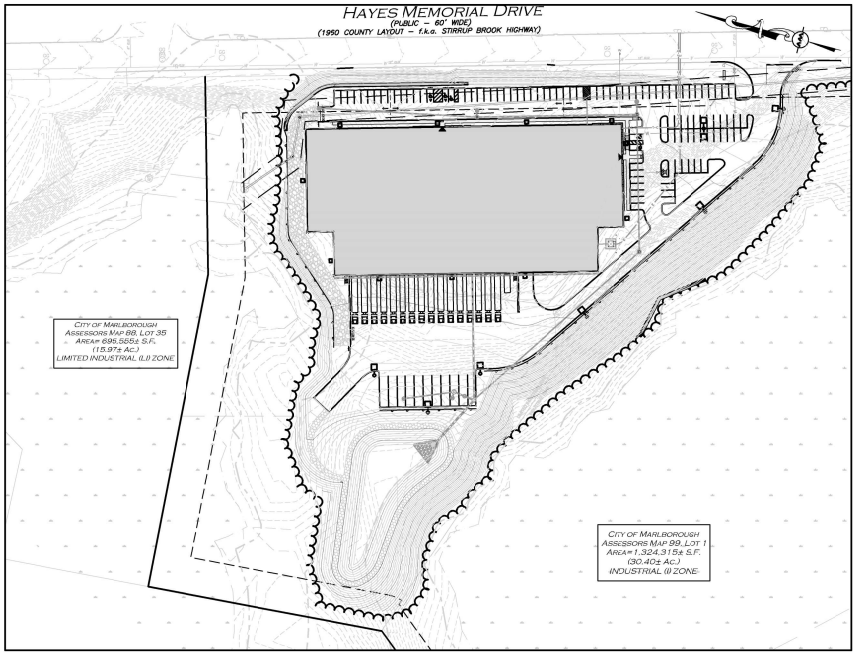
THE GUTIERREZ COMPANY
200 SUMMIT DRIVE, SUITE 400
BURLINGTON, MA 01803
781.272.7000

LAND SURVEYOR, SITE ENGINEER
LANDSCAPE ARCHITECT:

ALLEN & MAJOR ASSOCIATES, INC.
100 COMMERCE WAY, SUITE 5
WOBURN, MA 01801
TEL.: 781.935.6889
FAX.: 781.935.2896

ENVIRONMENTAL CONSULTANT:

GODDARD CONSULTING, LLC
291 MAIN STREET, SUITE 8
NORTHBOROUGH, MA 01532
508.393.3784



LIST OF DRAWINGS

DRAWING TITLE	SHEET NO.	ISSUED	REVISED
CIVIL DRAWINGS			
EXISTING CONDITIONS KEY SHEET	V-101	06-05-2020	-
EXISTING CONDITIONS	V-103	06-05-2020	-
EXISTING CONDITIONS	V-104	06-05-2020	-
EXISTING CONDITIONS	V-106	06-05-2020	-
ABBREVIATIONS AND NOTES	C-001	06-05-2020	-
ABBREVIATIONS AND NOTES	C-002	06-05-2020	-
LOCUS PLAN	C-100	06-05-2020	-
EROSION CONTROL PLAN	C-101	06-05-2020	-
LAYOUT & MATERIALS PLAN	C-102	06-05-2020	-
GRADING & DRAINAGE PLAN	C-103	06-05-2020	-
UTILITIES PLAN	C-104	06-05-2020	-
FIRE TRUCK TURNING PLAN	C-105	06-05-2020	-
TRUCK TURNING PLAN	C-106	06-05-2020	-
PHOTOMETRICS PLAN	C-107	06-05-2020	-
SNOW STORAGE PLAN	C-108	06-05-2020	-
CIVIL DETAILS	C-501	06-05-2020	-
CIVIL DETAILS	C-502	06-05-2020	-
CIVIL DETAILS	C-503	06-05-2020	-
CIVIL DETAILS	C-504	06-05-2020	-
CIVIL DETAILS	C-505	06-05-2020	-
CIVIL DETAILS	C-506	06-05-2020	-
LANDSCAPE DRAWINGS			
LANDSCAPE PLAN	L-101	06-05-2020	-
LANDSCAPE DETAILS	L-102	06-05-2020	-
ARCHITECTURAL DRAWINGS			
CONCEPTUAL RENDERING	—	06-05-2020	-

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil & structural engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY
WOBURN MA 0 801-8501
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

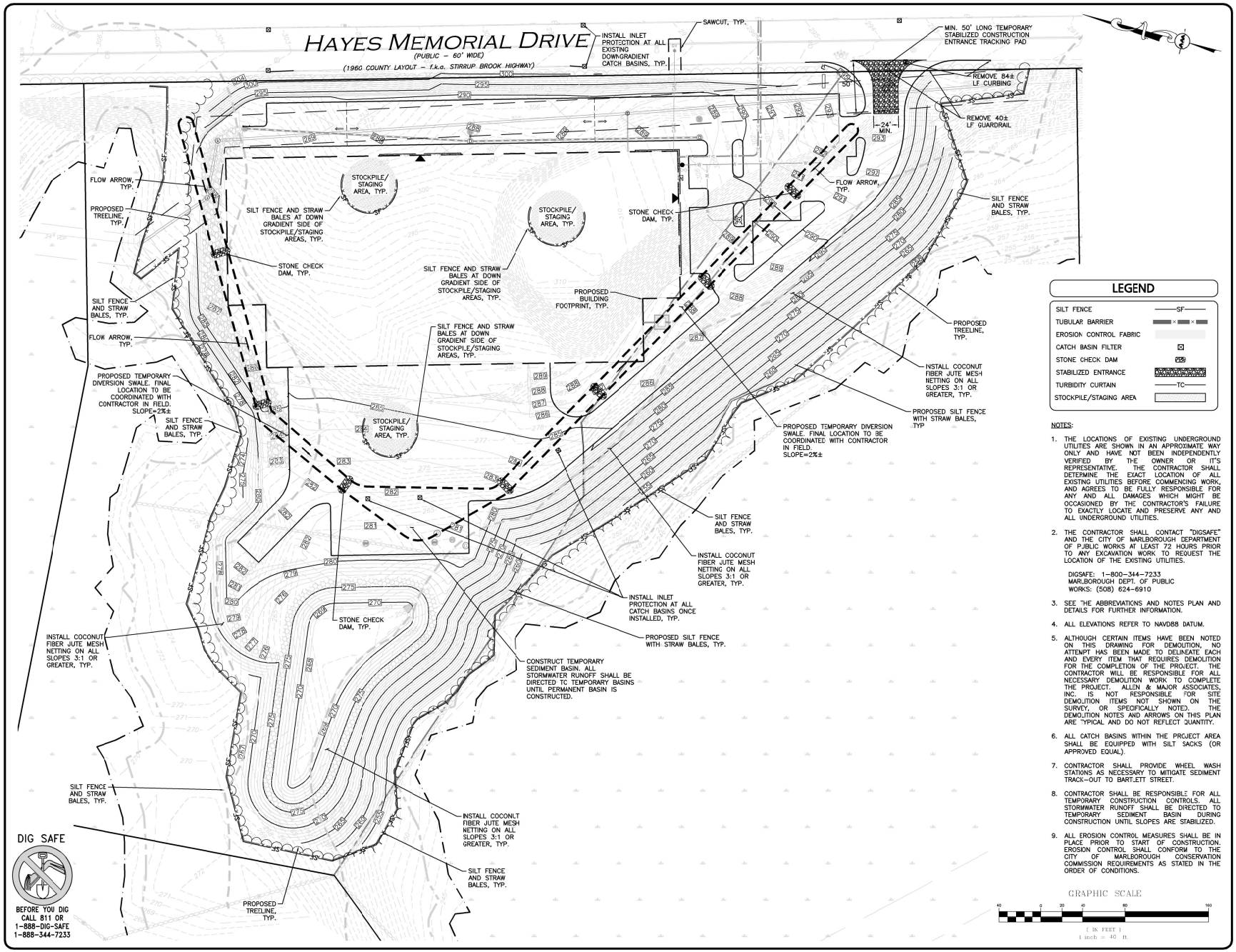
COMMONWEALTH OF MASSACHUSETTS
CARLTON M. QUINN
CIVIL
No. 49923
REGISTERED PROFESSIONAL ENGINEER
6.5.20
PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

CITY OF MARLBOROUGH, MA
SITE PLAN REVIEW COMMITTEE APPROVAL
MAJOR SITE PLAN APPROVAL
SIGNATURE DATE

DIG SAFE
BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

SUBMITTED FOR LOCAL APPROVAL: APRIL 17, 2020
ISSUED TO CONSERVATION COMMISSION: JUNE 5, 2020

N:\PROJECTS\1145-10A\CIVIL\DRAWINGS\CURRENT\LOT L\C-1145-10-L_COVER.DWG



LEGEND

SILT FENCE	SF
TUBULAR BARRIER	
EROSION CONTROL FABRIC	
CATCH BASIN FILTER	
STONE CHECK DAM	
STABILIZED ENTRANCE	
TURBIDITY CURTAIN	TC
STOCKPILE/STAGING AREA	

NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR IT'S REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
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   DIGSAFE: 1-800-344-7233
   MARLBOROUGH DEPT. OF PUBLIC WORKS: (508) 624-6910
3. SEE THE ABBREVIATIONS AND NOTES PLAN AND DETAILS FOR FURTHER INFORMATION.
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5. ALTHOUGH CERTAIN ITEMS HAVE BEEN NOTED ON THIS DRAWING FOR DEMOLITION, NO ATTEMPT HAS BEEN MADE TO DELINEATE EACH AND EVERY ITEM THAT REQUIRES DEMOLITION FOR THE COMPLETION OF THE PROJECT. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL NECESSARY DEMOLITION WORK TO COMPLETE THE PROJECT. ALLEN & MAJOR ASSOCIATES, INC. IS NOT RESPONSIBLE FOR SITE DEMOLITION ITEMS NOT SHOWN ON THE SURVEY, OR SPECIFICALLY NOTED. THE DEMOLITION NOTES AND ARROWS ON THIS PLAN ARE TYPICAL AND DO NOT REFLECT QUANTITY.
6. ALL CATCH BASINS WITHIN THE PROJECT AREA SHALL BE EQUIPPED WITH SILT SACKS (OR APPROVED EQUAL).
7. CONTRACTOR SHALL PROVIDE WHEEL WASH STATIONS AS NECESSARY TO MITIGATE SEDIMENT TRACK-OUT TO BARTLETT STREET.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY CONSTRUCTION CONTROLS. ALL STORMWATER RUNOFF SHALL BE DIRECTED TO TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION UNTIL SLOPES ARE STABILIZED.
9. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO START OF CONSTRUCTION. EROSION CONTROL SHALL CONFORM TO THE CITY OF MARLBOROUGH CONSERVATION COMMISSION REQUIREMENTS AS STATED IN THE ORDER OF CONDITIONS.

COMMONWEALTH OF MASSACHUSETTS
CARLTON M. QUINN
CIVIL
No. 49023
REGISTERED PROFESSIONAL ENGINEER
6.5.20

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
2	2020-06-05	REVISED PER CITY COMMENTS
1	2020-05-04	REVISED FOR SITE PLAN REVIEW

APPLICANT/OWNER:
THE GUTIERREZ COMPANY
200 SUMMIT DRIVE, SUITE 400
BURLINGTON, MA 01803

PROJECT:
PARCEL L DEVELOPMENT
HAYES MEMORIAL DRIVE
MARLBOROUGH, MA

PROJECT NO.	1145-10A	DATE:	04/17/2020
SCALE:	1" = 40'	DWG. NAME:	C-1145-10A
DESIGNED BY:	DMR/SJL	CHECKED BY:	CMQ

PREPARED BY:
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civil engineering ▸ land surveying
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WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:	SHEET No.
EROSION CONTROL PLAN	C-101

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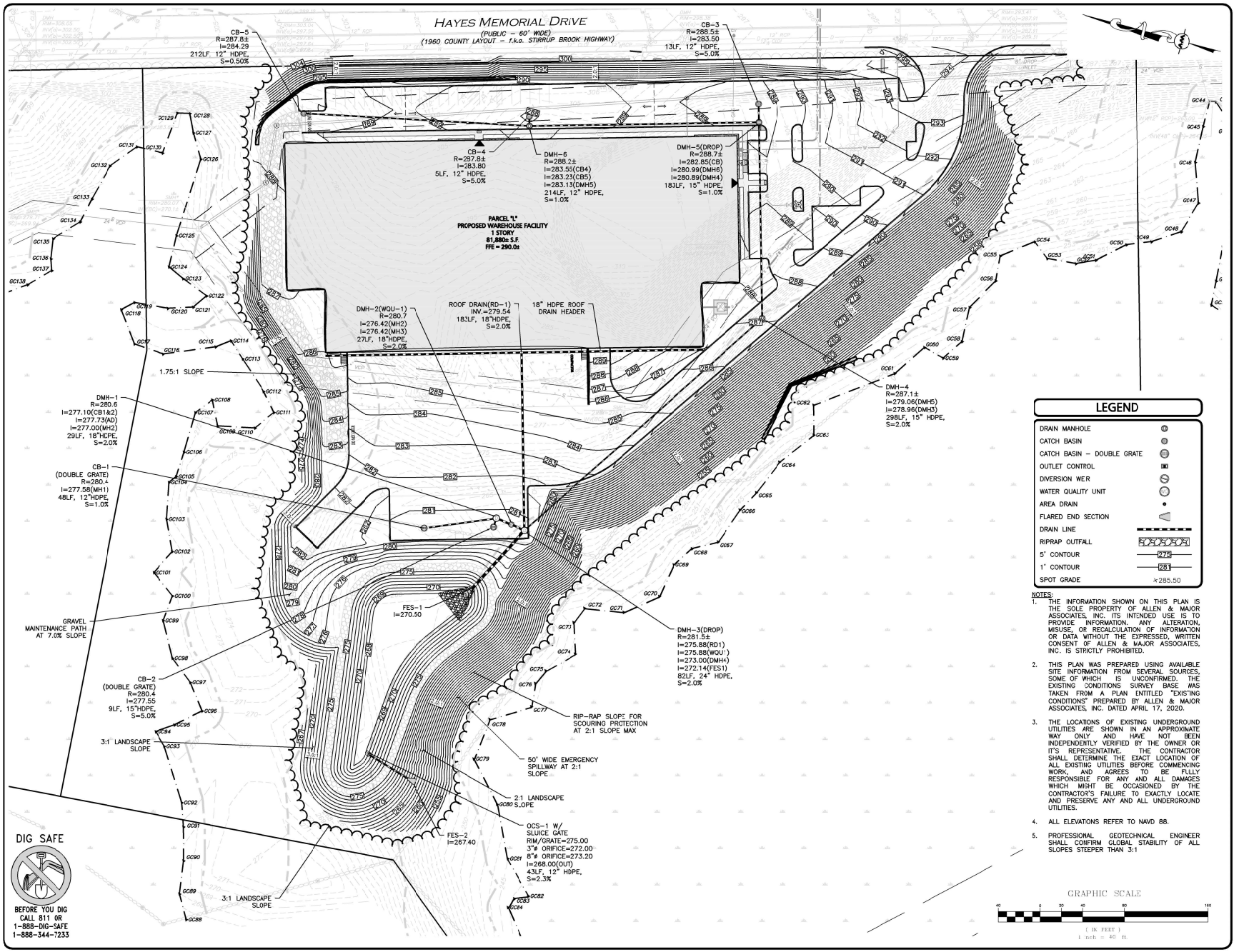

N:\PROJECTS\1145-10A\CIVIL\DRAWINGS\CURRENT\LOT L\C-1145-10-_GRADING & DRAINAGE.DWG

CARLTON M. QUINN
CIVIL
No.49923
REGISTERED PROFESSIONAL ENGINEER
6.5.20

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
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1	2020-05-04	REVISED FOR SITE PLAN REVIEW

APPLICANT\OWNER:
THE GUTIERREZ COMPANY
200 SUMMIT DRIVE, SUITE 400
BURLINGTON, MA 01803

PROJECT:
PARCEL L DEVELOPMENT
HAYES MEMORIAL DRIVE
MARLBOROUGH, MA

PROJECT NO.	1145-10A	DATE:	04/17/2020
SCALE:	1" = 40'	DWG. NAME:	C-1145-10A
DESIGNED BY:	DMR/SJL	CHECKED BY:	CMQ

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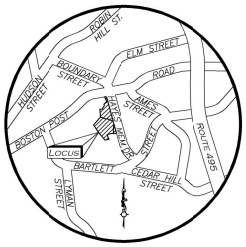
DRAWING TITLE:
GRADING & DRAINAGE PLAN

SHEET No.
C-103



LOCUS MAP
(NOT TO SCALE)

SITE DEVELOPMENT PLANS FOR
PARCEL "M" DEVELOPMENT
MAP 99, LOT 1 & MAP 99, LOT 6
HAYES MEMORIAL DRIVE
MARLBOROUGH, MA

APPLICANT:

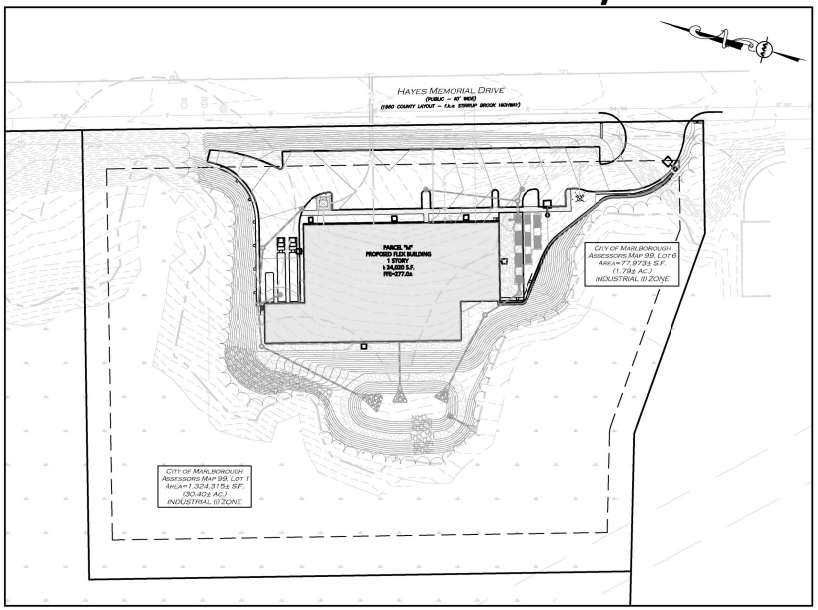
THE GUTIERREZ COMPANY
200 SUMMIT DRIVE, SUITE 400
BURLINGTON, MA 01803
781.272.7000

LAND SURVEYOR, SITE ENGINEER
LANDSCAPE ARCHITECT:

ALLEN & MAJOR ASSOCIATES, INC.
100 COMMERCE WAY, SUITE 5
WOBURN, MA 01801
781.935.6889

ENVIRONMENTAL CONSULTANT:

GODDARD CONSULTING, LLC
291 MAIN STREETM, SUITE 8
NORTHBOROUGH, MA 01532
508.393.3784



GRAPHIC SCALE

(IN FEET)
1 inch = 60 ft.

LIST OF DRAWINGS			
DRAWING TITLE	**SHEET NO.**	**ISSUED**	**REVISED**
CIVIL DRAWINGS			
EXISTING CONDITIONS KEY SHEET	V-101	06-05-2020	-
EXISTING CONDITIONS	V-104	06-05-2020	-
EXISTING CONDITIONS	V-105	06-05-2020	-
ABBREVIATIONS AND NOTES	C-001	06-05-2020	-
ABBREVIATIONS AND NOTES	C-002	06-05-2020	-
LOCUS PLAN	C-100	06-05-2020	-
EROSION CONTROL PLAN	C-101	06-05-2020	-
LAYOUT & MATERIALS PLAN	C-102	06-05-2020	-
GRADING & DRAINAGE PLAN	C-103	06-05-2020	-
UTILITIES PLAN	C-104	06-05-2020	-
FIRE TRUCK TURNING PLAN	C-105	06-05-2020	-
TRUCK TURNING PLAN	C-106	06-05-2020	-
PHOTOMETRICS PLAN	C-107	06-05-2020	-
SNOW STORAGE PLAN	C-108	06-05-2020	-
CIVIL DETAILS	C-501	06-05-2020	-
CIVIL DETAILS	C-502	06-05-2020	-
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CIVIL DETAILS	C-504	06-05-2020	-
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LANDSCAPE PLAN	L-101	06-05-2020	-
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ARCHITECTURAL DRAWINGS			
CONCEPTUAL RENDERING	—	06-05-2020	-

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

CITY OF MARLBOROUGH, MA
SITE PLAN REVIEW COMMITTEE APPROVAL

MAJOR SITE PLAN APPROVAL

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SUBMITTED FOR CONSERVATION COMMISSION: JUNE 5, 2020

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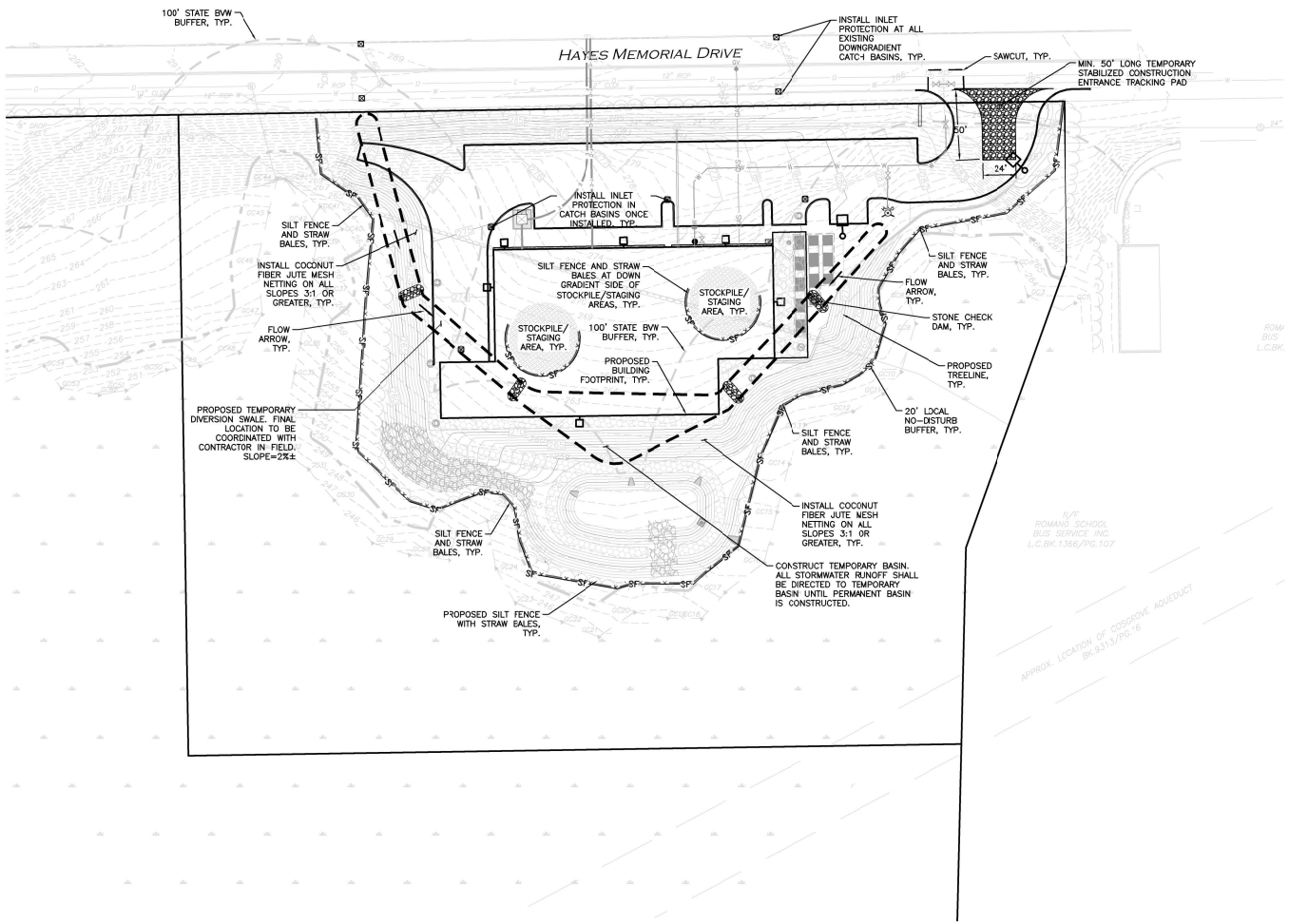

LEGEND

SILT FENCE	SF
TUBULAR BARRIER	
EROSION CONTROL FABRIC	
CATCH BASIN FILTER	
STONE CHECK DAM	
STABILIZED ENTRANCE	
TURBIDITY CURTAIN	TC
STOCKPILE/STAGING AREA	

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7. ALL ON-SITE DEMOLITION INCLUDING CUT & CAP OF UTILITIES SHALL BE PERFORMED TO CITY OF MARLBOROUGH AND SERVICE PROVIDER STANDARDS.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

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N:\PROJECTS\1145-10A\CIVIL\DRAWINGS\CURRENT\LOT M\C-1145-10-M_EROSION CONTROL.DWG

COMMONWEALTH OF MASSACHUSETTS CARLTON M. QUINN CIVIL No. 49923 REGISTERED PROFESSIONAL ENGINEER 6.5.20

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	2020-06-05	REVISED PER CITY COMMENTS

APPLICANT/OWNER:
THE GUTIERREZ COMPANY
200 SUMMIT DRIVE, SUITE 400
BURLINGTON, MA 01803

PROJECT:
PARCEL M DEVELOPMENT
HAYES MEMORIAL DRIVE
MARLBOROUGH, MA

PROJECT NO.	1145-10A	DATE:	04-17-2020
SCALE:	1" = 40'	DWG. NAME:	C-1145-10A
DESIGNED BY:	DMR	CHECKED BY:	CMQ

PREPARED BY:

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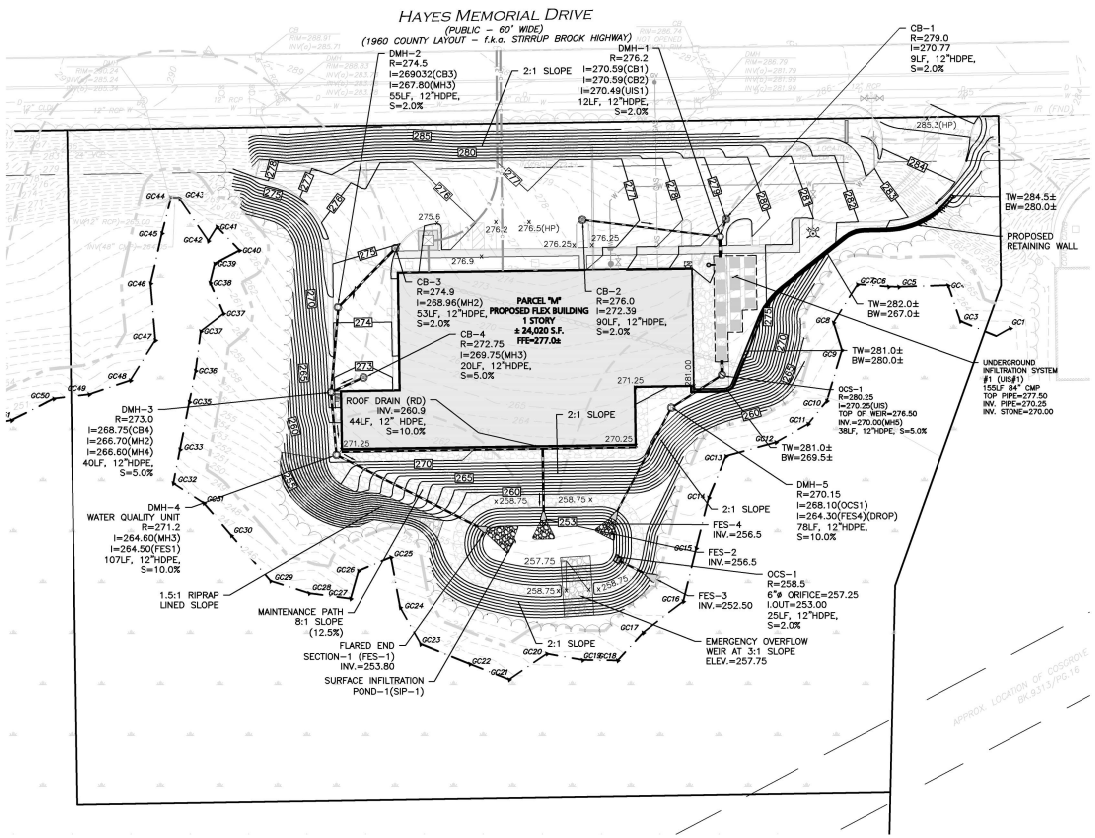
DRAWING TITLE: EROSION CONTROL PLAN

SHEET No. C-101



LEGEND

- DRAIN MANHOLE
- CATCH BASIN
- CATCH BASIN – DOUBLE GRATE
- OUTLET CONTROL
- DIVERSION WEIR
- WATER QUALITY UNIT
- AREA DRAIN
- FLARED END SECTION
- DRAIN LINE
- RIPRAP OUTFALL
- HEADWALL
- 5' CONTOUR (280)
- 1' CONTOUR (277)
- SPOT GRADE ×275.50
- INFILTRATION SYSTEM
- INFILTRATION PIPE
- DETENTION PIPE
- UNDERDRAIN (UD)
- FLOW DIRECTION

NOTES:

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2. THIS PLAN WAS PREPARED USING AVAILABLE SITE INFORMATION FROM SEVERAL SOURCES, SOME OF WHICH IS UNCONFIRMED. THE EXISTING CONDITIONS SURVEY BASE WAS TAKEN FROM A PLAN ENTITLED "EXISTING CONDITIONS" PREPARED BY ALLEN & MAJOR ASSOCIATES, INC. DATED MARCH 20, 2020.
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4. ALL ELEVATIONS REFER TO NAVD 88.
5. PROFESSIONAL GEOTECHNICAL ENGINEER SHALL CONFIRM GLOBAL STABILITY OF ALL SLOPES STEEPER THAN 3:1

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(IN FEET)
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COMMONWEALTH OF MASSACHUSETTS
CARLTON M. QUINN
CIVIL
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6.8.20

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DRAWING TITLE:	SHEET No.
GRADING & DRAINAGE PLAN	C-103