CITY OF HAVERHILL
CITY COUNCIL AGENDA –
Tuesday, October 27, 2026 at 7:00 PM
Theodore A. Pelosi, Jr. Council Chambers, 4 Summer St, Room 202
In-Person/Remote Meeting: https://meet.google.com/wjm-ryuu-vkg

This meeting of Haverhill City Council will be held in-person at the location provided on this notice as its official meeting location pursuant to the Open Meeting Law. As the meeting is held in person at a physical location that is open and accessible to the public, the City Council is not required to provide remote access to the meeting. Members of the public are welcome to attend this in-person meeting. Please note that a live stream of the meeting is being provided only as a courtesy to the public, and the meeting will not be suspended or terminated if technological problems interrupt the virtual broadcast, unless otherwise required by law. Members of the public with particular interest in any specific item on this agenda should make plans for in-person vs. virtual attendance accordingly. Those attending tonight's meeting should be aware that the meeting is being audio and video recorded by HCTV, The Eagle Tribune, and WHAV. Any audience members who wish to record any part of the meeting must inform the Council President who will announce the recording. This is to comply with the MA wiretap statute. Thank you.

1. **OPENING PRAYER**
2. **PLEDGE OF ALLEGIANCE**
3. **APPROVAL OF MINUTES OF PRIOR MEETING**
4. **ASSIGNMENT OF THE MINUTES REVIEW FOR THE NEXT MEETING:**
5. **COMMUNICATIONS FROM THE MAYOR:**

OCT 23 AM10:56
HAVCITYCLERK

5.1. Mayor Barrett requests to introduce Kerri Perry and Deputy Fire Chief Justin Borden to discuss fire safety and Community Action Inc's Low-Income Home Energy Assistant Program (LIHEAP)

5.2. Mayor Barrett submits the following gift order:

5.2.1. Order- Authorizing the City Council to accept a gift donation from Wingate Residences in the amount of $ 200.00 for the Council on Aging Department's Halloween Party at the Citizen Center

5.3. Mayor Barrett submits an Order to authorize borrowing for the Haverhill High School Fire Alarm Project Bonds

5.3.1. Order- That the City of Haverhill hereby appropriates Eight Hundred Thousand Dollars ($800,000), for the purpose of paying costs of the replacement, modernization and equipping of the fire alarm system at the Haverhill High School

FILE 10 DAYS

6. **COMMUNICATIONS FROM COUNCILORS TO INTRODUCE AN INDIVIDUAL(S) TO ADDRESS THE COUNCIL:**

6.1. President Jordan wishes to introduce Timothy Coco, Raymond Comeau, and Arthur Veasey, members of the Committee for a Downtown Statue of John Greenleaf

Whittier, to discuss their initiative for placing a statue of John Greenleaf Whittier in an active downtown location

6.2. Councilor Sullivan wishes to recognize Ryan Hiro for having earned his Eagle Scout

6.3. Councilor Ferreira wishes to introduce Andrea Watson to speak about National Lead Poisoning Prevention Week

7. PUBLIC PARTICIPATION- REQUESTS UNDER COUNCIL RULE 28:

8. COMMUNICATIONS AND REPORTS FROM CITY OFFICERS AND EMPLOYEES:

8.1. Angel A. Perkins, *City Auditor and Chief Financial Officer*, submits the revenue and expense reports for the month of September 2026

8.2. Kaitlin M. Wright Esposito, *City Clerk*, shares November 3rd state election reminder

9. UTILITY PUBLIC HEARING(S) AND RELATED ORDER(S):

10. PUBLIC HEARINGS AND RELATED ORDERS:

10.1. **Doc 21-K** - Jacki Byerley, Planning Director, submits proposed amendments to Chapter 255, Zoning, for review and consideration

10.2. **Doc 21-G**- PDD-26-1; Attorney Russell Channen for client Pentucket North Development, LLC requests to amend Chapter 255 Zoning Ordinance and Zoning Map by creating a Special Permit Planned Development District in accordance with Section 8.5 of the Zoning Ordinance. Applicant, Pentucket North Development, LLC is requesting a special permit of a planned residential development on a portion of land owned by Cedardale, Inc, located off of Boston Road known as 931 Boston Road (Map 754 Block 2 Lot 21) to construct six duplex units and two single family units. The property is currently zoned Commercial Highway (CH)

Continued from August 25, 2026

10.3. **Doc 21-B** - Planning Director, Jacki Byerley, requests a hearing for the following Zoning Amendment – Battery Energy Storage Systems Ordinance: re: Amend Chapter 255 Zoning Ordinance and Zoning Map – Battery Energy Storage Systems Overlay District (BESS)– by inserting a new section 7.9 Battery Energy Storage Systems, amending section 3.1.3 Table of Use and Parking regulations by allowing a Tier 1, Tier 2 and Tier 3 BESS and amending the Zoning Map to include the BESS Overlay District. The overlay district will be creating regulations for the installation and use of free-standing battery energy storage systems ("BESS"), adding to the table the overlay district with the allowed Tiers and updating the zoning map to include the BESS Overlay District, or take any other action related to

Continued from September 15, 2026

10.4. **Doc 41-B** – Vice President Michiston, as Chair of the Planning and Development Committee, per recommendation of the Planning and Development Committee on August 24, 2026 and vote of the City Council on September 15, 2026 requests a hearing for the following Zoning Amendment – Battery Energy Storage Systems Ordinance for Hilldale Ave location re: Amend Chapter 255 Zoning Ordinance and Zoning Map – Battery Energy Storage Systems Overlay District (BESS)– by inserting a new section 7.9 Battery Energy Storage Systems, amending section 3.1.3 Table of Use and Parking regulations by allowing a Tier 1, Tier 2 and Tier 3 BESS and amending the Zoning Map to include the BESS Overlay District. The overlay district will be creating regulations for the installation and use of free-standing battery energy storage systems ("BESS"), adding to the table the overlay district with the allowed Tiers and updating the zoning map to include the BESS Overlay District, or take any other action related to

11. APPOINTMENTS:

11.1. **Confirming Appointments:**
11.2. **Non-Confirming Appointments:**
11.3. **Constables:**
11.4. **Resignation:**

12. PETITIONS:

12.1. **Applications Handicap Parking Sign:** *with Police approval*
12.2. **Amusement/Event Application:** *with Police approval*
12.3. **Auctioneer License:**
12.4. **Tag Days**: *with Police approval*
12.5. **One Day Liquor License –with Police & License Commission approval**
12.6. **ANNUAL LICENSE RENEWALS:**
12.6.1. **Hawker Peddlers License- Fixed location** – *w/Police approval*
12.6.2. **Coin-Op License *Renewals*** – *with Police approval*
12.6.3. **Christmas Tree Vendor** – *with Police approval*
12.6.4. **Taxi Driver Licenses:** *with Police approval*
12.6.5. **Taxi/Limousine License** *with Police approval*
12.6.6. **Junk Dealer /Collector License** - *with Police approval*
12.6.7. **Pool/Billiard**
12.6.8. **Bowling**
12.6.9. **Sunday Bowling**
12.6.10. **Buy & Sell Secondhand Articles** *with Police approval*
12.6.11. **Buy & Sell Secondhand Clothing** *with Police approval*
12.6.12. **Pawnbroker license** - *with police approval*
12.6.13. **Fortune Teller** *with - Police approval*
12.6.14. **Buy & Sell Old Gold** – *with Police approval*

12.6.14.1. **GOLD-26-4** - Freddy Rodriguez for *Javier's Jewelry Repair*, 741 South Main St Unit 1

12.6.15. **Roller Skating Rink**

12.6.16. **Sunday Skating**

12.6.17. **Exterior Vending Machines/Redbox Automated Retail, LLC**

12.6.18. **Limousine/Livery License/Chair Cars** *with Police approval*

13. MOTIONS AND ORDERS:

13.1. Order- Pay bills of the previous years and to further authorize the payment from current year departmental appropriations as listed below:

Vendor	Amount	Account
WB Mason	**$133.23**	**Police**
WB Mason	**$133.23**	**Police**
	TOTAL= $266.46	

14. ORDINANCES (FILE 10 DAYS):

14.1. Ordinance re: Vehicles and Traffic; Amend Ch 240; be further amended by ADDING the following to § 240-85 Schedule B: Parking Restrictions and Prohibitions:

LOCATION	REGULATION	HOURS/ DAYS
20 Park St	NO PARKING (except for 1 24- hours Handicap parking space)	24 HRS

File 10 Days

15. COMMUNICATIONS FROM COUNCILORS:

15.1. Councilors Lewandowski and Ferreira request update from Mayor on snow plan for season including services for senior population and snowplow contractor staffing

15.2. Vice President Michitson wishes to announce a Planning and Development Committee meeting on Monday, November 9, 2026, at 6PM in Room 202, City Council Chambers

16. UNFINISHED BUSINESS OF PRECEDING MEETING:

17. RESOLUTIONS AND PROCLAMATIONS:

18. COUNCIL COMMITTEE REPORTS AND ANNOUNCEMENTS:

19. DOCUMENTS REFERRED TO COMMITTEE STUDY:

20. LONG TERM MATTERS STUDY LIST:

21. ADJOURN:

5.1

MELINDA E. BARRETT
MAYOR

CITY OF HAVERHILL
MASSACHUSETTS

CITY HALL, ROOM 100
FOUR SUMMER STREET
HAVERHILL, MA 01830
PHONE 978-374-2300
FAX 978-373-7544
MAYOR@HAVERHILLMA.GOV
WWW.HAVERHILLMA.GOV

OCT 23 AM 9:06
HAVCITYCLERK

October 23, 2026

To: City Council President Timothy J. Jordan and Members of the Haverhill City Council

From: Mayor Melinda E. Barrett

Re: Introduce Kerri Perry and Deputy Chief Justin Borden

Dear Mr. President and Members of the City Council:

I respectfully request to introduce Kerri Perry and Deputy Fire Chief Justin Borden to discuss fire safety and Community Action Inc.'s Low-Income Home Energy Assistance Program (LIHEAP).

Very truly yours,

Melinda E. Barrett
Mayor

5.2

MELINDA E. BARRETT
MAYOR

CITY OF HAVERHILL
MASSACHUSETTS

CITY HALL, ROOM 100
FOUR SUMMER STREET
HAVERHILL, MA 01830
PHONE 978-374-2300
FAX 978-373-7544
MAYOR@HAVERHILLMA.GOV
WWW.HAVERHILLMA.GOV

October 22, 2026

To: City Council President Timothy J. Jordan and Members of the Haverhill City Council

From: Mayor Melinda E. Barrett

RE: Order Authorizing the City Council to Accept a Gift of $200.00 from Wingate Residences at Haverhill

Dear Mr. President and Members of the Haverhill City Council:

Please see the attached order authorizing the City Council to accept a gift of $200.00 dollars from Wingate Residences for the Council on Aging Department's Halloween Party at the Citizen's Center.

I recommend approval.

Sincerely,

Melinda E. Barrett

Melinda E. Barrett
Mayor

MEB/em

Document

CITY OF HAVERHILL

In Municipal Council

OCT 22 PM3:06
HAVCITYCLERK

Ordered:

GIFT ACCEPTANCE

At a regularly convened meeting of the City Council of the City of Haverhill, held on the 27th day of October 2026, it was voted as follows:

That the City Council of the City of Haverhill duly elected, qualified, and acting as such, on behalf of the City votes to accept a gift of two hundred dollars ($200.00) for the Halloween Party at the Citizens Center. Consistent with the purpose of the donation, as stated in the letter from Wingate Residences at Haverhill addressed to the City of Haverhill dated September 2026, the Gift shall be used by the Council on Aging Department.

YEAS: _____

NAYS: _____

ABSENT: _____

PASSED IN COUNCIL: _____

A True Record, Attest:

_____
Date Approved

_____
Kaitlin M. Wright, City Clerk

_____
Melinda E. Barrett, Mayor

9-14-26

To Whom it May Concern:

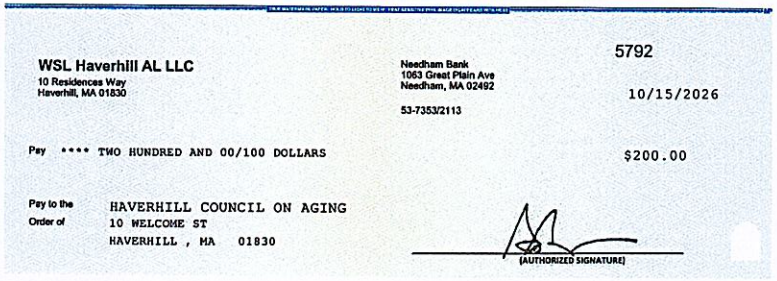
Wingate Residences at Haverhill has donated $200 to the Haverhill Council on Aging for the sponsorship of the Halloween Party on 10-23-26. We enjoy being included in your programming and look forward to more opportunities to work together.

Kind Regards,

Stacey Blakeslee

Director of Community Relations

Wingate Residences at Haverhill



WSL Haverhill AL LLC
10 Residences Way
Haverhill, MA 01830

Needham Bank
1063 Great Plain Ave
Needham, MA 02492

53-7353/2113

5792

10/15/2026

Pay **** TWO HUNDRED AND 00/100 DOLLARS $200.00

Pay to the Order of
HAVERHILL COUNCIL ON AGING
10 WELCOME ST
HAVERHILL , MA 01830

(AUTHORIZED SIGNATURE)

5.3

MELINDA E. BARRETT
MAYOR

CITY OF HAVERHILL
MASSACHUSETTS

CITY HALL, ROOM 100
FOUR SUMMER STREET
HAVERHILL, MA 01830
PHONE 978-374-2300
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WWW.HAVERHILLMA.GOV

October 23, 2026

To: City Council President Timothy J. Jordan and Members of the Haverhill City Council

From: Mayor Melinda E. Barrett

Re: Order for Haverhill High School Fire Alarm Project Bonds

Dear Mr. President and Members of the City Council:

I respectfully submit an Order to borrow $800,000.00 for the Haverhill High School fire alarm project.

I recommend approval.

Very truly yours,

Melinda C. Barrett

Melinda E. Barrett
Mayor

HAVERHILL PUBLIC SCHOOLS

Office of the Chief Financial Officer

CITY OF HAVERHILL
MEMORANDUM

TO: Haverhill City Council

FROM: Clancy Main, Chief Financial Officer, Haverhill Public Schools

DATE: October 23, 2026

RE: **Haverhill High School Fire Alarm System Replacement – Capital Funding Request**

The Haverhill Public Schools is requesting $800,000 in capital funding for the replacement and modernization of the fire alarm system at Haverhill High School.

The existing fire alarm system is outdated and has experienced ongoing issues related to aging equipment and wiring throughout the building. The main control panel is nearing the end of its useful life, making continued repairs an increasingly unsustainable approach.

The proposed project would include a full replacement of the fire alarm system, including the main control panel, annunciators, strobes, associated devices, and the necessary rewiring to support the upgraded system.

This project is an important investment in the safety of students, staff, and visitors at Haverhill High School. Replacing the aging system will improve reliability, reduce the need for ongoing repairs, and ensure the building has a modern fire alarm system capable of meeting its operational and safety needs.

The total estimated project cost is $800,000, with funding requested through the City's FY2027 Capital Budget. Similar fire alarm replacement work has previously been completed at two other schools within the district.

We respectfully request the City Council's consideration and support of this capital funding request to address this critical infrastructure need at Haverhill High School.

Clancy Main
Chief Financial Officer
Haverhill Public Schools

Document

CITY OF HAVERHILL

In Municipal Council

Ordered:

OCT 21 PM4:05
HAVCITYCLERK

$800,000 Haverhill High School Fire Alarm Project Bonds

Ordered: That Eight Hundred Thousand Dollars ($800,000) is hereby appropriated for the purpose of paying costs of the replacement, modernization and equipping of the fire alarm system at the Haverhill High School, including the payment of all costs incidental and related thereto; and that to meet this appropriation, the Treasurer, with the approval of the Mayor, is authorized to borrow said amount pursuant to Chapter 44, Section 7(1) of the General Laws, or pursuant to any other enabling authority, and to issue bonds or notes of the City therefor.

Further Ordered: That the Treasurer is authorized to file an application with the appropriate officials of The Commonwealth of Massachusetts (the "Commonwealth") to qualify under Chapter 44A of the General Laws any and all bonds of the City authorized to be borrowed pursuant to this loan order and to provide such information and execute such documents as such officials of the Commonwealth may require in connection therewith.

Outlook

Thank you for placing your order with us.

From North of Boston <noreply@wave2adportal.com>
Date Thu 10/22/2026 11:50 AM
To CityClerk <cityclerk@haverhillma.gov>
Cc cmacdonald@northofboston.com <cmacdonald@northofboston.com>; Kaitlin Wright Esposito <kwright@haverhillma.gov>; Natalia Hernandez <NHernandez@HaverhillMa.gov>

OCT 22 AM11:54
HAVCITYCLERK

Warning! External Email. Exercise caution when opening attachments or clicking on any links.

THANK YOU for your notice submission!

This is your confirmation that your order has been submitted. Below are the details of your transaction. Please save this confirmation for your records.

Job Details

Order Number:	W0148728
Business Type:	All Other Public Notices
Notice Size:	Public Notices
Notice Estimate:	$104.87
Referral Code:	High School Fire Alarm Loan

Account Details

Haverhill Clerk
4 SUMMER ST STE 118
HAVERHILL, MA 01830
978-374-2312
cityclerk@cityofhaverhill.com
HAVERHILL CITY CLERK

Schedule for notice number W01487280

Thu Oct 29, 2026

Haverhill Gazette Public *All Zones*

Notices

CITY OF HAVERHILL
In Municipal Council
Ordered:
$800,000 Haverhill High School Fire Alarm Project Bonds

Ordered: That Eight Hundred Thousand Dollars ($800,000) is hereby appropriated for the purpose of paying costs of the replacement, modernization and equipping of the fire alarm system at the Haverhill High School, including the payment of all costs incidental and related thereto; and that to meet this appropriation, the Treasurer, with the approval of the Mayor, is authorized to borrow said amount pursuant to Chapter 44, Section 7(1) of the General Laws, or pursuant to any other enabling authority, and to issue bonds or notes of the City therefor.

Further Ordered: That the Treasurer is authorized to file an application with the appropriate officials of The Commonwealth of Massachusetts (the "Commonwealth") to qualify under Chapter 44A of the General Laws any and all bonds of the City authorized to be borrowed pursuant to this loan order and to provide such information and execute such documents as such officials of the Commonwealth may require in connection therewith.

HG - Publication Dates

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6.1

CITY COUNCIL
Timthoy J. Jordan, *President*
John A. Michitson, *Vice President*
Thomas J. Sullivan
Colin F. LePage
Melissa J. Lewandowski
Catherine P. Rogers
Shaun P. Toohey
Michael S. McGonagle
Daniel R. Diodati
Devan Ferreira
Ralph T. Basiliere

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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS 01830-5843

October 19, 2026

OCT 19 PM1:30
HAVCITYCLERK

TO: Members of the City Council

President Jordan wishes to introduce Timothy Coco, Raymond Comeau and Arthur Veasey members of the Committee for a Downtown Statue of John Greenleaf Whittier to discuss their initiative for placing a statue of John Greenleaf Whittier in an active downtown location.

Timothy J. Jordan

President Timothy J. Jordan

(meeting: 10.27.26)

PROPOSAL FOR A DOWNTOWN STATUE OF JOHN GREENLEAF WHITTIER

To be presented to the Haverhill City Council, October 27, 2026

Purpose

The Committee for a Downtown Statue of John Greenleaf Whittier respectfully seeks the Haverhill City Council's support for placing a statue of Whittier, with mention of his accomplishments, in an active downtown location. We thank members of the City Council for allowing us to speak tonight.

Whittier's current memorials

A you know, there are a number of memorials to John Greenleaf Whittier in the city and vicinity, for example, the Whittier Birthplace on 305 Whittier Road, the Whittier Home in Amesbury, and a Whittier Building, a Whittier Bridge, and two Whittier Schools. We think that a downtown statue of Haverhill's favorite son would complement these tributes. Two reasons come readily to mind.

Reason 1 for Whittier downtown: to enhance the daily lives of citizens

The first reason is to have Whittier's values and accomplishments displayed to Haverhill citizens, young and old, as they go about their daily activities. These values and accomplishments enabled Whittier to become a major poet, abolitionist, and advisor during his time, and they will serve, we believe, as a daily inspiration to the citizens of Haverhill. The list of Whittier's virtues is long, and it includes honesty, humility, courage, perseverance, righteousness, and self-reliance. This is why his contemporaries elected him to the Massachusetts House of Representatives and elicited his aid in the founding of the national Republican Party; and why Harvard invited him to serve two terms as an overseer and awarded him an honorary Doctor of Laws degree. It is why schools and cities in the nation, and one college, are named after him; and why, on his 80th birthday, he received a birthday letter signed by 59 U.S. senators, every member of the U.S. Supreme Court, and 330 members of the U.S. House of Representatives. Finally, it is why, after his death in 1892, major newspapers, including The New York Times, The Washington Post, The San Francisco Chronicle, The Cleveland Plain Dealer, and the Philadelphia Inquirer, published obituaries and notices. He is a worthy model for living.

Reason 2 for Whittier downtown: to enhance the stature of the city of Haverhill

The second reason for a downtown statue is to place Whittier *within* the city he loved in order to accentuate their association. Other communities have seen the value of doing this. For example, there is a hometown statue of Longfellow in Portland, Maine; one of Poe in Baltimore; one of Whitman in Brooklyn; one of Thoreau at Walden Pond; two of Mark Twain in Hannibal, Missouri; and one of Whittier's partner in abolition, William Lloyd Garrison, in Newburyport. The only statue of Whittier is in Whittier, California. Haverhill is fortunate indeed to be the birthplace of this extraordinary American, and the city cannot but gain in stature in the eyes of both citizens and outsiders by being even more closely associated with him.

Work completed and proposed next steps

The Committee has been meeting for more than a year. Most recently, we have been been making the rounds of interested parties, including the Mayor's Office, Sal Lupoli Companies, and the "Possible Dreams" annual forum, describing our project and eliciting feedback. We have also consulted with sculptors. The feedback has been uniformly positive. If the Haverhill City Council also has a positive opinion of the project, we intend to continue community outreach and begin steps toward the formation of a private fundraising campaign.

Yours respectfully,

Timothy Coco
Raymond Comeau
Arthur Veasey
Committee for a Downtown Statue of John Greenleaf Whittier

6.2

CITY COUNCIL
Timthoy J. Jordan, *President*
John A. Michitson, *Vice President*
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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS 01830-5843

October 22, 2026

TO: President and Members of the Haverhill City Council

Councilor Sullivan wishes to recognize Ryan Hiro for having earned his Eagle Scout.

Thomas J. Sullivan

Thomas J. Sullivan

OCT 23 AM8:35
HAVCITYCLERK

(10.27.26)

6.3

CITY COUNCIL
Timthoy J. Jordan, *President*
John A. Michitson, *Vice President*
Thomas J. Sullivan
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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS 01830-5843

October 23, 2026

TO: President and Members of the City Council

Councilor Ferreira wishes to introduce Andrea Watson to speak about National Lead Poisoning Prevention Week.

Devan Ferreira

Councilor Devan Ferreira

HAVCITYCLERK
OCT 23 AM9:08

8.1

Haverhill

Office of the City Auditor, Room 106
Phone: 978-374-2306 Fax: 978-373-8476
aperkins@cityofhaverhill.com

October 16, 2026

To The Honorable City Council

OCT 18 AM9:53
HAVCITYCLERK

Attached are the revenue and expense reports through September 2026.

The general fund revenue shows a year-over-year increase of 2.13%, which is down from 6.67% in September of last year. As anticipated, investment income has decreased due to reduced invested ARPA funds and borrowing proceeds. Investment earnings recognized through last September were $1.1 million compared to just $225,857 through this September. This decline in investment earnings was incorporated into the 2027 operating budget, so it is not negatively affecting budget performance. Overall, the general fund revenue is just slightly below its year-to-date collection benchmark of 24%, currently standing at 23.8%.

The general fund operating budget is progressing as planned; however, in 2027, the city has significantly reduced its operating reserves due to budget constraints. As we navigate these challenging financial conditions, it is essential for all departments to manage budgets accurately, given the limited capacity to accommodate unexpected expenses.

As discussed in the recent department head meeting, the Mayor has extended the budget freeze on all discretionary purchases until further notice.

The city's free cash has been submitted to the Massachusetts Department of Revenue for certification. As in previous years, a portion of this free cash will be allocated to high-priority capital projects, placeholders for snow and ice removal, and the 2028 operating budget. The 2028 budget process will begin earlier this year and is intended to conclude in early June.

Sincerely,

Angel A. Perkins, CPFO, CGA, CFE
Chief Financial Officer & City Auditor

Year to Date Benchmark	25.00%

City Department	Budget	Expended as of 9/30/26	Unexpended as of 9/30/26	% Expended
Council Salaries	$ 236,676	$ 59,764	$ 176,912	25.25%
Council Expenses	$ 6,600	$ 314	$ 6,286	4.76%
Mayor Salaries	$ 446,004	$ 95,440	$ 350,564	21.40%
Mayor Expenses	$ 206,750	$ 12,779	$ 193,971	6.18%
Auditor's Office Salaries	$ 406,751	$ 103,339	$ 303,412	25.41%
Auditor's Office Expenses	$ 148,100	$ 1,592	$ 146,508	1.07%
Assessors Salaries	$ 310,083	$ 78,407	$ 231,676	25.29%
Assessors Expenses	$ 171,079	$ 41,772	$ 129,307	24.42%
Treasurer/Collector Salaries	$ 428,727	$ 101,830	$ 326,897	23.75%
Treasurer/Collector Expenses	$ 250,300	$ 39,199	$ 211,101	15.66%
Constituent Services Salaries	$ 105,672	$ 25,013	$ 80,659	23.67%
Constituent Services Expenses	$ 7,500	$ -	$ 7,500	0.00%
Purchasing Salaries	$ 102,632	$ 26,718	$ 75,914	26.03%
Purchasing Expenses	$ 15,050	$ 3,053	$ 11,997	20.29%
Law Department Salaries	$ 47,754	$ 12,604	$ 35,150	26.39%
Law Department Legal	$ 425,000	$ 81,478	$ 343,522	19.17%
Human Resources Salaries	$ 331,555	$ 84,921	$ 246,634	25.61%
Human Resources Expenses	$ 130,300	$ 49,506	$ 80,794	37.99%
MIS Salaries	$ 211,100	$ 51,291	$ 159,809	24.30%
MIS Expenses	$ 641,809	$ 249,445	$ 392,364	38.87%
MIS Capital	$ 50,000	$ 12,044	$ 37,956	24.09%
City Clerk Salaries	$ 612,582	$ 176,926	$ 435,656	28.88%
City Clerk Expenses	$ 154,380	$ 42,934	$ 111,446	27.81%
TOTAL GENERAL GOVERNMENT	**$ 5,446,404**	**$ 1,350,369**	**$ 4,096,035**	24.8%
Building Maint. Salaries	$ 26,000	$ 6,500	$ 19,500	25.00%
Building Maint. Expenses	$ 373,500	$ 63,391	$ 310,109	16.97%
Inspectional & Health Services Salaries	$ 1,271,710	$ 307,324	$ 964,386	24.17%
Inspectional & Health Services Expenses	$ 45,450	$ 8,924	$ 36,526	19.63%

City Department	Budget	Expended as of 9/30/26	Unexpended as of 9/30/26	% Expended
Public Health Salaries	$ 254,291	$ 74,755	$ 179,536	29.40%
Public Health Expenses	$ 7,000	$ 678	$ 6,322	9.69%
Economic Development Salaries	$ 366,920	$ 54,342	$ 312,578	14.81%
Economic Development Expenses	$ 52,370	$ 29,775	$ 22,595	56.86%
TOTAL COMMUNITY & ECONOMIC DEVELOPMENT	**$ 2,397,241**	**$ 545,689**	**$ 1,851,552**	22.8%
Police Salaries	$ 15,215,388	$ 3,522,751	$ 11,692,637	23.15%
Police Expenses	$ 1,876,608	$ 534,174	$ 1,342,434	28.46%
Police Capital	$ 410,000	$ 341,074	$ 68,926	83.19%
Fire Salaries	$ 14,883,477	$ 3,514,276	$ 11,369,201	23.61%
Fire Expenses	$ 1,006,973	$ 170,084	$ 836,889	16.89%
Fire Capital	$ 29,522	$ -	$ 29,522	0.00%
TOTAL PUBLIC SAFETY	**$ 33,421,968**	**$ 8,082,359**	**$ 25,339,609**	24.2%
Whittier Regional School Assessment	$ 9,469,211	$ 2,367,303	$ 7,101,908	25.00%
North Shore Essex Tech. Assessment	$ 690,625	$ -	$ 690,625	0.00%
School Department	$ 136,998,618	$ 14,514,596	$ 122,484,022	10.59%
TOTAL EDUCATION	**$ 147,158,454**	**$ 16,881,899**	**$ 130,276,555**	11.5%
Public Works Administration Salaries	$ 297,318	$ 55,823	$ 241,495	18.78%
Public Works Administration Expenses	$ 37,165	$ 3,297	$ 33,868	8.87%
Public Works Highways Salaries	$ 1,127,200	$ 339,858	$ 787,342	30.15%
Public Works Highways Expenses	$ 712,800	$ 151,651	$ 561,149	21.28%
Public Works Highways Capital	$ 100,000	$ -	$ 100,000	0.00%
Public Works Solid Waste/Recycling Salaries	$ 219,899	$ 56,075	$ 163,824	25.50%
Public Works Solid Waste/Recycling Expenses	$ 5,898,252	$ 329,493	$ 5,568,759	5.59%
Public Works Parking Area Salaries	$ 51,726	$ 18,503	$ 33,223	35.77%
Public Works Parking Area Expenses	$ 396,670	$ 29,008	$ 367,662	7.31%
Public Works Street Marking Expenses	$ 200,000	$ 6,588	$ 193,412	3.29%
Public Works Fleet Maint. Salaries	$ 281,158	$ 43,177	$ 237,981	15.36%
Public Works Fleet Maint. Expenses	$ 76,260	$ 5,092	$ 71,168	6.68%
Public Works Park Dept. Salaries	$ 587,791	$ 164,286	$ 423,505	27.95%
Public Works Park Dept. Expenses	$ 285,871	$ 48,119	$ 237,752	16.83%

City Department	Budget	Expended as of 9/30/26	Unexpended as of 9/30/26	% Expended
Public Works Street Lighting Expenses	$ 753,608	$ 140,234	$ 613,374	18.61%
Public Works Snow & Ice Removal Salaries	$ 229,330	$ 2,498	$ 226,832	1.09%
Public Works Snow & Ice Removal Expenses	$ 980,670	$ -	$ 980,670	0.00%
TOTAL PUBLIC WORKS	**$ 12,235,718**	**$ 1,393,702**	**$ 10,842,016**	11.4%
Citizens Center Salaries	$ 317,822	$ 89,137	$ 228,685	28.05%
Citizens Center Expenses	$ 168,610	$ 22,881	$ 145,729	13.57%
Veterans Services Salaries	$ 131,645	$ 31,660	$ 99,985	24.05%
Veterans Services Expenses	$ 533,250	$ 110,275	$ 422,975	20.68%
Senior Services Salaries	$ 12,100	$ 2,500	$ 9,600	20.66%
Senior Services Expenses	$ 2,400	$ -	$ 2,400	0.00%
Stadium Commission	$ 61,600	$ 7,565	$ 54,035	12.28%
Recreation Salaries	$ 235,397	$ 156,693	$ 78,704	66.57%
Recreation Expenses	$ 85,000	$ 6,703	$ 78,297	7.89%
Public Library Salaries	$ 1,711,916	$ 411,187	$ 1,300,729	24.02%
Public Library Expenses	$ 298,134	$ 108,101	$ 190,033	36.26%
TOTAL HUMAN SERVICES	**$ 3,557,874**	**$ 946,702**	**$ 2,611,172**	26.6%
Debt Service	$ 8,834,819	$ 788,357	$ 8,046,462	8.92%
TOTAL DEBT SERVICE	**$ 8,834,819**	**$ 788,357**	**$ 8,046,462**	8.9%
Retirement Fund	$ 23,838,461	$ 23,838,461	$ -	100.00%
Unemployment Compensation	$ 280,000	$ 163,545	$ 116,455	58.41%
Group Insurance	$ 31,583,332	$ 2,160,751	$ 29,422,581	6.84%
Payroll Taxes (FICA/Medicare)	$ 2,207,955	$ 379,644	$ 1,828,311	17.19%
Workers Compensation	$ 890,000	$ 260,651	$ 629,349	29.29%
Injured on Duty Claims	$ 210,000	$ 153,795	$ 56,205	73.24%
Sick Leave Bank	$ 182,934	$ 71	$ 182,863	0.04%
Vacational Buyback	$ 50,000	$ -	$ 50,000	0.00%
Retiree Medical Claims	$ 85,000	$ 3,234	$ 81,766	3.80%
TOTAL EMPLOYEE BENEFITS	$ 59,327,682	$ 26,960,152	$ 32,367,530	45.4%
General Liability Insurance	$ 1,381,899	$ 849,054	$ 532,845	61.44%
Salary Reserve	$ 388,666	$ 21,000	$ 367,666	5.40%

City Department	Budget	Expended as of 9/30/26	Unexpended as of 9/30/26	% Expended
Budget Reserve	$ 600,000	$ 19,334	$ 580,666	3.22%
State Assessments (Cherry Sheets)	$ 10,271,435	$ 2,580,681	$ 7,690,754	25.12%
Reserve for Abatement & Exemption (Overlay)	$ 250,000	$ -	$ 250,000	0.00%
TOTAL OTHER CITY EXPENSES	**$ 12,892,000**	**$ 3,470,069**	**$ 9,421,931**	26.9%
TOTAL GENERAL FUND	**$ 285,272,160**	**$ 60,419,298**	**$ 224,852,862**	21.2%

Water Department Salaries	$ 4,021,835	$ 871,781	$ 3,150,054	21.68%
Water Department Expenses	$ 10,313,361	$ 4,269,460	$ 6,043,901	41.40%
Water Department Capital	$ 451,000	$ 48,628	$ 402,372	10.78%
Water Department Indirect	$ 254,221	$ -	$ 254,221	0.00%
TOTAL WATER DEPARTMENT	**$ 15,040,417**	**$ 5,189,869**	**$ 9,850,548**	34.5%
Wastewater Salaries	$ 3,189,677	$ 744,091	$ 2,445,586	23.33%
Wastewater Expenses	$ 12,411,268	$ 3,305,421	$ 9,105,847	26.63%
Wastewater Capital	$ 1,102,000	$ 145,627	$ 956,373	13.21%
Wastewater Indirect	$ 718,418	$ -	$ 718,418	0.00%
TOTAL WASTEWATER DEPARTMENT	**$ 17,421,363**	**$ 4,195,139**	**$ 13,226,224**	24.1%

	FY '25 through 9/30/24	FY '26 through 9/30/25	FY '27 through 9/30/26	Trendline
TOTAL GENERAL GOVERNMENT	$ 1,334,577	$ 1,206,567	$ 1,350,369	
TOTAL COMMUNITY & ECONOMIC DEVELO	$ 471,875	$ 475,622	$ 545,689	
TOTAL PUBLIC SAFETY	$ 6,871,726	$ 7,309,341	$ 8,082,359	
TOTAL EDUCATION	$ 19,310,363	$ 16,066,494	$ 16,881,899	
TOTAL PUBLIC WORKS	$ 1,781,838	$ 2,047,493	$ 1,393,702	
TOTAL HUMAN SERVICES	$ 885,985	$ 903,299	$ 946,702	
TOTAL DEBT SERVICE	$ 1,356,911	$ 1,077,945	$ 788,357	
TOTAL EMPLOYEE BENEFITS	$ 25,629,286	$ 25,901,227	$ 26,960,152	
TOTAL OTHER CITY EXPENSES	$ 3,241,810	$ 3,381,946	$ 3,470,069	
TOTAL CITY EXPENDITURES	**$ 60,884,371**	**$ 58,369,934**	**$ 60,419,298**	
TOTAL WATER DEPARTMENT	$ 4,482,823	$ 2,418,851	$ 5,189,869	
TOTAL WASTEWATER DEPARTMENT	$ 3,895,447	$ 2,548,176	$ 4,195,139	

Expense Report as of 9/30/2026

City of Haverhill

Revenue Report

Period Ending 9/30/26

Year to Year Comparison

Revenue Source	9/30/2024	9/30/2025	9/30/2026	FY 26 to 27 % Change	FY 26 to 27 $ Change	FY 25-27 Trendline
Real Estate & Pers Property	$ 32,327,512	$ 35,129,482	$ 36,383,579	3.57%	$ 1,254,097	
Motor Vehcile Excise	$ 1,041,067	$ 866,700	$ 881,124	1.66%	$ 14,424	
Meals Excise	$ 342,160	$ 332,983	$ 364,134	9.36%	$ 31,151	
Hotel / Room Excise	$ 94,694	$ 100,560	$ 93,964	-6.56%	$ (6,596)	
Boat & Other Excise	$ 458	$ 1,227	$ 479	-60.93%	$ (748)	
Cannabis Excise	$ 308,446	$ 340,227	$ 319,752	-6.02%	$ (20,475)	
Waste Disposal Facility Program	$ 549,491	$ 515,941	$ 871,376	68.89%	$ 355,435	
PILOT	$ 243,793	$ 20,558	$ 26,473	28.77%	$ 5,915	
Penalties & Interest	$ 160,725	$ 233,395	$ 238,446	2.16%	$ 5,051	
Fees	$ 254,590	$ 279,728	$ 300,520	7.43%	$ 20,792	
Rentals	$ 40,041	$ 34,148	$ 58,214	70.48%	$ 24,066	
Departmental Revenue	$ 355,447	$ 308,293	$ 150,620	-51.14%	$ (157,673)	
License & Permits	$ 842,059	$ 479,619	$ 734,695	53.18%	$ 255,076	
Fines & Forefits	$ 145,596	$ 194,038	$ 109,849	-43.39%	$ (84,189)	
Investments	$ 677,055	$ 1,113,448	$ 225,857	-79.72%	$ (887,591)	
Medicaid Reimbursement					$ -	
*Misc Revenue	$ 66,985	$ 7,865	$ 9,015	14.62%	$ 1,150	
Comm of MA Cherry Sheet	$ 24,847,178	$ 26,496,177	$ 27,099,031	2.28%	$ 602,854	
Wastewater Enterprise Fund	$ 4,427,452	$ 4,192,169	$ 4,341,881	3.57%	$ 149,712	
Water Enterprise Fund	$ 3,639,770	$ 4,054,052	$ 3,936,819	-2.89%	$ (117,233)	
Other GF Rev - Trnsf From Sp Rev & Free Cash					$ -	
Total Revenue	**$ 70,364,519**	**$ 74,700,610**	**$ 76,145,829**	**1.93%**	**$ 1,445,219**	
Total Revenue without Enterprise Funds	$ 62,297,297	$ 66,454,389	$ 67,867,129	2.13%	$ 1,412,740	
Total Local Receipts	$ 5,122,607	$ 4,828,730	$ 4,384,520	-9.20%	$ (444,210)	

Prepared by Angel A. Perkins, Chief Financial Officer

City of Haverhill

Revenue Report

Period Ending 9/30/26

Collections as a Percent of Budget

Revenue Source	FY 27 Estimated Revenue	FY 27 Actual Revenue Collections	$ Surplus / (Deficit)	YTD Benchmark	Actual Revenue Benchmark
Real Estate & Pers Property	$ 146,107,374	$ 36,383,579	$ (109,723,795)	25%	24.9%
Motor Vehcile Excise	$ 9,025,789	$ 881,124	$ (8,144,665)	8%	9.8%
Meals Excise	$ 1,300,000	$ 364,134	$ (935,866)	25%	28.0%
Hotel / Room Excise	$ 310,000	$ 93,964	$ (216,036)	25%	30.3%
Boat & Other Excise	$ 8,400	$ 479	$ (7,921)	8%	5.7%
Cannabis Excise	$ 1,133,040	$ 319,752	$ (813,288)	25%	28.2%
Waste Disposal Facility Program	$ 3,023,244	$ 871,376	$ (2,151,868)	25%	28.8%
PILOT	$ 281,555	$ 26,473	$ (255,082)	25%	9.4%
Penalties & Interest	$ 742,000	$ 238,446	$ (503,554)	25%	32.1%
Fees	$ 998,900	$ 300,520	$ (698,380)	25%	30.1%
Rentals	$ 198,450	$ 58,214	$ (140,236)	25%	29.3%
Departmental Revenue	$ 555,000	$ 150,620	$ (404,380)	25%	27.1%
License & Permits	$ 2,300,000	$ 734,695	$ (1,565,305)	25%	31.9%
Fines & Forefits	$ 625,000	$ 109,849	$ (515,151)	25%	17.6%
Investments	$ 1,000,000	$ 225,857	$ (774,143)	25%	22.6%
Medicaid Reimbursement	$ 1,000,000	$ -	$ (1,000,000)	25%	0.0%
*Misc Revenue		$ 9,015	$ 9,015	0%	100.0%
Comm of MA Cherry Sheet	$ 110,453,103	$ 27,099,031	$ (83,354,072)	25%	24.5%
Wastewater Enterprise Fund	$ 17,421,363	$ 4,341,881	$ (13,079,482)	25%	24.9%
Water Enterprise Fund	$ 15,040,417	$ 3,936,819	$ (11,103,598)	25%	26.2%
Other GF Rev - Trnsf From Sp Rev & Free Cash	$ 6,210,304	$ -	$ (6,210,304)	0%	0.0%
Total	**$ 317,733,939**	**$ 76,145,829**	**$ (241,588,110)**	**24%**	**24.0%**
Estimated General Fund Revenue	*$ 285,272,159*	*$ 67,867,129*	*$ (217,405,030)*	*24%*	*23.8%*
Estimated Local Receipts	*$ 22,501,378*	*$ 4,384,520*	*$ (18,116,858)*	*18%*	*19.5%*

Prepared by Angel A. Perkins, Chief Financial Officer

8.2

Haverhill

City Clerk's Office, Room 118
Phone: 978-374-2312 Fax: 978-373-8490
cityclerk@haverhillma.gov

October 18, 2026

OCT 18 AM10:11
HAVCITYCLERK

To: President Jordan and Members of the Haverhill City Council,

As of the October 27, 2026 City Council meeting, we are just one week away from the 2026 Midterm Elections.

Early Voting is still ongoing and there are just a few days left where voters can cast a ballot early in-person. Voters can vote early in-person on Wednesday 10/28, Thursday 10/29, and Friday 10/30 8 AM to 4 PM in the Early Voting Room, located on the basement level of City Hall.

If you are voting by mail and have not yet returned your ballot, please hand-deliver it either using our secure election drop box located on the Main Street side of City Hall or directly to the City Clerk's Office (room 118) to ensure timely receipt. Do not risk placing it in the mail as it may not arrive in time.

As always, voters who have not already cast a ballot have the opportunity to vote on Election Day, Tuesday, November 3, between 7:00 AM and 8:00 PM at their regular polling location. Unsure where your polling location is? Visit wheredoivotema.com to find out.

A gentle reminder to all Haverhill voters, no matter if you are voting by mail, early in-person, or on Election Day, you will receive a two-card ballot. Card 1 is front and back, with all candidates and questions 1-3 on the front and the backside lists questions 4-7. Card 2 is only one-sided and has questions 8-10. Once you reach the bottom of card 2, you will have now completed voting. Please be sure to return both cards when voting.

Respectfully,

Kaitlin M. Wright Esposito

Kaitlin M. Wright Esposito, *CMC/CMMC*

City Clerk

10.1

Document # 21-K

Jacki Byerley, *Planning Director*, submits proposed amendments to Chapter 255, Zoning, for review and consideration

IN COUNCIL: September 15, 2026

Hearing scheduled for October 27, 2026

11 YEAS, 0 NAYS, 0 ABSENT

Attest: Kaitlin M. Wright Esposito

Kaitlin M. Wright Esposito, CMC

City Clerk

Haverhill

Economic Development and Planning
Phone: 978-374-2330

To: City Council

From: Jacki Byerley, AICP, Planning Director

Re: Amend Chapter 255 Zoning Ordinance and Appendix A Table 1: Table of Use and Parking Regulations

Date: September 10, 2026

The Planning Department is submitting the attached proposed amendments to Chapter 255, Zoning, for City Council review and consideration. Planning has worked with the Building Commissioner and City Solicitor to develop the requested revisions.

The proposed amendments are intended to clarify and update the Zoning Ordinance. The major revisions include:

- Administrative and Development Review: Updating references throughout the ordinance to the Planning Director or designee and clarifying responsibilities.
- Signs: Clarifying that an establishment may have a maximum of two wall signs, provided they are mounted on and face different sides of the building.
- Parking: Updating minimum parking-space dimensions, allowing a limited number of compact spaces and replacing the existing parking diagrams to reflect the 9x18 parking dimension. Along with clarifying parking and loading standards for five contiguous spaces and extending the exemption of backing into a street to a three-family dwelling.
- Residential Accessory Storage: Clarifying the requirements and limitations for the exterior storage of trailers, unregistered automobiles, campers and boats in residential districts.
- PDD Rezoning and Application Submissions: Removing fee amounts and applications submission requirements from the ordinance to reference the Council's application procedures.
- Performance Guarantees: Clarifying acceptable forms of performance guarantees.
- Consolidated Permitting: Updating the ordinance to address Consolidated Local Permits and small clean energy infrastructure, including the development review and pre-filing municipal meeting process.
- Special Permits: Extending the special permit lapse period to 36 months from 24 months.
- Nonconforming Structures and Uses: Clarifying provisions governing alterations to nonconforming structures and increasing the abandonment period for a nonconforming use or structure from two years to four years before protected status is lost.
- Definitions: Adding definitions for "Performance Guarantee" and "Data Center."

Appendix A – Table of Use and Parking Regulations

The proposed amendments also include several changes to Appendix A, Table 1 – Table of Use and Parking Regulations. These revisions are intended to make the table consistent with the proposed ordinance changes and clarify where certain uses are permitted.

Specifically, the table would:

- Add "Data Center" as a new use. The proposed table identifies the use as prohibited in all zoning districts establishing a clear zoning classification for this use.
- Revise the regulations for large family day-care homes, changing the current special-permit designation to allowed (Y) in the applicable districts.
- Update the accessory storage provisions in the table to correspond with the proposed revisions to Section 3.2.2.2, clarifying the treatment of trailers, unregistered automobiles, and boats as accessory storage.
- Make related corrections and updates to the use table so that the table reflects the terminology and requirements contained in the amended ordinance.
- Removing the special permit requirement for a three-family in the RU Zoning District.

The attached ordinance identifies the proposed revisions through strikeout for language to be removed and for new language to be bolded and underlined. The proposed Appendix A table is included as a separate attachment for ease of review.

If possible, I respectfully request that the City Council schedule these proposed zoning amendments for a public hearing on October 27, 2026, to allow for public review and comment.

Thank you for your consideration,

Jacki Byerly
Planning Director

DOCUMENT

CITY OF HAVERHILL

SEP 18 AM10:21
HAVCITYCLERK

In Municipal Council

ORDERED:

Municipal Ordinance Chapter 255 Zoning

An Ordinance Relating to Zoning to Amend Chapter 255 Zoning Ordinance and Appendix A Table 1: Table of Use and Parking Regulations

Since this Ordinance exceeds in length eight octavo pages of ordinary book print, in lieu of advertising, it is published by the City Council in a municipal bulletin, placed on file in the City Clerk's Office, and posted on the municipal bulletin in City Hall.

PLACED ON FILE for at least 10 days

Attest:

Kaitlin M. Wright, CMC, City Clerk

AN ORDINANCE RELATING TO ZONING

BE IT ORDAINED by the City Council of the City of Haverhill that Chapter 255, Zoning, of the code of the City of Haverhill, as amended, being and is hereby further amended as follows (~~strike out~~ removed and **bold and underline** new)

First:

A. Section 8.3.7.5 first sentence shall be amended as follows:

Lottery or tenant selection agent. The applicant for an inclusionary development project shall engage a DHCD and City of Haverhill Office of Economic Development and **Planning** approved lottery agent for homeownership units who shall ensure affirmative marketing and compliance with income requirements as well as DHCD requirements for maximum housing purchase price for affordable housing units.

B. Section 8.3.9.4, second sentence shall be amended as follows:

No building permit shall be issued until an approved regulatory agreement is recorded at the Registry of Deeds and the Building Commissioner is notified by the **Planning** Director ~~of the Office of Economic Development and Planning~~ or **its** ~~his/her~~ **designee** ~~representative~~ that the project is progressing in a satisfactory manner in fulfilling its affordable housing requirement.

C. Section 8.3.10, first paragraph fourth sentence shall be amended as follows:

No building permit for an inclusionary development project shall be issued unless the ~~Director of the Office of Economic Development and Planning~~ **Planning Director or designee** has determined that the applicant's affirmative marketing plan satisfies these requirements.

D. Section 9.3.10.1 third sentence shall amended as follows:

The location and design of any pathways/walkways, open space, or parks shall be approved by the **Planning Director or its designee** ~~Economic Development Director~~ and in keeping with the City's rail trail design.

E. Section 9.3.12.1 second sentence shall be amended as follows:

The size and design of the park must be approved by the **Planning** ~~Economic Development~~ Director **or its designee.**

F. Section 9.3.12.2.b second sentence shall be amended as follows:

The size and design of the park must be approved by the **Planning** ~~Economic Development~~ Director **or its designee.**

G. Section 9.3.12.2.c third sentence shall be amended as follows:

The use must be approved by the **Planning** ~~Economic Development~~ Director **or its designee**.

H. Section 9.3.12.4 second sentence shall be amended as follows:

The area, location, and amenities included in the park must be approved by the **Planning** ~~Economic Development~~ Director **or its designee**.

I. Section 9.3.12 shall be amended as follows:

Any off-street parking required by this section in Sub-Zone E for any building or use may be included as part of any off-street parking area similarly required for another building or use on the same site only when the type of buildings or uses indicate that the usage of such parking area would not occur simultaneously, as determined by the **Planning** ~~Economic Development~~ Director **or its designee**.

J. Section 9.3.18.3.b.2.i shall be amended as follows:

Any other information which may include required traffic, school, and/or utilities impact study and in order to adequately evaluate the scope and potential impacts of the proposed project if deemed necessary by the **Planning** ~~Economic Development~~ Director **or its designee**.

K. Section 9.3.19.1.a second sentence shall be amended as follows:

The applicant shall also file 20 copies of the application and the other required submittals with the **Planning** ~~Economic Development~~ Director **or its designee** on behalf of the PAA.

L. Section 9.3.19.1.c shall be amended as follows:

An applicant for by-right (site plan review - minor) plan approval shall file the application and all required submittals with the **Planning** ~~Economic Development~~ Director **or its designee**.

M. Section 9.3.19.2.a shall be amended as follows:

Upon receipt of the application for special permit plan approval or by-right (site plan review - major) plan approval, the City Clerk shall immediately provide a copy of the application materials to the City Council, the Planning Board, the Board of Appeals, the Board of Health, the Conservation Commission, the Fire Department, the Police Department, the Building Commissioner, the Department of Public Works, the **Planning** ~~Economic Development~~ Department, and the Community Development Division. Furthermore, the ~~Economic Development~~ **Planning** Director or City Clerk may obtain comments pertaining to design from an architect if deemed necessary by the ~~Economic Development~~ **Planning** Director. Any such board, agency, or officer shall provide written comments within 60 days of its receipt of a copy of the plan and application for approval, or within 30 days of such receipt in the case of a preferred project. Furthermore, the **Planning** ~~Economic Development~~ **Director** shall determine within 10 days of receipt of either a by-right or special permit application whether the project described in the application constitutes a preferred project and shall inform the applicant of such.

N. Section 9.3.19.2.b shall be amended as follows

In the case of a by-right (site plan review - minor) plan approval, the Economic Development Director shall immediately provide a copy of the application materials to the Board of Health, the Conservation Commission, the Fire Department, the Police Department, the Building Commissioner, the Department of Public Works, the ~~Economic Development~~ **Planning** Department, and the Community Development Division. Furthermore, the **Planning** ~~Economic Development~~ Director or City Clerk may obtain comments pertaining to design from an architect if deemed necessary by the **Planning** ~~Economic Development~~ Director. The departments shall provide comment within 30 days or, in the case of a preferred project, within 15 days. Furthermore, the **Planning** ~~Economic Development~~ Director **or its designee** shall determine within 10 days of receipt of the application materials whether the project described in the application constitutes a preferred project and shall inform the applicant of such.

O. Section 9.3.21.1 shall be amended as follows:

Minor Change. After either by-right or special permit plan approval, an applicant may apply to make minor changes involving minor utility or building orientation adjustments, lighting or facade adjustments, or minor adjustments to parking, landscaping, or other site details that do not affect the overall massing, final build-out or building envelope of the site and do not materially affect the open space from that shown on the previously approved site plan and do not increase the number of dwelling units in the project in the aggregate form that was provided in the original plan approval. Plans showing such minor changes and an application must be submitted to the **Planning** ~~Economic Development~~ Director. The **Planning** ~~Economic Development~~ Director **or its designee** shall make a determination as to whether the changes constitute a minor change and may authorize such changes, in writing, to the applicant. The **Planning** ~~Economic Development~~ Director **or its designee** shall set forth any decision to approve or deny such minor changes, in writing,

within 30 days after the applicant has filed its application and shall provide a copy of its decision to the applicant for filing with the City Clerk.

P. Section 9.3.21.2 shall be amended as follows:

Major Change. Those changes deemed by the **Planning** ~~Economic Development~~ Director, **or its designee** to constitute a major change because of the nature of the change in relation to the prior approved plan or because such change cannot be appropriately characterized as a minor change as described above, shall be processed by the PAA as a new application for by-right (site plan review - major) approval or special permit plan approval pursuant to this article.

Second:

A. Section 6.2.7 Title shall be amended as follows:

Signs Permitted in Any R ~~or S~~ District.

B. Section 6.2.8.1

Wall Signs (Accessory). ~~One wall sign for each building frontage of each establishment shall be permitted.~~ **A maximum of two wall signs shall be permitted for each establishment, provided that the signs are mounted on and face different sides of the building (front, sides, or rear).** ~~Such~~ **Each** wall sign shall not exceed a maximum area of 40 square feet per building frontage in any CN District, or a maximum sign area of 120 square feet per building frontage in a CG District, or a maximum sign area of 120 square feet per building frontage in any CH District.

C. Section 6.2.9 Title shall be amended as follows:

Signs Permitted in Any ~~I~~ **B** District

D. Section 8.5.5.1 shall be amended as follows:

Submission Fee. The SPGA shall specify submission fees **in the application requirements as adopted from time to time and set forth in the application procedures and** ~~for a PDD District rezoning in~~ its rules and regulations. ~~In no case shall the fee be less than $850.~~ The required fee shall be submitted with the rezoning request and preliminary plan.

E. Section 8.5.6 shall be amended as follows:

All documents must be submitted to the SPGA **in accordance with the rules and regulations of the SPGA.** ~~no later than two business days prior to meetings at which the amendment will be considered. Fifteen copies shall be submitted. Documents shall also be made available electronically for access by the general public~~.

F. Section 9.3.19.1 shall be amended as follows:

1. Filing.

(a) An applicant for special permit plan approval or by-right (site plan review - major) shall file ~~30 copies of~~ the application and all required submittals, including notice of the date of filing, with the City Clerk on behalf of the PAA **in accordance with the Rules and Regulations of the SPGA**.

~~(b)~~ An applicant for by-right plan (site plan review - minor) approval shall file the application and all required submittals, including notice of the date of filing, with the City Clerk **in accordance with the Rules and Regulations of the SPGA**. ~~The applicant shall also file 20 copies of the application and the other required submittals with the Economic Development Director on behalf of the PAA.~~

(c) An applicant for by-right (site plan review - minor) plan approval shall file the application and all required submittals **in accordance with the Rules and Regulations of the SPGA** ~~with the Economic Development Director~~.

Third

A. Section 3.2.2.2 shall be amended as follows:

Trailer, Automobile, or Boat.

a. In any residential district accessory exterior the ~~Accessory~~ storage of **no more than of the following unregistered items;** one trailer, **or** one ~~unregistered~~ automobile ~~and/~~or one boat shall be allowed as per Table 1.

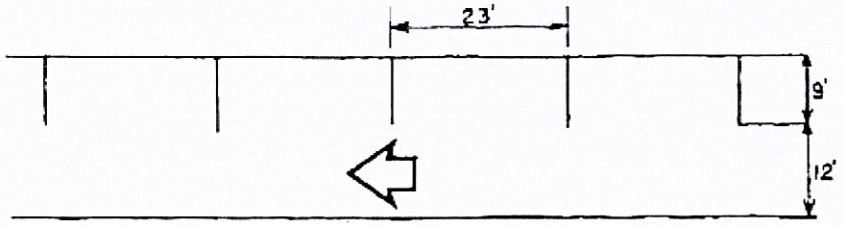
b. In any residential district accessory exterior storage of a camper or trailer or boat so long as not more than three of any combination of the foregoing shall be permitted .

B. Section 6.1.4 shall be amended as follows:

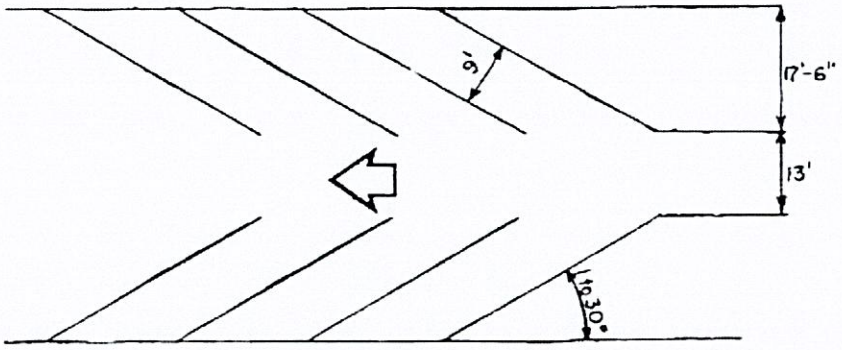
Off-street parking areas shall ~~be~~ **include standard spaces no smaller than 9 feet wide by 18 feet long and may include 10% of the total required spaces designed for compact cars no smaller than 8 feet wide by 16 feet long and further the spaces shall be** designed to comply with one or a combination of the following minimum standards.

And delete the existing diagrams numbered 1-5 and replace with the following:

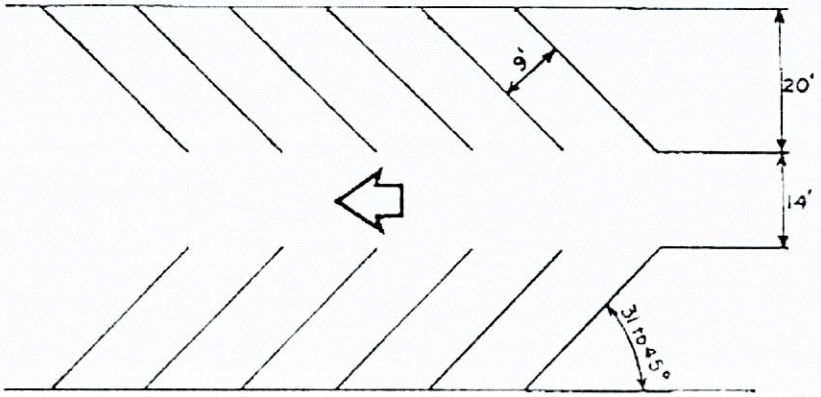
1. Parallel parking.



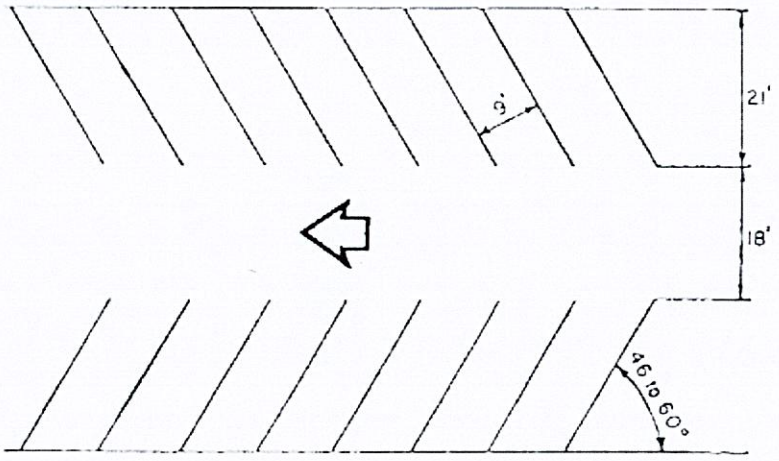
2. One- to thirty-degree angle parking.



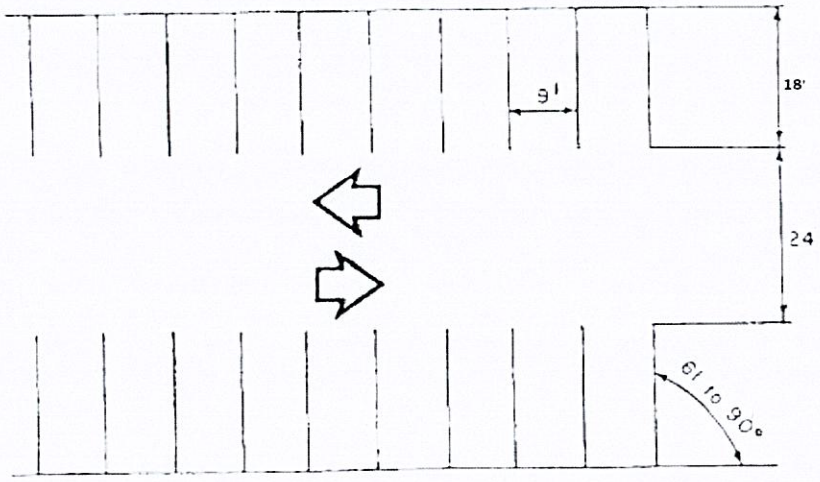
3. Thirty-one- to forty-five-degree angle parking.



4. Forty-six- to sixty-degree angle parking.



5. Sixty-one- to ninety-degree angle parking.



C. Section 6.1.16 first paragraph shall be amended as follows:

All parking and loading areas containing over five **contiguous** spaces, including automotive and drive-in establishments of all types, shall be either contained within structures, or subject to the following:

D. Section 6.1.12.7 shall be amended as follows:

Parking and loading spaces other than those required for single,- ~~and~~ two-family **and three-family** dwellings shall be so arranged as not to permit backing of automobiles onto any street.

E. Section 7.2.8.1 shall be amended as follows:

Before an applicant may remove sand, gravel, minerals or other earth materials from a site under a permit granted by the Board of Appeals for that purpose, there must be in effect a performance **guarantee which may be in the form of a tripartite agreement, savings account or surety** bond **held by** ~~with~~ the City Treasurer of not less than $3,000 per acre to be excavated under the permit. The bond may not be terminated unless 30 days' written notice of intent to terminate has been given to the City Treasurer and to the Board of Appeals and Conservation Commission and the Board of Appeals has voted to release such **guarantee** ~~bond~~.

Fourth: The following is in relation to the requirements of Consolidated Permitting:

A. 10.1.3 **Other Approvals Required.**
Where authorization of a use of land or of a structure is required by the Board of Appeals or City Council, a copy of such written authorization shall be sent by the Clerk of the Board or Council to the Building Commissioner within 14 days of granting of approval and shall be received by the Building Commissioner prior to the issuance of a permit. **If an applicant for a building permit has applied for a Consolidated Local Permit under 225 CMR 29.00, a building permit shall not be issued unless the Consolidated Local Permit has been granted.** In addition, the Building Commissioner in such cases where the Board or Council has granted a limited or conditional zoning variance or special permit shall not issue a permit until the applicant submits an affidavit from the Essex County Registry of Deeds that such authorization of the Board or Council has been recorded. Furthermore, the Building Commissioner shall not issue a permit where approval by the Mayor, State Department of Natural Resources and the State Department of Public Works for the filling of wetlands; and/or a certificate of appropriateness from the Historic District Commission, if and when required; and/or a covenant or offer for

acceptance of open space, until these requirements are met in writing**, or if a Consolidated Local Permit under 225 CMR 29.00 has been denied**. Authorization for a permit shall be null and void if the applicant has not obtained his permit from the Building Commissioner after one year from the date of approval of his application by the City Council or the Board.

B. 10.1.4 **Development Review.**

1. In addition to plans and drawings required for submission under regulations of the Building Code or this chapter, all applications for building permits for 1) new construction of a single-family home, or 2) change of use in an existing structure, or 3) any new construction of a multifamily, commercial, or business structure, or 4) the development of three or more parking spaces, **or 5) small clean energy infrastructure or facilities subject to a Consolidated Local Permit and as defined under 225 CMR 29,00** shall be submitted to the Building Commissioner accompanied by evidence required by the City departments set forth below (the "City departments"). This process shall be called "development review." Approval shall be required, when applicable, from the following City departments:

a. Water and Sewer Departments.
b. Fire Chief.
c. Police Chief.
d. City Engineer.
e. Health Department.
f. Conservation Commission.
g. Planning Department

2. The purpose of this development review is to ensure, prior to issuance of a building permit, that the proposed development or site alterations will comply with the State Building Code, other state laws and regulations, this chapter (including the performance standards set forth in § **6.3**), and public safety standards. If, in the opinion of the relevant City departments, the work proposed deviates from the standards set forth above, the SPGA or the Building Commissioner may deny the application for a building permit or other work. Each City department shall conduct its review within 45 days and report to the applicant and the Building Commissioner in writing**, except for small clean energy infrastructure or facilities subject to a Consolidated Local Permit, which shall be subject to the processes under 225 CMR 29.00, including a pre-filing municipal meeting with the departments listed above, where applicable. The purpose of the pre-filing municipal meeting is for the Applicant and the City to:**

(a) Verify basic project and site information, including zoning information, known areas subject to state or local environmental laws, and any other areas, structures, or buildings of cultural or historical significance that could be impacted by the project;

(b) Identify to the best extent possible all needed decisions and permits from the Local Government;
(c) Identify, to the best extent possible, any applicable local bylaws and processes;
(d) Identify, to the best extent possible, any other potential permitting, design, or engineering obstacles or items of concern that might hinder the Applicant's ability to secure all needed decisions within the 12-month approval timeframe; and
(e) Discuss dates, times, and locations for an information session, if applicable.

Fifth:

A. Section 10.4.6 Lapse, shall be amended as follows:

Special permits shall lapse if a substantial use thereof or construction thereunder has not begun, except for good cause, within **36** ~~24~~ months following the filing of the special permit approval (plus such time required to pursue or await the determination of an appeal referred to in MGL c. 40A,§ 17, from the grant thereof) with the City Clerk.

B. Section 11.1 shall be amended by adding the following definition in the appropriate alphabetical order:

Performance Guarantee – a surety bond, saving account, tripartite agreement, covenant or other similar financial surety in an amount required by the provisions of this Ordinance.

Sixth:

A. Section 5.5.3 shall be amended as follows:

Alteration to a structure which encroaches upon one or more required yard or setback areas, where the alteration will comply with all current setback, yard, building coverage and building height requirements **or where there is either a horizontal or vertical extension along the same non-conforming side or rear setbacks or if there is an intensification of lot coverage**.

In the event that the Building Commissioner determines that the nonconforming nature of such structure would be increased by the proposed reconstruction, extension, alteration, or change, the Board of Appeals may, by special permit, allow such reconstruction, extension, alteration, or change where it determines that the proposed modification will not be substantially more detrimental than the existing nonconforming structure to the neighborhood.

B. Section 5.6 shall be amended as follows:

A nonconforming use or structure which has been abandoned, or not used for a period of ~~two~~ **four** years, shall lose its protected status and be subject to all of the provisions of this zoning by-law; provided, however, that such use or structure may be restored to its protected status by special permit from the City Council.

Seventh:

Section 11.1 Add the following new definition is alphabetical order:

Data Center: A physical facility or building use to house computer systems, servers, and associated components for storing, processing, and distributing digital information.

Eighth:

Appendix A, Table 1: Table of Use and Parking Regulations should be amended as set forth on the attached table:

255 Attachment 1

APPENDIX A
TABLE 1: TABLE OF USE AND PARKING REGULATIONS

[Amended 8-8-1972 by Doc. 197; 8-14-1973 by Doc. 188; 9-17-1974 by Doc. 210-C; 8-12-1975 by Doc. 160-C; 10-12-1976 by Doc. 135-C; 3-22-1977 by Doc. 8-C; 6-6-1978 by Doc. 103-C; 12-18-1979 by Doc. 270-C; 6-10-1980 by Doc. 89-C; 1-12-1982 by Doc. 206-C; 5-11-1982 by Doc. 94; 5-24-1983 by Doc. 65-B; 8-23-1983 by Doc. 56-E; 12-27-1983 by Doc. 184-C; 6-10-1992 by Doc. 52-C; 6-14-1994 by Doc. 59-B; 4-25-1995 by Doc. 48-B; 10-27-1998 by Doc. 128-B; 6-27-2000 by Doc. 79-L; 1-23-2001 by Doc. 137-B; 8-14-2001 by Doc. 97-CC; 8-26-2003 by Doc. 104-B; 4-27-2004 by Doc. 42-B; 2-8-2005 by Doc. 159-B; 3-22-2005 by Doc. 26-B;6-28-2005 by Doc. 81-B (as corrected 6-27-2006); 10-18-2005 by Doc. 137-B; 2-28-2006 by Doc. 19-BB; 6-10-2008 by Doc. 61-B; 3-9-2010 by Doc. 4-B; 8-10-2010 by Doc. 17-GGG; 6-11-2013 by Doc. 62-B; 8-25-2015 by Doc. 99-B; 1-30-2018 by Doc. 130-B; 3-12-2019 by Doc. 25; 3-12-2019 by Doc. 25-B; 11-10-2020 by Doc. 40-B; 5-10-2022 by Doc. 41-B; 3-18-2025 by Doc. 2-B; 3-18-2025 by Doc. 4-B; 3-18-2025 by Doc. 15-B]

Table of Abbreviations:
Y = Allowed
N = Prohibited
BA = Allowed with Special Permit by Board of Appeals
CC = Allowed with Special Permit by City Council

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
A. RESIDENTIAL USES															
1. One-family detached dwelling	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	A
2. Two-family dwelling	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	A
3. Three-family dwelling	N	N	N	N	CC	~~CC~~**Y**	N	N	CC	N	N	N	N	N	K
4. Multifamily dwelling	N	N	N	N	CC	CC	CC	N	CC	CC	N	N	S	N	K[3]
5. Flexible development	CC	CC	CC	CC	N	N	CC	N	N	N	N	N	N	N	A
6. Lodging, boarding, or rooming house	N	N	N	N	BA	BA	N	N	BA	BA	N	N	BA	N	A
7. Congregate care housing	CC	CC	CC	CC	CC	CC	N	N	N	N	CC	N	N	N	J
8. Fraternity or sorority housing, off campus	N	N	N	N	BA	BA	N	N	BA	N	N	N	N	N	A
9. Bed-and-breakfast establishment	N	CC	CC	CC	CC	CC	Y	Y	N	CC	N	N	N	N	L
10. Long-term care facility	N	CC	N	CC	CC	CC	N	CC	CC	CC	Y	N	CC	N	Q
11. Assisted living residence	N	CC	N	CC	CC	CC	N	CC	CC	CC	Y	N	CC	N	Q
12. Expansion of a residential dwelling to contain up to 6 dwelling units where no exterior structural changes are required	N	N	N	N	BA	A	N	N	BA	BA	N	N	N	N	A
13. Accessory dwelling unit	Y	Y	Y	Y	Y	Y	SP	SP	SP	SP	SP	SP	SP	SP	SP

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
B. COMMUNITY USES															
1. Museum	BA	BA	BA	BA	BA	BA	Y	Y	Y	Y	N	Y	Y	BA	D
2. Historical association or society	BA	BA	BA	BA	BA	Y	Y	Y	Y	Y	N	Y	Y	N	E
3. Use of land or structures for religious purposes on land owned or leased by a religious sect or denomination	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	H
4. Use of land or structures for educational purposes on land owned or leased by the Commonwealth or any of its agencies, subdivisions or bodies politic or by a religious sect or denomination or by a nonprofit educational corporation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	I,M
5. Child-care center	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	O,—
6. City governmental building, unless otherwise specified	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	E
7. City auditorium	N	N	N	N	BA	BA	N	Y	Y	Y	N	Y	Y	N	H
8. City equipment garage	BA	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	F
9. City or nonprofit cemetery, including crematorium therein	BA	Y	Y	Y	Y	Y	N	N	N	Y	N	N	N	N	None
10. City parking lot or structure	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
11. Essential services	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
12. Private utility, overhead transmission line (15 kilovolts or over), substation, transformer station or similar facility or building	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	N	BA	BA	BA	None
13. Power plant, sewage treatment plant, refuse facility and solid waste disposal facility as defined in MGL c. 16, s. 18, and assigned under the provisions of MGL c. 111, s. 150A	CC	CC	N	N	N	N	N	N	N	N	N	N	Y	Y	O
14. Hospital	BA	BA	N	N	BA	BA	N	N	BA	BA	Y	N	BA	CC	R
15. Psychiatric hospital or clinic	N	N	N	N	CC	CC	N	N	CC	CC	Y	CC	N	N	R
16. Privately operated detention center or jail	N	N	N	N	N	N	N	CC	N	CC	N	N	N	N	R,O
17. Drug or alcohol rehabilitation facility	N	N	N	N	CC	CC	N	N	CC	CC	Y	N	N	N	R
18. Safe injection facility	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
C. AGRICULTURAL USES															
1. Agriculture, exempt	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	None
2. Raising and keeping of livestock, horses and poultry, not including the raising of swine or fur animals for commercial use, nonexempt	BA	Y	Y	N	N	N	N	N	N	N	N	N	N	BA	None
3. Commercial stable, nonexempt	BA	Y	N	N	N	N	N	BA	N	N	N	N	N	N	D
4. Greenhouse or stand for wholesale and retail sale of agricultural or farm products raised primarily on the same premises, exempt	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	S
5. Greenhouse or stand for wholesale and retail sale of agricultural or farm products raised primarily on the same premises, nonexempt	Y	Y	Y	N	N	N	Y	Y	Y	N	N	N	N	N	S
6. Nursery, including outdoor storage, nonexempt	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	D

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
D. RECREATIONAL USES															
1. Indoor recreation facility operated by governmental unit	CC	CC	CC	CC	CC	Y	CC	Y	Y	Y	N	Y	CC	CC	F
2. Outdoor recreation facility operated by governmental unit	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
3. Golf course and associated clubhouse	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	B
4. Hunting club and/or target range (rifle, pistol, shotgun and/or bow), subject to the standards specified by the National Rifle Association	BA	BA	N	N	N	N	N	N	N	N	N	N	N	N	T
5. Tennis club, swim club and/or fishing club, outdoor except for accessory buildings	BA	BA	N	N	BA	BA	Y	Y	Y	Y	N	Y	N	N	T
6. Nonprofit day camp or other nonprofit camp	BA	BA	N	N	N	N	N	N	N	N	N	N	N	N	G
7. Noncommercial forestry and growing of all vegetation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
8. Recreational facility (indoor and operated for profit or nonprofit, including such items as stadium, race track, sports pavilion, etc.), unless otherwise specified	N	N	N	N	N	N	N	CC	CC	CC	N	CC	CC	CC	E
9. Health/fitness club (indoor athletic and exercise facility)	N	N	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	D

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
E. OFFICE USES															
1. Office, general or business	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	E
2. Bank and other financial institution	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	D
3. Office, professional	N	N	N	N	N	BA	Y	Y	Y	Y	N	Y	Y	Y	D,E
4. Office, medical or dental office or clinic	N	N	N	N	N	BA	Y	Y	Y	Y	Y	Y	Y	Y	C

F. RETAIL AND SERVICE USES	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
1. General retail and business, business and/or consumer service establishments, unless otherwise specified (See auto-oriented and/or bulk storage activities, and entertainment, eating and/or drinking establishments)	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	C
2. Retail use in excess of 50,000 square feet of gross floor area	N	N	N	N	N	N	CC	Y	CC	CC	N	N	N	N	C
3. Convenience retail	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	C,D
4. Personal service establishment	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	C
5. Health care services	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y	C
6. Heating and air conditioning, sales and installation	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	E
7. Antique sales	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	D
8. Furniture sales	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	D,—
9. Furniture, nonretail	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y	D
10. Landscaping and gardening equipment, retail sales (no outdoor storage)	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	D
11. Lumber and/or building materials sales	N	N	N	N	N	N	N	N	BA	BA	N	N	N	Y	Y	G
12. Miscellaneous business machines, computer and equipment repair service	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	BA	Y	E
13. Monument and tombstone sales	N	N	N	N	N	N	N	N	BA	BA	N	N	N	N	N	F
14. Sales by vending machine as principal use	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	U
15. Swimming pools and related equipment sales	N	N	N	N	N	N	N	N	Y	Y	N	N	N	BA	N	E
16. Body art establishment, subject to compliance with Board of Health Regulations	N	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	C

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
G. EATING, DRINKING, AND ENTERTAINMENT ESTABLISHMENTS															
1. Restaurant, coffee shop, diner, luncheonette, and sandwich shop, without drive-through	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	V
2. Restaurant, coffee shop, diner, luncheonette, and sandwich shop, with drive-through	N	N	N	N	N	N	N	Y	N	N	N	N	Y	N	W
3. Amusement facility and/or amusement park and/or amusement arcade (except in the CBD)	N	N	N	N	N	N	N	BA	BA	N	N	N	BA	BA	B
4. Cocktail lounge or bar, with no live entertainment and/or dancing *Special permit from BA required in Washington Street Historic District	N	N	N	N	N	N	BA	Y	Y	Y*	N	N	Y	N	V
5. Cocktail lounge or bar, with live entertainment and/or dancing	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	V
6. Cafeteria	N	N	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	V
7. Dairy bar, without drive-through	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	V
8. Dairy bar, with drive-through	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	W
9. Membership club, lodge or society	N	N	N	N	N	N	N	Y	Y	Y	N	N	CC	N	V
10. Motion picture or theatre establishment, indoor	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	V
11. Motion picture or theatre establishment, outdoor	N	N	N	N	N	N	N	Y	N	N	N	N	Y	N	None, Y
12. Pool hall	N	N	N	N	N	N	N	N	Y	Y	N	N	Y	N	D
13. Bowling alleys	N	N	N	N	N	N	N	Y	Y	Y	N	N	BA	N	X
14. Adult use (see § 7.9)	N	N	N	N	N	N	N	N	CC	N	N	N	CC	N	C

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
H. MOTOR VEHICLE AND MARINE RELATED USES															
1. Motor vehicle station (fuel/service station), not to include the sale of more than 1 vehicle at any one time	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	C
2. Motor vehicle body and paint shop (no outdoor storage of equipment or parts and not to include the sale of more than 1 vehicle at any one time)	N	N	N	N	N	N	N	Y	BA	BA	N	N	N	N	D
3. Motor vehicle dealer, new and/or used, sales and/or rentals, includes usual motor vehicle body and repair services	N	N	N	N	N	N	N	CC	CC	CC	N	N	CC	N	E
4. Motor vehicle garage (general repairs, no outdoor storage of equipment or parts and not to include the sale of more than 1 vehicle at any one time)	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	D
5. Motor vehicle supplies, parts and accessories, retail sales (no outdoor storage)	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	E
6. Motor vehicle wash	N	N	N	N	N	N	N	Y	Y	N	N	N	Y	N	F
7. Motorcycle sales and service	N	N	N	N	N	N	N	Y	BA	N	N	N	N	N	F
8. Mobile home and/or trailer sales and/or rental (not to be occupied on the site)	N	N	N	N	N	N	N	Y	BA	N	N	N	N	N	E
9. Truck sales or rental	N	N	N	N	N	N	N	Y	BA	N	N	N	N	N	F
10. Heavy equipment sales or rental	N	N	N	N	N	N	N	Y	BA	N	N	N	Y	Y	F
11. Boat marina and supply sales	CC	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	F

I. MISCELLANEOUS COMMERCIAL USES	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
1. Blueprinting, photostatting, or custom printing	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	E
2. Business machine and equipment repair service	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	E
3. Catering service	N	N	N	N	N	N	N	BA	BA	BA	N	N	Y	Y	F
4. Commercial parking lot or structures	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	N	None
5. Contractors	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	None
6. Delivery service and/or parcel post	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	E
7. Dry-cleaning and/or linen supply processing plant	N	N	N	N	N	N	N	BA	BA	N	N	N	Y	Y	D
8. Dry-cleaning pickup station	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	C
9. Dry-cleaning pickup station and processing facility not to exceed 4,000 square feet gross floor area	N	N	N	N	N	N	BA	BA	BA	BA	N	BA	BA	BA	C
10. Fuel distributor	N	N	N	N	N	N	N	Y	Y	N	N	N	Y	N	E
11. Fuel storage tanks (aboveground) for fuel distribution	N	N	N	N	N	N	N	BA	BA	N	N	N	BA	N	E
12. Funeral home or establishment	N	N	N	N	BA	BA	N	Y	Y	Y	N	N	N	N	D
13. Home-improvement contractor, cabinet maker, kitchen or bathroom equipment sales, electrical or plumbing shop (with no outdoor storage)	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	E
14. Home-improvement contractor, cabinet maker, kitchen or bathroom equipment sales, electrical or plumbing shop (with outdoor storage)	N	N	N	N	N	N	N	BA	BA	N	N	N	Y	N	E
15. Hotel or motel	N	N	N	N	N	N	N	CC	CC	CC	N	CC	CC	CC	J
16. Janitorial service firm	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	F .
17. Landscaping service company	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	E
18. Landscaping/snow plowing	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	None
19. Professional and/or business schools for profit (includes dance, music, art, other professional and/or business schools)	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	I
20. Trade school, for profit	N	N	N	N	N	N	N	N	N	N	Y	N	Y	Y	Y	I
21. Animal day clinic	N	N	N	N	N	N	N	N	BA	N	N	N	N	N	N	D

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
I. MISCELLANEOUS COMMERCIAL USES (cont'd)															
22. Kennel or veterinary hospital in which all animals, fowl or other forms of life are completely enclosed in pens or other structures	BA	BA	N	N	N	N	N	BA	N	N	N	N	N	N	D
23. Commercial communications and/or television tower, provided that it shall be at least 500 feet from any R District	BA	N	N	N	N	N	N	BA	BA	BA	N	BA	BA	BA	None
24. Mixed use	N	N	N	N	N	N	CC	CC	CC	CC	N	N	N	N	N

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
J. WHOLESALE, TRANSPORTATION, INDUSTRIAL USES															
1. Removal of sand, gravel, quarry or other raw material	N	CC	N	N	N	N	N	N	N	N	N	N	N	CC	O
2. Low level radioactive waste disposal and/or treatment facility	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
3. Processing and treating of raw materials, including operations appurtenant to the taking, grading, drying, sorting, crushing, grinding and milling operations	N	N	N	N	N	N	N	N	N	N	N	N	N	CC	O
4. Construction industry, including suppliers	N	N	N	N	N	N	N	BA	N	N	N	N	Y	Y	O
5. Manufacturing, assembling and/or processing of manufactured products	N	N	N	N	N	N	N	Y	N	BA	N	N	Y	Y	O
6. Laboratory for research and development work or establishment engaged in specialized manufacturing, and uses accessory thereto, provided that all activities shall be conducted within enclosed structures	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	O
7. Corporate headquarters or research center	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	O
8. Bakery plant	N	N	N	N	N	N	N	N	N	BA	N	N	Y	Y	O
9. Railroad yard and railway express service	N	N	N	N	N	N	N	N	N	Y	N	N	Y	Y	F
10. Truck terminal, motor freight terminal, warehousing	N	N	N	N	N	N	N	BA	N	N	N	N	Y	Y	O
11. Interstate truck terminal	N	N	N	N	N	N	N	N	N	N	N	N	N	BA	O
12. Bus or railroad passenger terminal	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	B
13. Airport or heliport	N	N	N	N	N	N	N	CC	CC	N	N	CC	CC	CC	B
14. Other transportation service	N	N	N	N	N	N	N	BA	BA	BA	N	BA	BA	N	B
15. Wholesale operation	N	N	N	N	N	N	N	Y	Y	Y	N	BA	Y	Y	F
16. Mini- or self-storage warehouse	N	N	N	N	N	N	N	BA	N	N	N	N	BA	BA	G

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
J. WHOLESALE, TRANSPORTATION, INDUSTRIAL USES (cont'd)															
17. Open storage of raw materials, furnished goods or construction equipment and structures for storing such equipment, provided that it shall be screened from outside view and all entrances shall have a solid gate at least 6 feet in height	N	N	N	N	N	N	N	N	N	N	N	N	BA	BA	None
18. Junkyard, provided that it is enclosed by a 6-foot masonry wall with solid gates and no repair or storage is carried on outside such wall	N	N	N	N	N	N	N	N	N	N	N	N	BA	N	Z
19. Hazardous waste treatment, disposal and/or storage facility as defined under Massachusetts Department of Environmental Quality Engineering (Protection) Hazardous Waste Regulations 310 CMR 30.00 et seq. shall not be permitted as a sole and principal use	N	N	N	N	N	N	N	N	N	N	N	N	N	N	—
20. Warehouse	N	N	N	N	N	N	N	BA	N	N	N	N	Y	Y	O
21. Data Center	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
K. ACCESSORY USES															
1. Accessory apartment	BA	BA	BA	BA	BA	BA	BA	N	N	N	N	N	N	N	J
2. Accessory dwelling unit in a commercial or industrial area for a caretaker or resident employee	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	None
3. Home occupation	BA	BA	BA	BA	BA	BA	Y	Y	Y	N	N	N	N	N	D
4. Family day-care home, small	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
5. Family day-care home, large	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~N~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	None
6. Adult day-care home	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	None
7. Accessory activities of corporate headquarters, research facility, office, utility company, printing operation, motor vehicle repair or service, but no outdoor storage	N	N	N	N	N	N	N	Y	Y	Y	N	Y	BA	Y	None
8. Accessory building such as a private garage, playhouse, greenhouse, toolshed or similar accessory structures, subject to provisions of Section 4.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	None
9. Accessory swimming pool, subject to provisions of Section 4.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	None
10. Accessory private garage for not more than 3 noncommercial motor vehicles and, except on a farm, not more than 2-ton rated or less in size commercial motor vehicle	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
11. Accessory storage of commercial vehicle, exceeding 24 feet in length or 2-ton rating	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	None
12. Accessory storage**, see section 3.2.2.2 a. and b. for limitations.** ~~of 1 trailer for/or 1 unregistered automobile or boat, provided such shall either be stored within a principal or accessory building or behind the building line within the side or rear yards and shall not be used for dwelling or sleeping purposes~~	~~N~~**Y**	~~N~~**Y**	~~N~~**Y**	~~N~~**Y**	~~N~~**Y**	~~N~~**Y**	Y	Y	Y	Y	Y	Y	Y	Y	None

K. ACCESSORY USES (cont'd)	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
13. A trailer or mobile home for each contractor or subcontractor for temporary use on a construction site subject to Section 3.2.2.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
14. Temporary mobile home subject to Section 3.2.2.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	J
15. Wall, fence or similar man-made enclosure without the use of barbed or razor wire, provided that it be:															
A. Not more than 6 feet in height	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	None
B. Not more than 10 feet in height, provided that nonresidential use shall limit such enclosures to not more than 6 feet in height except by special permit	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	None
16. Up to 3 lodgers or boarders in an existing dwelling, provided that the exterior of the structure is not altered	N	N	N	N	BA	BA	Y	Y	Y	Y	N	N	N	N	M
17. Accessory telephone answering service, provided that there is no exterior alteration that would serve to change the character of the structure and it does not occupy more than 25% of the gross floor area	BA	BA	BA	BA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
18. Accessory retail or wholesale business activity selling products produced in part or in whole on the premises, provided that such activity does not occupy more than 25% of the gross floor area	N	N	N	N	N	N	N	N	N	Y	N	BA	Y	Y	None
19. Accessory keeping of birds or animals as domestic pets, subject to approval by the Board of Health	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
20. Any accessory activities necessary in connection with scientific research or scientific development or related productions	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	Y	BA	BA	BA	None
21. (Reserved)															
22. Storage containers and structures,	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	None

subject to compliance with § 3.2.4															

Notes to Use Table

A. With the exception of Interstate Route 495, no automobile service station shall be built within a 500-foot radius of the property line of an already existing automobile service station. On Interstate Route 495, no automobile service station shall be built within 500 feet of the property line of an already existing automobile service station on the same side of the highway.

B. Trailers shall be prohibited in any district, except as provided for in this item.

C. Access from any R ~~or S~~ Zoning District to an existing roadway which must pass through or into any other R ~~or S~~ Zoning or through any C ~~or I~~ District is permitted.

D. Access from any ~~I or~~ C Zoning District to an existing roadway which must pass through or into any other ~~I or~~ C Zoning District is permitted.

E. Access from any ~~I or~~ C Zoning District to an existing roadway which must pass through an R ~~or S~~ Zoning District may be permitted by a special permit issued by the Board of Appeals.

F. Over three coin-operated machines, as defined in Chapter 104 of the Code, in any establishment other than bars, clubs and bowling alleys and skating rinks, constitute an amusement arcade (under the general category of amusement facility) allowed only in CH, CG, BG, and BP[1] Zones throughout the City (except for the central business district as defined below where arcades shall not be allowed) which requires a special permit from the Board of Appeals. The sale and/or consumption of alcoholic beverages shall be prohibited in all amusement arcades. For the purpose of this section, the central business district is defined as that area enclosed by the following boundaries: Starting at the point of intersection of Mill Street and Ginty Boulevard southerly along the project center line of Mill Street to the Merrimack River floodwall; thence westerly along the floodwall to its intersection with the B & M railway line; thence northerly along the railway line to its intersection with the projected center line of Granite Street; thence northeasterly along the center lines of Granite Street and Locust Street to Walnut Street; thence southwesterly along the center line of Walnut Street to Bailey Boulevard; thence easterly along the center lines of Bailey Boulevard and Ginty Boulevard to the point of origin.

G. Unless specifically exempted by the Building Inspector because of exceptional architectural design and/or site considerations, new single- and two-family structures shall be designed so that the principal facade, i.e., that facade containing the principal entrance (front door), shall be basically parallel to the front lot line.

H. Once a principal facade has been established for any structure or building, whether existing or new, the area between such facade and the adjacent street or public approach to the structure or building shall not be built upon or used for an unattached building or structure in excess of 10 feet in height. This shall apply to the RU and RH Zoning areas only.

I. For all mixed use buildings, parking shall be provided cumulatively for each use in the building.

Outlook

Thank you for placing your order with us.

From North of Boston <noreply@wave2adportal.com>
Date Mon 9/21/2026 9:56 AM
To CityClerk <cityclerk@haverhillma.gov>
Cc cmacdonald@northofboston.com <cmacdonald@northofboston.com>; Kaitlin Wright Esposito <kwright@haverhillma.gov>; Natalia Hernandez <NHernandez@HaverhillMa.gov>

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THANK YOU for your notice submission!

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Job Details

Order Number: W0147784
Business Type: All Other Public Notices
Notice Size: Public Notices
Notice Estimate: $57.69
Referral Code: Zoning Amend Chapter 255

Account Details

Haverhill Clerk
4 SUMMER ST STE 118
HAVERHILL, MA 01830
978-374-2312
cityclerk@cityofhaverhill.com
HAVERHILL CITY CLERK

Schedule for notice number W01477840

Thu Sep 24, 2026
Haverhill Gazette Public *All Zones*
Notices

CITY OF HAVERHILL
In Municipal Council
ORDERED:
Municipal Ordinance
Chapter 255 Zoning
An Ordinance Relating to Zoning to Amend Chapter 255 Zoning Ordinance and Appendix A Table 1: Table of Use and Parking Regulations
Since this Ordinance exceeds in length eight octavo pages of ordinary book print, in lieu of advertising, it is published by the City Council in a municipal bulletin, placed on file in the City Clerk's Office, and posted on the municipal bulletin in City Hall.
PLACED ON FILE for at least 10 days
Attest:
Kaitlin M. Wright Esposito, CMC, City Clerk
HG - Publication Dates

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Haverhill

Economic Development and Planning
Phone: 978-374-2330

OCT 15 PM12:58
HAVCITYCLERK

To: City Council

From: Jacki Byerley, AICP, Planning Director

Re: Amend Chapter 255 Zoning Ordinance and Appendix A Table 1: Table of Use and Parking Regulations

Date: October 15, 2026

At the regularly scheduled Planning Board meeting of October 14, 2026 the Planning Board voted to send a favorable recommendation of the attached Zoning Ordinance and Table amendments as drafted by the Planning Department, Building Commissioner and City Solicitor.

The proposed amendments are intended to clarify and update the Zoning Ordinance. The major revisions include:

- Administrative and Development Review: Updating references throughout the ordinance to the Planning Director or designee and clarifying responsibilities.
- Signs: Clarifying that an establishment may have a maximum of two wall signs, provided they are mounted on and face different sides of the building.
- Parking: Updating minimum parking-space dimensions, allowing a limited number of compact spaces and replacing the existing parking diagrams to reflect the 9x18 parking dimension. Along with clarifying parking and loading standards for five contiguous spaces and extending the exemption of backing into a street to a three-family dwelling.
- Residential Accessory Storage: Clarifying the requirements and limitations for the exterior storage of trailers, unregistered automobiles, campers and boats in residential districts.
- PDD Rezoning and Application Submissions: Removing fee amounts and applications submission requirements from the ordinance to reference the Council's application procedures.
- Performance Guarantees: Clarifying acceptable forms of performance guarantees.
- Consolidated Permitting: Updating the ordinance to address Consolidated Local Permits and small clean energy infrastructure, including the development review and pre-filing municipal meeting process.
- Special Permits: Extending the special permit lapse period to 36 months from 24 months.
- Nonconforming Structures and Uses: Clarifying provisions governing alterations to nonconforming structures and increasing the abandonment period for a nonconforming use or structure from two years to four years before protected status is lost.
- Definitions: Adding definitions for "Performance Guarantee" and "Data Center."

Appendix A – Table of Use and Parking Regulations

The proposed amendments also include several changes to Appendix A, Table 1 – Table of Use and Parking Regulations. These revisions are intended to make the table consistent with the proposed ordinance changes and clarify where certain uses are permitted.

Specifically, the table would:

- Add "Data Center" as a new use. The proposed table identifies the use as prohibited in all zoning districts establishing a clear zoning classification for this use.
- Revise the regulations for large family day-care homes, changing the current special-permit designation to allowed (Y) in the applicable districts.
- Update the accessory storage provisions in the table to correspond with the proposed revisions to Section 3.2.2.2, clarifying the treatment of trailers, unregistered automobiles, and boats as accessory storage.
- Make related corrections and updates to the use table so that the table reflects the terminology and requirements contained in the amended ordinance.
- Removing the special permit requirement for a three-family in the RU Zoning District.

The attached ordinance identifies the proposed revisions through strikeout for language to be removed and for new language to be bolded and underlined. The proposed Appendix A table is included as a separate attachment for ease of review.

AN ORDINANCE RELATING TO ZONING

BE IT ORDAINED by the City Council of the City of Haverhill that Chapter 255, Zoning, of the code of the City of Haverhill, as amended, being and is hereby further amended as follows (~~strike out~~ removed and **bold and underline** new)

First:

A. Section 8.3.7.5 first sentence shall be amended as follows:

Lottery or tenant selection agent. The applicant for an inclusionary development project shall engage a DHCD and City of Haverhill Office of Economic Development and **Planning** approved lottery agent for homeownership units who shall ensure affirmative marketing and compliance with income requirements as well as DHCD requirements for maximum housing purchase price for affordable housing units.

B. Section 8.3.9.4, second sentence shall be amended as follows:

No building permit shall be issued until an approved regulatory agreement is recorded at the Registry of Deeds and the Building Commissioner is notified by the **Planning** Director ~~of the Office of Economic Development and Planning~~ or **its** ~~his/her~~ **designee** ~~representative~~ that the project is progressing in a satisfactory manner in fulfilling its affordable housing requirement.

C. Section 8.3.10, first paragraph fourth sentence shall be amended as follows:

No building permit for an inclusionary development project shall be issued unless the ~~Director of the Office of Economic Development and Planning~~ **Planning Director or designee** has determined that the applicant's affirmative marketing plan satisfies these requirements.

D. Section 9.3.10.1 third sentence shall amended as follows:

The location and design of any pathways/walkways, open space, or parks shall be approved by the **Planning Director or its designee** ~~Economic Development Director~~ and in keeping with the City's rail trail design.

E. Section 9.3.12.1 second sentence shall be amended as follows:

The size and design of the park must be approved by the **Planning** ~~Economic Development~~ Director **or its designee.**

F. Section 9.3.12.2.b second sentence shall be amended as follows:

The size and design of the park must be approved by the **Planning** ~~Economic Development~~ Director **or its designee.**

G. Section 9.3.12.2.c third sentence shall be amended as follows:

The use must be approved by the **Planning** ~~Economic Development~~ Director **or its designee**.

H. Section 9.3.12.4 second sentence shall be amended as follows:

The area, location, and amenities included in the park must be approved by the **Planning** ~~Economic Development~~ Director **or its designee**.

I. Section 9.3.12 shall be amended as follows:

Any off-street parking required by this section in Sub-Zone E for any building or use may be included as part of any off-street parking area similarly required for another building or use on the same site only when the type of buildings or uses indicate that the usage of such parking area would not occur simultaneously, as determined by the **Planning** ~~Economic Development~~ Director **or its designee**.

J. Section 9.3.18.3.b.2.i shall be amended as follows:

Any other information which may include required traffic, school, and/or utilities impact study and in order to adequately evaluate the scope and potential impacts of the proposed project if deemed necessary by the **Planning** ~~Economic Development~~ Director **or its designee**.

K. Section 9.3.19.1.a second sentence shall be amended as follows:

The applicant shall also file 20 copies of the application and the other required submittals with the **Planning** ~~Economic Development~~ Director **or its designee** on behalf of the PAA.

L. Section 9.3.19.1.c shall be amended as follows:

An applicant for by-right (site plan review - minor) plan approval shall file the application and all required submittals with the **Planning** ~~Economic Development~~ Director **or its designee**.

M. Section 9.3.19.2.a shall be amended as follows:

Upon receipt of the application for special permit plan approval or by-right (site plan review - major) plan approval, the City Clerk shall immediately provide a copy of the application materials to the City Council, the Planning Board, the Board of Appeals, the Board of Health, the Conservation Commission, the Fire Department, the Police Department, the Building Commissioner, the Department of Public Works, the **Planning** ~~Economic Development~~ Department, and the Community Development Division. Furthermore, the ~~Economic~~ ~~Development~~ **Planning** Director or City Clerk may obtain comments pertaining to design from an architect if deemed necessary by the ~~Economic Development~~ **Planning** Director. Any such board, agency, or officer shall provide written comments within 60 days of its receipt of a copy of the plan and application for approval, or within 30 days of such receipt in the case of a preferred project. Furthermore, the **Planning** ~~Economic Development~~ **Director** shall determine within 10 days of receipt of either a by-right or special permit application whether the project described in the application constitutes a preferred project and shall inform the applicant of such.

N. Section 9.3.19.2.b shall be amended as follows

In the case of a by-right (site plan review - minor) plan approval, the Economic Development Director shall immediately provide a copy of the application materials to the Board of Health, the Conservation Commission, the Fire Department, the Police Department, the Building Commissioner, the Department of Public Works, the ~~Economic~~ ~~Development~~ **Planning** Department, and the Community Development Division. Furthermore, the **Planning** ~~Economic Development~~ Director or City Clerk may obtain comments pertaining to design from an architect if deemed necessary by the **Planning** ~~Economic Development~~ Director. The departments shall provide comment within 30 days or, in the case of a preferred project, within 15 days. Furthermore, the **Planning** ~~Economic Development~~ Director **or its designee** shall determine within 10 days of receipt of the application materials whether the project described in the application constitutes a preferred project and shall inform the applicant of such.

O. Section 9.3.21.1 shall be amended as follows:

Minor Change. After either by-right or special permit plan approval, an applicant may apply to make minor changes involving minor utility or building orientation adjustments, lighting or facade adjustments, or minor adjustments to parking, landscaping, or other site details that do not affect the overall massing, final build-out or building envelope of the site and do not materially affect the open space from that shown on the previously approved site plan and do not increase the number of dwelling units in the project in the aggregate form that was provided in the original plan approval. Plans showing such minor changes and an application must be submitted to the **Planning** ~~Economic Development~~ Director. The **Planning** ~~Economic Development~~ Director **or its designee** shall make a determination as to whether the changes constitute a minor change and may authorize such changes, in writing, to the applicant. The **Planning** ~~Economic Development~~ Director **or its designee** shall set forth any decision to approve or deny such minor changes, in writing,

within 30 days after the applicant has filed its application and shall provide a copy of its decision to the applicant for filing with the City Clerk.

P. Section 9.3.21.2 shall be amended as follows:

Major Change. Those changes deemed by the **Planning** ~~Economic Development~~ Director, **or its designee** to constitute a major change because of the nature of the change in relation to the prior approved plan or because such change cannot be appropriately characterized as a minor change as described above, shall be processed by the PAA as a new application for by-right (site plan review - major) approval or special permit plan approval pursuant to this article.

Second:

A. Section 6.2.7 Title shall be amended as follows:

Signs Permitted in Any R ~~or S~~ District.

B. Section 6.2.8.1

Wall Signs (Accessory). ~~One wall sign for each building frontage of each establishment shall be permitted.~~ **A maximum of two wall signs shall be permitted for each establishment, provided that the signs are mounted on and face different sides of the building (front, sides, or rear).** ~~Such~~ **Each** wall sign shall not exceed a maximum area of 40 square feet per building frontage in any CN District, or a maximum sign area of 120 square feet per building frontage in a CG District, or a maximum sign area of 120 square feet per building frontage in any CH District.

C. Section 6.2.9 Title shall be amended as follows:

Signs Permitted in Any ~~I~~ **B** District

D. Section 8.5.5.1 shall be amended as follows:

Submission Fee. The SPGA shall specify submission fees **in the application requirements as adopted from time to time and set forth in the application procedures and** ~~for a PDD District rezoning in~~ its rules and regulations. ~~In no case shall the fee be less than $850.~~ The required fee shall be submitted with the rezoning request and preliminary plan.

E. Section 8.5.6 shall be amended as follows:

All documents must be submitted to the SPGA **in accordance with the rules and regulations of the SPGA.** ~~no later than two business days prior to meetings at which the amendment will be considered. Fifteen copies shall be submitted. Documents shall also be made available electronically for access by the general public~~.

F. Section 9.3.19.1 shall be amended as follows:

1. Filing.

(a) An applicant for special permit plan approval or by-right (site plan review - major) shall file ~~30 copies of~~ the application and all required submittals, including notice of the date of filing, with the City Clerk on behalf of the PAA **in accordance with the Rules and Regulations of the SPGA**.

~~(b)~~ An applicant for by-right plan (site plan review - minor) approval shall file the application and all required submittals, including notice of the date of filing, with the City Clerk **in accordance with the Rules and Regulations of the SPGA**. ~~The applicant shall also file 20 copies of the application and the other required submittals with the Economic Development Director on behalf of the PAA.~~

(c) An applicant for by-right (site plan review - minor) plan approval shall file the application and all required submittals **in accordance with the Rules and Regulations of the SPGA** ~~with the Economic Development Director~~.

Third

A. Section 3.2.2.2 shall be amended as follows:

Trailer, Automobile, or Boat.

a. In any residential district accessory exterior the ~~Accessory~~ storage of **no more than of the following unregistered items;** one trailer, **or** one ~~unregistered~~ automobile ~~and/~~or one boat shall be allowed as per Table 1.

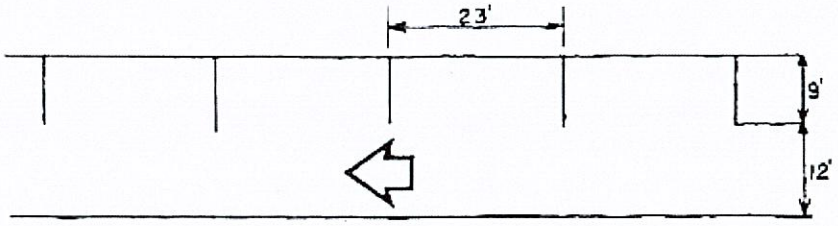
b. In any residential district accessory exterior storage of a camper or trailer or boat so long as not more than three of any combination of the foregoing shall be permitted .

B. Section 6.1.4 shall be amended as follows:

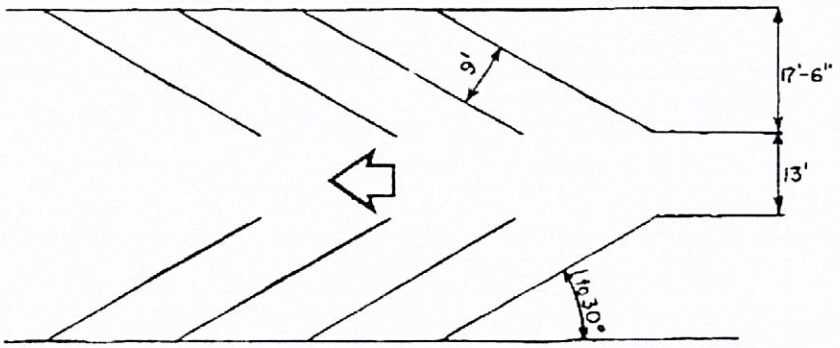
Off-street parking areas shall ~~be~~ **include standard spaces no smaller than 9 feet wide by 18 feet long and may include 10% of the total required spaces designed for compact cars no smaller than 8 feet wide by 16 feet long and further the spaces shall be** designed to comply with one or a combination of the following minimum standards.

And delete the existing diagrams numbered 1-5 and replace with the following:

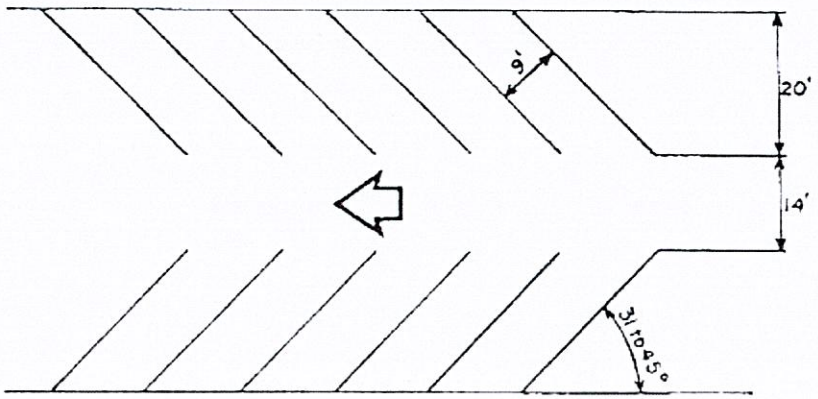
1. Parallel parking.



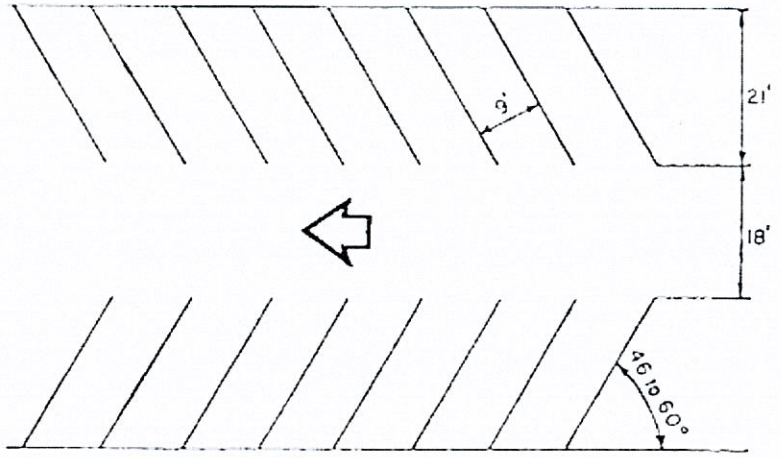
2. One- to thirty-degree angle parking.



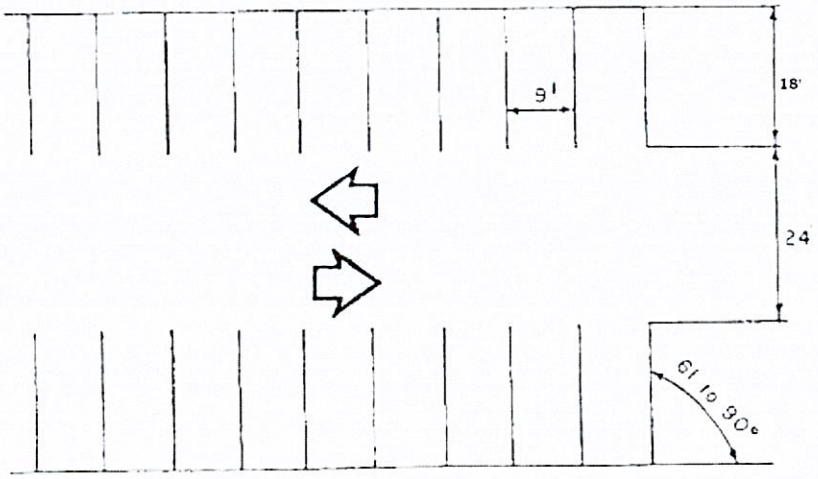
3. Thirty-one- to forty-five-degree angle parking.



4. Forty-six- to sixty-degree angle parking.



5. Sixty-one- to ninety-degree angle parking.



C. Section 6.1.16 first paragraph shall be amended as follows:

All parking and loading areas containing over five **contiguous** spaces, including automotive and drive-in establishments of all types, shall be either contained within structures, or subject to the following:

D. Section 6.1.12.7 shall be amended as follows:

Parking and loading spaces other than those required for single,- ~~and~~ two-family **and three-family** dwellings shall be so arranged as not to permit backing of automobiles onto any street.

E. Section 7.2.8.1 shall be amended as follows:

Before an applicant may remove sand, gravel, minerals or other earth materials from a site under a permit granted by the Board of Appeals for that purpose, there must be in effect a performance **guarantee which may be in the form of a tripartite agreement, savings account or surety** bond **held by** ~~with~~ the City Treasurer of not less than $3,000 per acre to be excavated under the permit. The bond may not be terminated unless 30 days' written notice of intent to terminate has been given to the City Treasurer and to the Board of Appeals and Conservation Commission and the Board of Appeals has voted to release such **guarantee** ~~bond~~.

Fourth: The following is in relation to the requirements of Consolidated Permitting:

A. 10.1.3 **Other Approvals Required.**
Where authorization of a use of land or of a structure is required by the Board of Appeals or City Council, a copy of such written authorization shall be sent by the Clerk of the Board or Council to the Building Commissioner within 14 days of granting of approval and shall be received by the Building Commissioner prior to the issuance of a permit. **If an applicant for a building permit has applied for a Consolidated Local Permit under 225 CMR 29.00, a building permit shall not be issued unless the Consolidated Local Permit has been granted.** In addition, the Building Commissioner in such cases where the Board or Council has granted a limited or conditional zoning variance or special permit shall not issue a permit until the applicant submits an affidavit from the Essex County Registry of Deeds that such authorization of the Board or Council has been recorded. Furthermore, the Building Commissioner shall not issue a permit where approval by the Mayor, State Department of Natural Resources and the State Department of Public Works for the filling of wetlands; and/or a certificate of appropriateness from the Historic District Commission, if and when required; and/or a covenant or offer for

acceptance of open space, until these requirements are met in writing**, or if a Consolidated Local Permit under 225 CMR 29.00 has been denied**. Authorization for a permit shall be null and void if the applicant has not obtained his permit from the Building Commissioner after one year from the date of approval of his application by the City Council or the Board.

B. 10.1.4 **Development Review.**

1. In addition to plans and drawings required for submission under regulations of the Building Code or this chapter, all applications for building permits for 1) new construction of a single-family home, or 2) change of use in an existing structure, or 3) any new construction of a multifamily, commercial, or business structure, or 4) the development of three or more parking spaces, **or 5) small clean energy infrastructure or facilities subject to a Consolidated Local Permit and as defined under 225 CMR 29,00** shall be submitted to the Building Commissioner accompanied by evidence required by the City departments set forth below (the "City departments"). This process shall be called "development review." Approval shall be required, when applicable, from the following City departments:

a. Water and Sewer Departments.
b. Fire Chief.
c. Police Chief.
d. City Engineer.
e. Health Department.
f. Conservation Commission.
g. Planning Department

2. The purpose of this development review is to ensure, prior to issuance of a building permit, that the proposed development or site alterations will comply with the State Building Code, other state laws and regulations, this chapter (including the performance standards set forth in § **6.3**), and public safety standards. If, in the opinion of the relevant City departments, the work proposed deviates from the standards set forth above, the SPGA or the Building Commissioner may deny the application for a building permit or other work. Each City department shall conduct its review within 45 days and report to the applicant and the Building Commissioner in writing**, except for small clean energy infrastructure or facilities subject to a Consolidated Local Permit, which shall be subject to the processes under 225 CMR 29.00, including a pre-filing municipal meeting with the departments listed above, where applicable. The purpose of the pre-filing municipal meeting is for the Applicant and the City to:**

(a) Verify basic project and site information, including zoning information, known areas subject to state or local environmental laws, and any other areas, structures, or buildings of cultural or historical significance that could be impacted by the project;

(b) Identify to the best extent possible all needed decisions and permits from the Local Government;
(c) Identify, to the best extent possible, any applicable local bylaws and processes;
(d) Identify, to the best extent possible, any other potential permitting, design, or engineering obstacles or items of concern that might hinder the Applicant's ability to secure all needed decisions within the 12-month approval timeframe; and
(e) Discuss dates, times, and locations for an information session, if applicable.

Fifth:

A. Section 10.4.6 Lapse, shall be amended as follows:

Special permits shall lapse if a substantial use thereof or construction thereunder has not begun, except for good cause, within **36** ~~24~~ months following the filing of the special permit approval (plus such time required to pursue or await the determination of an appeal referred to in MGL c. 40A,§ 17, from the grant thereof) with the City Clerk.

B. Section 11.1 shall be amended by adding the following definition in the appropriate alphabetical order:

Performance Guarantee – a surety bond, saving account, tripartite agreement, covenant or other similar financial surety in an amount required by the provisions of this Ordinance.

Sixth:

A. Section 5.5.3 shall be amended as follows:

Alteration to a structure which encroaches upon one or more required yard or setback areas, where the alteration will comply with all current setback, yard, building coverage and building height requirements **or where there is either a horizontal or vertical extension along the same non-conforming side or rear setbacks or if there is an intensification of lot coverage**.

In the event that the Building Commissioner determines that the nonconforming nature of such structure would be increased by the proposed reconstruction, extension, alteration, or change, the Board of Appeals may, by special permit, allow such reconstruction, extension, alteration, or change where it determines that the proposed modification will not be substantially more detrimental than the existing nonconforming structure to the neighborhood.

B. Section 5.6 shall be amended as follows:

A nonconforming use or structure which has been abandoned, or not used for a period of ~~two~~ **four** years, shall lose its protected status and be subject to all of the provisions of this zoning by-law; provided, however, that such use or structure may be restored to its protected status by special permit from the City Council.

Seventh:

Section 11.1 Add the following new definition is alphabetical order:

Data Center: A physical facility or building use to house computer systems, servers, and associated components for storing, processing, and distributing digital information.

Eighth:

Appendix A, Table 1: Table of Use and Parking Regulations should be amended as set forth on the attached table:

255 Attachment 1

APPENDIX A
TABLE 1: TABLE OF USE AND PARKING REGULATIONS

[Amended 8-8-1972 by Doc. 197; 8-14-1973 by Doc. 188; 9-17-1974 by Doc. 210-C; 8-12-1975 by Doc. 160-C; 10-12-1976 by Doc. 135-C; 3-22-1977 by Doc. 8-C; 6-6-1978 by Doc. 103-C; 12-18-1979 by Doc. 270-C; 6-10-1980 by Doc. 89-C; 1-12-1982 by Doc. 206-C; 5-11-1982 by Doc. 94; 5-24-1983 by Doc. 65-B; 8-23-1983 by Doc. 56-E; 12-27-1983 by Doc. 184-C; 6-10-1992 by Doc. 52-C; 6-14-1994 by Doc. 59-B; 4-25-1995 by Doc. 48-B; 10-27-1998 by Doc. 128-B; 6-27-2000 by Doc. 79-L; 1-23-2001 by Doc. 137-B; 8-14-2001 by Doc. 97-CC; 8-26-2003 by Doc. 104-B; 4-27-2004 by Doc. 42-B; 2-8-2005 by Doc. 159-B; 3-22-2005 by Doc. 26-B;6-28-2005 by Doc. 81-B (as corrected 6-27-2006); 10-18-2005 by Doc. 137-B; 2-28-2006 by Doc. 19-BB; 6-10-2008 by Doc. 61-B; 3-9-2010 by Doc. 4-B; 8-10-2010 by Doc. 17-GGG; 6-11-2013 by Doc. 62-B; 8-25-2015 by Doc. 99-B; 1-30-2018 by Doc. 130-B; 3-12-2019 by Doc. 25; 3-12-2019 by Doc. 25-B; 11-10-2020 by Doc. 40-B; 5-10-2022 by Doc. 41-B; 3-18-2025 by Doc. 2-B; 3-18-2025 by Doc. 4-B; 3-18-2025 by Doc. 15-B]

Table of Abbreviations:
Y = Allowed
N = Prohibited
BA = Allowed with Special Permit by Board of Appeals
CC = Allowed with Special Permit by City Council

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
A. RESIDENTIAL USES															
1. One-family detached dwelling	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	A
2. Two-family dwelling	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	A
3. Three-family dwelling	N	N	N	N	CC	~~CC~~Y	N	N	CC	N	N	N	N	N	K
4. Multifamily dwelling	N	N	N	N	CC	CC	CC	N	CC	CC	N	N	S	N	K[3]
5. Flexible development	CC	CC	CC	CC	N	N	CC	N	N	N	N	N	N	N	A
6. Lodging, boarding, or rooming house	N	N	N	N	BA	BA	N	N	BA	BA	N	N	BA	N	A
7. Congregate care housing	CC	CC	CC	CC	CC	CC	N	N	N	N	CC	N	N	N	J
8. Fraternity or sorority housing, off campus	N	N	N	N	BA	BA	N	N	BA	N	N	N	N	N	A
9. Bed-and-breakfast establishment	N	CC	CC	CC	CC	CC	Y	Y	N	CC	N	N	N	N	L
10. Long-term care facility	N	CC	N	CC	CC	CC	N	CC	CC	CC	Y	N	CC	N	Q
11. Assisted living residence	N	CC	N	CC	CC	CC	N	CC	CC	CC	Y	N	CC	N	Q
12. Expansion of a residential dwelling to contain up to 6 dwelling units where no exterior structural changes are required	N	N	N	N	BA	A	N	N	BA	BA	N	N	N	N	A
13. Accessory dwelling unit	Y	Y	Y	Y	Y	Y	SP	SP	SP	SP	SP	SP	SP	SP	SP

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
B. COMMUNITY USES															
1. Museum	BA	BA	BA	BA	BA	BA	Y	Y	Y	Y	N	Y	Y	BA	D
2. Historical association or society	BA	BA	BA	BA	BA	Y	Y	Y	Y	Y	N	Y	Y	N	E
3. Use of land or structures for religious purposes on land owned or leased by a religious sect or denomination	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	H
4. Use of land or structures for educational purposes on land owned or leased by the Commonwealth or any of its agencies, subdivisions or bodies politic or by a religious sect or denomination or by a nonprofit educational corporation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	I,M
5. Child-care center	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	O,—
6. City governmental building, unless otherwise specified	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	E
7. City auditorium	N	N	N	N	BA	BA	N	Y	Y	Y	N	Y	Y	N	H
8. City equipment garage	BA	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	F
9. City or nonprofit cemetery, including crematorium therein	BA	Y	Y	Y	Y	Y	N	N	N	Y	N	N	N	N	None
10. City parking lot or structure	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
11. Essential services	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
12. Private utility, overhead transmission line (15 kilovolts or over), substation, transformer station or similar facility or building	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	N	BA	BA	BA	None
13. Power plant, sewage treatment plant, refuse facility and solid waste disposal facility as defined in MGL c. 16, s. 18, and assigned under the provisions of MGL c. 111, s. 150A	CC	CC	N	N	N	N	N	N	N	N	N	N	Y	Y	O
14. Hospital	BA	BA	N	N	BA	BA	N	N	BA	BA	Y	N	BA	CC	R
15. Psychiatric hospital or clinic	N	N	N	N	CC	CC	N	N	CC	CC	Y	CC	N	N	R
16. Privately operated detention center or jail	N	N	N	N	N	N	N	CC	N	CC	N	N	N	N	R,O
17. Drug or alcohol rehabilitation facility	N	N	N	N	CC	CC	N	N	CC	CC	Y	N	N	N	R
18. Safe injection facility	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
C. AGRICULTURAL USES															
1. Agriculture, exempt	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	None
2. Raising and keeping of livestock, horses and poultry, not including the raising of swine or fur animals for commercial use, nonexempt	BA	Y	Y	N	N	N	N	N	N	N	N	N	N	BA	None
3. Commercial stable, nonexempt	BA	Y	N	N	N	N	N	BA	N	N	N	N	N	N	D
4. Greenhouse or stand for wholesale and retail sale of agricultural or farm products raised primarily on the same premises, exempt	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	S
5. Greenhouse or stand for wholesale and retail sale of agricultural or farm products raised primarily on the same premises, nonexempt	Y	Y	Y	N	N	N	Y	Y	Y	N	N	N	N	N	S
6. Nursery, including outdoor storage, nonexempt	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	D

D. RECREATIONAL USES	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
1. Indoor recreation facility operated by governmental unit	CC	CC	CC	CC	CC	Y	CC	Y	Y	Y	N	Y	CC	CC	F
2. Outdoor recreation facility operated by governmental unit	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
3. Golf course and associated clubhouse	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	B
4. Hunting club and/or target range (rifle, pistol, shotgun and/or bow), subject to the standards specified by the National Rifle Association	BA	BA	N	N	N	N	N	N	N	N	N	N	N	N	T
5. Tennis club, swim club and/or fishing club, outdoor except for accessory buildings	BA	BA	N	N	BA	BA	Y	Y	Y	Y	N	Y	N	N	T
6. Nonprofit day camp or other nonprofit camp	BA	BA	N	N	N	N	N	N	N	N	N	N	N	N	G
7. Noncommercial forestry and growing of all vegetation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
8. Recreational facility (indoor and operated for profit or nonprofit, including such items as stadium, race track, sports pavilion, etc.), unless otherwise specified	N	N	N	N	N	N	N	CC	CC	CC	N	CC	CC	CC	E
9. Health/fitness club (indoor athletic and exercise facility)	N	N	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	D

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
E. OFFICE USES															
1. Office, general or business	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	E
2. Bank and other financial institution	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	D
3. Office, professional	N	N	N	N	N	BA	Y	Y	Y	Y	N	Y	Y	Y	D,E
4. Office, medical or dental office or clinic	N	N	N	N	N	BA	Y	Y	Y	Y	Y	Y	Y	Y	C

F. RETAIL AND SERVICE USES	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
1. General retail and business, business and/or consumer service establishments, unless otherwise specified (See auto-oriented and/or bulk storage activities, and entertainment, eating and/or drinking establishments)	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	C
2. Retail use in excess of 50,000 square feet of gross floor area	N	N	N	N	N	N	CC	Y	CC	CC	N	N	N	N	C
3. Convenience retail	N	N	N	N	N	N	Y	Y	Y	Y	Y	N	N	Y	C,D
4. Personal service establishment	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	C
5. Health care services	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y	C
6. Heating and air conditioning, sales and installation	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	E
7. Antique sales	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	D
8. Furniture sales	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	D,—
9. Furniture, nonretail	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	D
10. Landscaping and gardening equipment, retail sales (no outdoor storage)	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	D
11. Lumber and/or building materials sales	N	N	N	N	N	N	N	BA	BA	N	N	N	Y	Y	G
12. Miscellaneous business machines, computer and equipment repair service	N	N	N	N	N	N	N	Y	Y	Y	N	N	BA	Y	E
13. Monument and tombstone sales	N	N	N	N	N	N	N	BA	BA	N	N	N	N	N	F
14. Sales by vending machine as principal use	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	U
15. Swimming pools and related equipment sales	N	N	N	N	N	N	N	Y	Y	N	N	N	BA	N	E
16. Body art establishment, subject to compliance with Board of Health Regulations	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	C

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
G. EATING, DRINKING, AND ENTERTAINMENT ESTABLISHMENTS															
1. Restaurant, coffee shop, diner, luncheonette, and sandwich shop, without drive-through	N	N	N	N	N	N	Y	Y	Y	Y	N	N	Y	N	V
2. Restaurant, coffee shop, diner, luncheonette, and sandwich shop, with drive-through	N	N	N	N	N	N	N	Y	N	N	N	N	Y	N	W
3. Amusement facility and/or amusement park and/or amusement arcade (except in the CBD)	N	N	N	N	N	N	N	BA	BA	N	N	N	BA	BA	B
4. Cocktail lounge or bar, with no live entertainment and/or dancing *Special permit from BA required in Washington Street Historic District	N	N	N	N	N	N	BA	Y	Y	Y*	N	N	Y	N	V
5. Cocktail lounge or bar, with live entertainment and/or dancing	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	V
6. Cafeteria	N	N	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	V
7. Dairy bar, without drive-through	N	N	N	N	N	N	Y	Y	Y	Y	Y	N	N	N	W
8. Dairy bar, with drive-through	N	N	N	N	N	N	N	Y	N	N	N	N	CC	N	V
9. Membership club, lodge or society	N	N	N	N	N	N	N	Y	Y	Y	Y	N	N	N	V
10. Motion picture or theatre establishment, indoor	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	None, Y
11. Motion picture or theatre establishment, outdoor	N	N	N	N	N	N	N	Y	N	N	N	N	Y	N	D
12. Pool hall	N	N	N	N	N	N	N	Y	Y	Y	N	N	BA	N	X
13. Bowling alleys	N	N	N	N	N	N	N	N	CC	N	N	N	CC	N	C
14. Adult use (see § 7.9)															

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
II. MOTOR VEHICLE AND MARINE RELATED USES															
1. Motor vehicle station (fuel/service station), not to include the sale of more than 1 vehicle at any one time	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	C
2. Motor vehicle body and paint shop (no outdoor storage of equipment or parts and not to include the sale of more than 1 vehicle at any one time)	N	N	N	N	N	N	N	Y	BA	BA	N	N	N	N	D
3. Motor vehicle dealer, new and/or used, sales and/or rentals, includes usual motor vehicle body and repair services	N	N	N	N	N	N	N	CC	CC	CC	N	N	CC	N	E
4. Motor vehicle garage (general repairs, no outdoor storage of equipment or parts and not to include the sale of more than 1 vehicle at any one time)	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	D
5. Motor vehicle supplies, parts and accessories, retail sales (no outdoor storage)	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	E
6. Motor vehicle wash	N	N	N	N	N	N	N	Y	BA	N	N	N	N	N	F
7. Motorcycle sales and service	N	N	N	N	N	N	N	Y	BA	N	N	N	N	N	F
8. Mobile home and/or trailer sales and/or rental (not to be occupied on the site)	N	N	N	N	N	N	N	Y	BA	N	N	N	N	N	E
9. Truck sales or rental	N	N	N	N	N	N	N	Y	BA	N	N	N	N	N	F
10. Heavy equipment sales or rental	N	N	N	N	N	N	N	Y	BA	N	N	N	Y	Y	F
11. Boat marina and supply sales	CC	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	F

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
I. MISCELLANEOUS COMMERCIAL USES															
1. Blueprinting, photostatting, or custom printing	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	E
2. Business machine and equipment repair service	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	E
3. Catering service	N	N	N	N	N	N	N	BA	BA	BA	N	N	Y	Y	F
4. Commercial parking lot or structures	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	N	None
5. Contractors	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	None
6. Delivery service and/or parcel post	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	E
7. Dry-cleaning and/or linen supply processing plant	N	N	N	N	N	N	N	BA	BA	N	N	N	Y	Y	D
8. Dry-cleaning pickup station	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	C
9. Dry-cleaning pickup station and processing facility not to exceed 4,000 square feet gross floor area	N	N	N	N	N	N	BA	BA	BA	BA	N	BA	BA	BA	C
10. Fuel distributor	N	N	N	N	N	N	N	Y	Y	N	N	N	Y	N	E
11. Fuel storage tanks (aboveground) for fuel distribution	N	N	N	N	N	N	N	BA	BA	N	N	N	BA	N	E
12. Funeral home or establishment	N	N	N	N	BA	BA	N	Y	Y	Y	N	N	N	N	D
13. Home-improvement contractor, cabinet maker, kitchen or bathroom equipment sales, electrical or plumbing shop (with no outdoor storage)	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	E
14. Home-improvement contractor, cabinet maker, kitchen or bathroom equipment sales, electrical or plumbing shop (with outdoor storage)	N	N	N	N	N	N	N	BA	BA	N	N	N	Y	N	E
15. Hotel or motel	N	N	N	N	N	N	N	CC	CC	CC	N	CC	CC	CC	J
16. Janitorial service firm	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	F
17. Landscaping service company	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	E
18. Landscaping/snow plowing	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	None
19. Professional and/or business schools for profit (includes dance, music, art, other professional and/or business schools)	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	I
20. Trade school, for profit	N	N	N	N	N	N	N	N	N	Y	N	Y	Y	Y	I
21. Animal day clinic	N	N	N	N	N	N	N	BA	N	N	N	N	N	N	D

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
I. MISCELLANEOUS COMMERCIAL USES (cont'd)															
22. Kennel or veterinary hospital in which all animals, fowl or other forms of life are completely enclosed in pens or other structures	BA	BA	N	N	N	N	N	BA	N	N	N	N	N	N	D
23. Commercial communications and/or television tower, provided that it shall be at least 500 feet from any R District	BA	N	N	N	N	N	N	BA	BA	BA	N	BA	BA	BA	None
24. Mixed use	N	N	N	N	N	N	CC	CC	CC	CC	N	N	N	N	N

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
J. WHOLESALE, TRANSPORTATION, INDUSTRIAL USES															
1. Removal of sand, gravel, quarry or other raw material	N	CC	N	N	N	N	N	N	N	N	N	N	N	CC	O
2. Low level radioactive waste disposal and/or treatment facility	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
3. Processing and treating of raw materials, including operations appurtenant to the taking, grading, drying, sorting, crushing, grinding and milling operations	N	N	N	N	N	N	N	N	N	N	N	N	N	CC	O
4. Construction industry, including suppliers	N	N	N	N	N	N	N	BA	N	N	N	N	Y	Y	O
5. Manufacturing, assembling and/or processing of manufactured products	N	N	N	N	N	N	N	Y	N	BA	N	N	Y	Y	O
6. Laboratory for research and development work or establishment engaged in specialized manufacturing, and uses accessory thereto, provided that all activities shall be conducted within enclosed structures	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	O
7. Corporate headquarters or research center	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	O
8. Bakery plant	N	N	N	N	N	N	N	N	N	BA	N	N	Y	Y	O
9. Railroad yard and railway express service	N	N	N	N	N	N	N	N	N	Y	N	N	Y	Y	F
10. Truck terminal, motor freight terminal, warehousing	N	N	N	N	N	N	N	BA	N	N	N	N	Y	Y	O
11. Interstate truck terminal	N	N	N	N	N	N	N	N	N	N	N	N	N	BA	O
12. Bus or railroad passenger terminal	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	B
13. Airport or heliport	N	N	N	N	N	N	N	CC	CC	N	N	CC	CC	CC	B
14. Other transportation service	N	N	N	N	N	N	N	BA	BA	BA	N	BA	BA	N	B
15. Wholesale operation	N	N	N	N	N	N	N	Y	Y	Y	N	BA	Y	Y	F
16. Mini- or self-storage warehouse	N	N	N	N	N	N	N	BA	N	N	N	N	BA	BA	G

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
J. WHOLESALE, TRANSPORTATION, INDUSTRIAL USES (cont'd)															
17. Open storage of raw materials, furnished goods or construction equipment and structures for storing such equipment, provided that it shall be screened from outside view and all entrances shall have a solid gate at least 6 feet in height	N	N	N	N	N	N	N	N	N	N	N	N	BA	BA	None
18. Junkyard, provided that it is enclosed by a 6-foot masonry wall with solid gates and no repair or storage is carried on outside such wall	N	N	N	N	N	N	N	N	N	N	N	N	BA	N	Z
19. Hazardous waste treatment, disposal and/or storage facility as defined under Massachusetts Department of Environmental Quality Engineering (Protection) Hazardous Waste Regulations 310 CMR 30.00 et seq. shall not be permitted as a sole and principal use	N	N	N	N	N	N	N	N	N	N	N	N	N	N	—
20. Warehouse	N	N	N	N	N	N	N	BA	N	N	N	N	Y	Y	O
21. Data Center	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
K. ACCESSORY USES															
1. Accessory apartment	BA	BA	BA	BA	BA	BA	BA	N	N	N	N	N	N	N	J
2. Accessory dwelling unit in a commercial or industrial area for a caretaker or resident employee	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	None
3. Home occupation	BA	BA	BA	BA	BA	BA	Y	Y	Y	N	N	N	N	N	D
4. Family day-care home, small	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
5. Family day-care home, large	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~N~~**Y**	~~BA~~**Y**	~~BA~~**Y**	~~BA~~**Y**	None
6. Adult day-care home	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	None
7. Accessory activities of corporate headquarters, research facility, office, utility company, printing operation, motor vehicle repair or service, but no outdoor storage	N	N	N	N	N	N	N	Y	Y	Y	N	Y	BA	Y	None
8. Accessory building such as a private garage, playhouse, greenhouse, toolshed or similar accessory structures, subject to provisions of Section 4.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	None
9. Accessory swimming pool, subject to provisions of Section 4.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	None
10. Accessory private garage for not more than 3 noncommercial motor vehicles and, except on a farm, not more than 2-ton rated or less in size commercial motor vehicle	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
11. Accessory storage of commercial vehicle, exceeding 24 feet in length or 2-ton rating	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	None
12. Accessory storage**, see section 3.2.2.2 a. and b. for limitations.** ~~of 1 trailer for/or 1 unregistered automobile or boat, provided such shall either be stored within a principal or accessory building or behind the building line within the side or rear yards and shall not be used for dwelling or sleeping purposes~~	~~N~~**Y**	~~N~~**Y**	~~N~~**Y**	~~N~~**Y**	~~N~~**Y**	~~N~~**Y**	Y	Y	Y	Y	Y	Y	Y	Y	None

	RS	RR	RL	RM	RH	RU	CN	CH	CG	CC	CM	OP	BG	BP	PC
K. ACCESSORY USES (cont'd)															
13. A trailer or mobile home for each contractor or subcontractor for temporary use on a construction site subject to Section 3.2.2.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
14. Temporary mobile home subject to Section 3.2.2.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	J
15. Wall, fence or similar man-made enclosure without the use of barbed or razor wire, provided that it be:															
A. Not more than 6 feet in height	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	None
B. Not more than 10 feet in height, provided that nonresidential use shall limit such enclosures to not more than 6 feet in height except by special permit	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	None
16. Up to 3 lodgers or boarders in an existing dwelling, provided that the exterior of the structure is not altered	N	N	N	N	BA	BA	Y	Y	Y	Y	N	N	N	N	M
17. Accessory telephone answering service, provided that there is no exterior alteration that would serve to change the character of the structure and it does not occupy more than 25% of the gross floor area	BA	BA	BA	BA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
18. Accessory retail or wholesale business activity selling products produced in part or in whole on the premises, provided that such activity does not occupy more than 25% of the gross floor area	N	N	N	N	N	N	N	N	N	Y	N	BA	Y	Y	None
19. Accessory keeping of birds or animals as domestic pets, subject to approval by the Board of Health	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	None
20. Any accessory activities necessary in connection with scientific research or scientific development or related productions	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	Y	BA	BA	BA	None
21. (Reserved)															
22. Storage containers and structures,	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	None

subject to compliance with § 3.2.4															

Notes to Use Table

A. With the exception of Interstate Route 495, no automobile service station shall be built within a 500-foot radius of the property line of an already existing automobile service station. On Interstate Route 495, no automobile service station shall be built within 500 feet of the property line of an already existing automobile service station on the same side of the highway.

B. Trailers shall be prohibited in any district, except as provided for in this item.

C. Access from any R ~~or S~~ Zoning District to an existing roadway which must pass through or into any other R ~~or S~~ Zoning or through any C ~~or I~~ District is permitted.

D. Access from any ~~I or~~ C Zoning District to an existing roadway which must pass through or into any other ~~I or~~ C Zoning District is permitted.

E. Access from any ~~I or~~ C Zoning District to an existing roadway which must pass through an R ~~or S~~ Zoning District may be permitted by a special permit issued by the Board of Appeals.

F. Over three coin-operated machines, as defined in Chapter 104 of the Code, in any establishment other than bars, clubs and bowling alleys and skating rinks, constitute an amusement arcade (under the general category of amusement facility) allowed only in CH, CG, BG, and BP[1] Zones throughout the City (except for the central business district as defined below where arcades shall not be allowed) which requires a special permit from the Board of Appeals. The sale and/or consumption of alcoholic beverages shall be prohibited in all amusement arcades. For the purpose of this section, the central business district is defined as that area enclosed by the following boundaries: Starting at the point of intersection of Mill Street and Ginty Boulevard southerly along the project center line of Mill Street to the Merrimack River floodwall; thence westerly along the floodwall to its intersection with the B & M railway line; thence northerly along the railway line to its intersection with the projected center line of Granite Street; thence northeasterly along the center lines of Granite Street and Locust Street to Walnut Street; thence southwesterly along the center line of Walnut Street to Bailey Boulevard; thence easterly along the center lines of Bailey Boulevard and Ginty Boulevard to the point of origin.

G. Unless specifically exempted by the Building Inspector because of exceptional architectural design and/or site considerations, new single- and two-family structures shall be designed so that the principal facade, i.e., that facade containing the principal entrance (front door), shall be basically parallel to the front lot line.

H. Once a principal facade has been established for any structure or building, whether existing or new, the area between such facade and the adjacent street or public approach to the structure or building shall not be built upon or used for an unattached building or structure in excess of 10 feet in height. This shall apply to the RU and RH Zoning areas only.

I. For all mixed use buildings, parking shall be provided cumulatively for each use in the building.

10.2

Document # 21-G

PDD-26-1;

Attorney Russell Channen for client *Pentucket North Development, LLC* requests to amend Chapter 255 Zoning Ordinance and Zoning Map by creating a Special Permit Planned Development District in accordance with Section 8.5 of the Zoning Ordinance. Applicant, Pentucket North Development, LLC is requesting a special permit of a planned residential development on a portion of land owned by Cedardale, Inc, located off of Boston Road known as 931 Boston Road (Map 754 Block 2 Lot 21) to construct six duplex units and two single family units. The property is currently zoned Commercial Highway (CH)

IN CITY COUNCIL: June 30, 2026

Refer to Planning Board & hearing scheduled for August 25, 2026

11 YEAS, 0 NAYS, 0 ABSENT

Attest: Kaitlin M. Wright Esposito

Kaitlin M. Wright Esposito, CMC

IN CITY COUNCIL: AUGUST 25 2026
CON'T TO OCTOBER 27 2026
10 YEAS, 0 NAYS, 1 ABSENT

ATTEST: Kaitlin M. Wright Esposito
KAITLIN M. WRIGHT ESPOSITO, CMC
CITY CLERK

Haverhill

Economic Development and Planning
Phone: 978-374-2330

To: City Council
From: Jacki Byerley, AICP, Planning Director
Re: 931 Boston Road – Special Permit Planned Development District
Date: October 15, 2026

On October 14, 2026 at a regularly scheduled Planning Board meeting the Board reviewed the application submitted by Pentucket North Development for a special permit of a planned residential development on a portion of land owned by Cedardale, Inc, located off of Boston Road known as 931 Boston Road (Map 754 Block 2 Lot 21) to construct six duplex units and two single family units.

The proposed project consists of six duplex units and two single family units together with associated parking, access, utilities, drainage, landscaping, grading, and other site improvements. Vehicular access to the proposed development is provided from I Street. During the review of the application, the adequacy and condition of I Street as the access roadway serving the proposed development were considered by the Planning Board and the appropriate City departments.

Based upon the review of the application and comments received during the hearing process, improvements to I Street are necessary to provide adequate and safe access to the proposed development and to address the impacts associated with the proposed project.

The applicant has proposed improvements to I Street to be reviewed by Engineering and Police prior to construction of the improvement. The applicant has also agreed to place additional hydrants within the site and will place sprinklers in all the units. They will work with the water department on the hydraulic analysis to confirm adequate water supply prior to construction and will mill/overlay I Street post construction.

Based on the information presented, the Planning Board voted to recommend that City Council approve the project, subject to conditions requiring improvements to I Street; completion of a hydraulic analysis; milling and overlaying of I Street post construction; installation of fire hydrants within the development, to be approved by the Fire Department; installation of sprinkler systems in all units and establishment of a homeowners association with a restriction prohibiting rentals of the units.

Kaitlin Wright Esposito

From: Jacki Byerley
Sent: Tuesday, August 18, 2026 7:47 AM
To: Kaitlin Wright Esposito
Subject: RE: Review Meeting 931 Boston Rd

Follow Up Flag: Follow up
Flag Status: Completed

Good morning Kaitlin,

The Planning Board continued this item to their September 9th meeting. I would recommend the Council open the hearing to meet the statutory requirements and immediately continue the hearing until either their October 20th or October 27th meeting. I cannot guarantee the Planning Board will complete its review of the proposal at the September meeting so I would like to allow time in case they continue to review it at their October 14th meeting.

Be well,
Jacki

From: Kaitlin Wright Esposito <kwright@haverhillma.gov>
Sent: Monday, August 17, 2026 3:56 PM
To: Jacki Byerley <JByerley@HaverhillMa.gov>
Subject: RE: Review Meeting 931 Boston Rd

Hi Jacki,

Does Planning Board intend to continue this matter on Wednesday?

Our Council packet for this item is VERY large, so if it will be heard before Council next week, I am going to start scanning now to save time before Friday.

Thanks!

All my best,

Kaitlin

Kaitlin M. Wright Esposito, CMC
City Clerk
4 Summer Street, Room 118
Office: (978) 374-2312
Fax: (978) 373-8490
kwright@haverhillma.gov

Planned Development District [PDD] ReZoning Amendment Proposal

PDD-26-1

Submitted On: May 7, 2026

Applicant

Russell Channen
9783142070
@ rchannen@pgclawoffice.com

Primary Location

931 BOSTON RD
Bradford, MA 01835

12.3

IMPORTANT: PLEASE READ BEFORE STARTING YOUR APPLICATION

JUN 24 PM3:50
HAVCITYCLERK

Applicant Information

What is Your Role in This Process?

Attorney/Agent

Applicant Business/Firm Phone

9788080722

Applicant Business/Firm City

Bradford

Applicant Business/Firm Zip

01835

Client Business Name

Ronald Mailloux

Client Email

ron@mbcbuilders.com

Client City

Bradford

Client Zip

01835

Client Business Structure

Limited Liability Corporation (LLC)

Type of Project

PRD: Residential Only or Residential with Business or Commercial

Applicant Business/Firm Name

Pentucket North Development LLC

Applicant Business/Firm Address

12 Ruby Circle

Applicant Business/Firm State

Massachusetts

Client Name

Ronald Mailloux

Client Phone

9788080722

Client Address

12 Ruby Circle

Client State

Massachusetts

Client County

Essex

Has There Been a Pre-Application Review?

Yes

Property Information

How Long Owned by Current Owner?

Over 50 years

Lot Dimension(s)

207.36' (frontage, South), 293.53' (W), 174.07' (N), 291.63' (E)000 square feet/

Type of Planned Development District

Planned Residential Development District (PRD)

Registry Plat Number, Block & Lot

754-2-21

Zoning District Where Property Located

CN - Commercial Neighborhood

Proposed Street Name(s)

TBD

Proposed Housing Plan Name

TBD (To be determined)

Type of Dwelling(s) Planned in Project

Single Family

Deed Recorded in Essex South Registry: Block Number

6023

Deed Recorded in Essex South Registry: Page

614

Does the Property Have Multiple Lots?

Yes

IF YES, How Many Lots?

2

IF YES, What Is/Are the Map, Block Lot (MBL) Number(s)?

754-2-21, 754-2-21A and 754-2-21C

IF YES, Provide Additional Addresses if Different Than "Location" (or Enter NONE")

None

Thoroughly Describe the Reason(s) for the Special Permit

There is a large parcel of land owned by Cedardale, Inc.. Incorporated into this large parcel is a rectangular section of land adjoining Cedardale's main location at 931 Boston Road. The entire parcel is currently zoned, Commercial Highway.
This application is filed to allow for a portion of the rectangular section of land to be developed in accordance with Chapter 255 Section 8.5 (The Planned Development (PD) District and specifically the Planned Residential Development District (PRD). PD's purpose is to allow for the development of commercial, busienss resideintial sites allowing some flexibility in the development of individual tracts of land. A review of the City's GEO Map shows that the proposed site abuts single family homes and is surrounded by the RH Zone. The proposed site and development would be consistent with the neighboring homes; would provide desparately needed housing; and would increase the city tax base. Access to the proposed site would be off of Boston Road and would not create any additional traffic to the area.

Property Description

The Proposed area is roughly 55,000 square feet and would allows for the construction of 6 duplexes and 2 single family units.

Current Property Use

Vacant

TOTAL Number of Units Planned

14

TOTAL Number of Parking Spaces Planned

28

Does the Property Contain Wetlands

No

Planned Lot Use

Lot Number

Lot 1

Lot Plat Number, Bock, Lot

754-2-21

Lot Dimensions

207.36'(Frontage, South); 293.53' (W); 174.07' (N), 291.63' (E)uare feet)

Number of Existing Buildings on Lot

0

Size of Existing Building(s) on Lot

none

Number of Buildings Planned for Lot

8

Size of Proposed Building(s)

Each Units exterior foot print is 20/ x 36'.quare feet. Each unit will have approximately 1,840 square feet of living space

Number of Families to be Accommodated

14

Extent of Proposed Alterations

New Construction: Residential

IF OTHER ALTERATIONS, Please Describe

--

Types of Units Planned on Lot

Condominiums (for sale)

Number of Units Planned on Lot

14

Special Circumstances

Building Coverage

--

Dimensional Variance

--

Front Yard Setback

--

Side Yard Setback

--

Rear Yard Setback

false

Lot Frontage

--

Lot Depth

--

Lot Area

--

Building Height

false

Floor Area Ratio

--

Open Space

--

Parking

--

Sign Size

--

Use

--

Other

--

Hearing Waiver

Agrees

Yes

Agreement & Signature

Agrees

true

PLEASE READ

Outlook

Thank you for placing your order with us.

From North of Boston <noreply@wave2adportal.com>
Date Mon 7/13/2026 8:44 AM
To CityClerk <cityclerk@haverhillma.gov>
Cc cmacdonald@northofboston.com <cmacdonald@northofboston.com>; Kaitlin Wright Esposito <kwright@haverhillma.gov>; Natalia Hernandez <NHernandez@HaverhillMa.gov>

Warning! External Email. Exercise caution when opening attachments or clicking on any links.

THANK YOU for your notice submission!

This is your confirmation that your order has been submitted. Below are the details of your transaction. Please save this confirmation for your records.

Job Details

Order Number:	W0145949
Business Type:	All Other Public Notices
Notice Size:	Public Notices
Notice Estimate:	$207.70
Referral Code:	PDD-26-1 Boston Rd.

Account Details

Haverhill Clerk
4 SUMMER ST STE 118
HAVERHILL, MA 01830
978-374-2312
cityclerk@cityofhaverhill.com
HAVERHILL CITY CLERK

Schedule for notice number W01459490

Thu Aug 6, 2026
Haverhill Gazette Public *All Zones*
Notices

Thu Aug 13, 2026
Haverhill Gazette Public *All Zones*
Notices

August 3, 2026

PUBLIC HEARING

City Council Chambers, City Hall, Room 202, 4 Summer st

Notice is hereby given that a hearing will be held for all parties interested, in a hybrid meeting (in person/virtual), on Tuesday August 25, 2026 at 7:00 PM on a request from Attorney Russell Channen on behalf of client, Ronald Mailloux of Pentucket North Development, LLC requests to amend Chapter 255 Zoning Ordinance and Zoning Map by creating a Special Permit Planned Development District in accordance with Section 8.5 of the Zoning Ordinance. Applicant, Pentucket North Development, LLC is requesting a special permit of a planned residential development on a portion of land owned by Cedardale, Inc. located off of Boston Road known as 931 Boston Road (Map 754 Block 2 Lot 21) to construct six duplex units and two single family units. The property is currently zoned Commercial Highway (CH.

(Residents who are interested in commenting on this item can either (1) Attend in person (Council Chambers, Room 202) or (2) Attend remotely using the link provided on the public meeting calendar on the City's website.)

Description of area, maps and plans are on file in the City Clerk's Office.

Kaitlin M. Wright Esposito, CMC
City Clerk
HG - Publication Dates

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This is an automated message, please do not reply to this e-mail. If you have any questions or concerns you may contact us toll-free at 800-681-6248.

August 11, 2026

City of Haverhill, MA

Advertisement Fee

Record No.PDD-26-1

Status Completed

Type Payment

Assignee Unassigned

Invoice ID 1234086

Became Active May 7, 2026

Due Date None

AUG 11 PM1:19
HAVCITYCLERK

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Kaitlin Wright Esposito Internal — May 7, 2026 at 3:27 pm

@Jacki Byerley Jacki, I added a legal notice fee. I reviewed the language for special permit fees and it is $250 or $5 per unit, whichever is greater. I am inclined to say the $850 is sufficient for the filing fee as it is outlined in the code. He has paid an additional $200 for the legal notice fee.

Kaitlin Wright Esposito — May 7, 2026 at 3:25 pm

You are too good, thank you!

Russell Channen — May 7, 2026 at 3:22 pm

Just did it. Nice seeing you today and thanks, as always, for your assistance.

Russell

Kaitlin Wright Esposito — May 7, 2026 at 3:20 pm

Hi Russell, Could you please pay the legal notice fee? Thank you!

Building Inspector Review

Record No.**PDD-26-1**

Status Completed

Type Approval

Assignee Tom Bridgewater

Became Active May 7, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Tom Bridgewater Internal June 10, 2026 at 12:05 pm

i will make comments at a later time

Kaitlin Wright Esposito June 10, 2026 at 11:45 am

@Tom Bridgewater Please review, ASAP. I am waiting for your sign off before announcing and setting a hearing date.

August 11, 2026

City of Haverhill, MA

Planning Director Review

Record No.PDD-26-1

Status Completed

Type Approval

Assignee Jacki Byerley

Became Active May 7, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Jacki Byerley October 15, 2026 at 10:37 am

Please see attached recommendation made by the Planning Board at their October 14, 2026 meeting.

Chris Loughnane 🔒 Internal June 5, 2026 at 9:24 am

Hi Jacki, the abutters and mailing labels have been attached. Chris

Jacki Byerley May 26, 2026 at 3:36 pm

Where this is both a rezoning as a Planned Development and a Special Permit from City Council doc 92-B may also need to be submitted.

Please supply an Ordinance Submission in accordance with Section 8.5.3.2.

An ANR plan will be need to be submitted along with a traffic report.

This is to be reviewed by the Planning Board for a recommendation to City Council at their July 8th meeting, further review and recommendation will be made when additional information is submitted.

Jacki Byerley May 8, 2026 at 2:42 pm

At the applicant's request the review meeting has been rescheduled to May 26th at 9:45 am.

Jacki Byerley May 7, 2026 at 3:27 pm

Application review meeting has been scheduled for May 19th at 9:45 am

City of Haverhill, MA

October 21, 2026

City Clerk Review - Hearing Dates Set

Record No.**PDD-26-1**

Status Completed

Type Approval

Assignee Kaitlin Wright Esposito

Became Active June 10, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Kaitlin Wright Esposito June 24, 2026 at 2:38 pm

Thank you, Russell. We will announce the hearing at the June 30th meeting for August 25th.

Russell Channen June 16, 2026 at 11:08 am

Hi Kaitlin. We would like August 25th.. Thanks

Russell

Kaitlin Wright Esposito June 16, 2026 at 10:51 am

Hi Russell, checking in – have you decided on a hearing date? Thank you!

Russell Channen June 10, 2026 at 12:46 pm

HI Kaitlin: I am reaching out to my client and the Engineer. I will respond asap.

Russell

Kaitlin Wright Esposito June 10, 2026 at 12:10 pm

Russell, please let me know some dates that would work for a hearing before Council for you and your client. Available dates are as follows: July 28, August 11, and August 25.

City of Haverhill, MA

August 11, 2026

Assessor Prepares Abutters List

Record No.**PDD-26-1**

Status Completed

Type Approval

Assignee Chris Loughnane

Became Active June 24, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Chris Loughnane 🔒 Internal June 5, 2026 at 9:24 am

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Jacki Byerley May 26, 2026 at 3:36 pm

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Please supply an Ordinance Submission in accordance with Section 8.5.3.2.

An ANR plan will be need to be submitted along with a traffic report.

This is to be reviewed by the Planning Board for a recommendation to City Council at their July 8th meeting, further review and recommendation will be made when additional information is submitted.

Jacki Byerley May 8, 2026 at 2:42 pm

At the applicant's request the review meeting has been rescheduled to May 26th at 9:45 am.

Jacki Byerley May 7, 2026 at 3:27 pm

Application review meeting has been scheduled for May 19th at 9:45 am

Messages

Chris Loughnane June 25, 2026 at 11:34 am

The abutters and mailing list was attached June 5, 2026.

Chris Loughnane Internal June 25, 2026 at 11:34 am

The abutters and mailing list was attached June 5, 2026.

City of Haverhill, MA

October 21, 2026

Conservation Department Review

Record No.**PDD-26-1**

Status Completed

Became Active June 25, 2026

Type Approval

Due Date None

Assignee Robert Moore

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Robert Moore September 24, 2026 at 5:57 pm

see Stormwater Review

Kaitlin Wright Esposito September 24, 2026 at 4:27 pm

Please review!

City of Haverhill, MA

October 21, 2026

DPW Review

Record No.**PDD-26-1**

Status Active

Became Active June 25, 2026

Type Approval

Due Date None

Assignee Robert Kimball

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Kaitlin Wright Esposito

September 24, 2026 at 4:27 pm

Please review!

City of Haverhill, MA

October 21, 2026

Engineering Department Review

Record No.**PDD-26-1**

Status Active

Became Active June 25, 2026

Type Approval

Due Date None

Assignee Lisa Demeo

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Jacki Byerley Internal — October 14, 2026 at 11:13 am

New plans were uploaded on October 8th

Lisa Demeo — October 2, 2026 at 4:05 pm

Please upload versions of the plans that are clear to read when zoomed in. I can't make out the text.

Kaitlin Wright Esposito — September 24, 2026 at 4:27 pm

Please review!

Fire1 Department Review

Record No.**PDD-26-1**

Status Completed
Became Active June 25, 2026
Type Approval
Due Date None
Assignee Justin Borden

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

June 30, 2026 at 8:39 am

Robert Irvine

No bark mulch within 18" of the foundations.

June 25, 2026 at 3:23 pm

Justin Borden

All provisions of 527 CMR 1.00 Ch 18 Fire Department access must be met, which may include a Fire Department turn around or second point of access / emergency access.

June 25, 2026 at 3:12 pm

Justin Borden

Sprinklered to NFPA 13.

Fire department access and turnaround on Y street.

1 & 2 Family Dwellings

The installation of smoke, heat, and co alarms shall be compliant to applicable MSBC 780 CMR 9th edition for 1 & 2 Family Residential Dwellings, 527 CMR 1.00 2021 ed., MGL, City of Haverhill ordinances including City of Haverhill Subdivision Rules and Regulations and fire prevention regulations that are required with this project.

Required permitting of fire protection systems should not hold up foundation permit, however Contractor information will be required.

Contractors hired to install fire protection systems shall be required to obtain permit approval of proposed fire alarm and or sprinkler systems before any building permit will be issued.

Failure to abide by the permitting process as required by the 9th edition of the MSBC, 780 CMR 51.R106.3.3.4 shall cause a delay in acquiring the final occupancy certificate.

City of Haverhill, MA

Fire2 Department Review

Record No.PDD-26-1

Status Skipped

Type Approval

Assignee Robert Irvine

Became Active June 25, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

No comments yet.

City of Haverhill, MA

August 11, 2026

Health Department Review

Record No.**PDD-26-1**

Status Completed

Became Active June 25, 2026

Type Approval

Due Date None

Assignee Mark Tolman

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Mark Tolman July 3, 2026 at 3:37 pm

Hi Russ,

All buildings will be connected to city water and sewer.

You need to speak with the rubbish and recycling coordinator to find out if this project will have private or municipal rubbish storage and pickup.

Any other questions or comments let me know.

Mark

City of Haverhill, MA

August 11, 2026

Police Department Review

Record No.**PDD-26-1**

Status Completed

Became Active June 25, 2026

Type Approval

Due Date None

Assignee Kevin Lynch

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

No comments yet.

City of Haverhill, MA

October 21, 2026

School Department Review

Record No.**PDD-26-1**

Status Completed

Type Approval

Assignee HPS Superintendent

Became Active June 25, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

No comments yet.

City of Haverhill, MA

October 21, 2026

Storm Water Review

Record No.**PDD-26-1**

Status Active

Became Active June 25, 2026

Type Approval

Due Date None

Assignee Robert Moore

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Robert Moore October 4, 2026 at 4:12 pm

Russell, thanks for uploading. New materials were sent to CEI for review.

Robert Moore September 24, 2026 at 5:59 pm

Awaiting response to August 28th stormwater peer review comments

Robert Moore August 11, 2026 at 7:50 pm

Applicant has filed under SWM-26-1 to pursue the required Stormwater Management Permit. Application is currently undergoing peer review by CEI.

Robert Moore July 1, 2026 at 7:32 pm

Hi Russell. The plan set is tough to read. Do you have a primary project contact at Morin-Cameron who I can add to this record. I'd like for them to upload a better PDF version of the plan.

Also, with the project requiring a Stormwater Management Permit under C.219, would you like for me to begin the peer review process and solicit a quote from our reviewer? One particular item I noted is that while the design acknowledged the 90% TSS removal requirement, it doesn't seem to address the 60% Total Phosphorus removal requirement. Infiltration systems such as this typically comply, but I'm not seeing a reference in the report.

City of Haverhill, MA

October 21, 2026

Wastewater Review

Record No.**PDD-26-1**

Status Completed

Became Active June 25, 2026

Type Approval

Due Date None

Assignee Paul Jessel

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Kaitlin Wright Esposito

September 24, 2026 at 4:27 pm

Please review!

City of Haverhill, MA

October 21, 2026

Water Department Review

Record No.**PDD-26-1**

Status Active

Became Active June 25, 2026

Type Approval

Due Date None

Assignee Shaun Burrier

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Kaitlin Wright Esposito

September 24, 2026 at 4:27 pm

Please review!

City of Haverhill, MA

August 11, 2026

First Ad Placement

Record No.**PDD-26-1**

Status Completed

Type Approval

Assignee Kaitlin Wright Esposito

Became Active July 9, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Kaitlin Wright Esposito July 10, 2026 at 3:37 pm

Advertise: August 6 and August 13, 2026

Haverhill Gazette

Kaitlin Wright Esposito 🔒 **Internal** July 9, 2026 at 3:58 pm

let's talk about ad dates for when you return. @Natalia Hernandez

City of Haverhill, MA

October 22, 2026

Placed on Agenda

Record No.**PDD-26-1**

Status Completed

Type Approval

Assignee Kaitlin Wright Esposito

Became Active July 10, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

931 BOSTON RD
Bradford, MA 01835

Owner

CEDARDALE, INC
BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

Kaitlin Wright Esposito July 10, 2026 at 3:38 pm

Announced June 30th for August 25th hearing.

August 11, 2026

City of Haverhill, MA

Local Zoning Board Notification

Record No.PDD-26-1

Status Inactive

Type Approval

Assignee Unassigned

Became Active Unknown

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

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Bradford, MA 01835

Owner

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BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

No comments yet.

August 11, 2026

City of Haverhill, MA

Second Ad Placement

Record No.PDD-26-1

Status Completed

Type Approval

Assignee Kaitlin Wright Esposito

Became Active July 10, 2026

Due Date None

Record No: PDD-26-1

Planned Development District [PDD] ReZoning Amendment Proposal

Status: Active

Submitted On: 5/7/2026

Primary Location

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Bradford, MA 01835

Owner

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BOSTON RD 931 WARD HILL, MA 01835

Applicant

Russell Channen
978-314-2070
rchannen@pgclawoffice.com
25 Kenoza Avenue
Haverhill, MA 01830

Messages

July 10, 2026 at 3:39 pm

Kaitlin Wright Esposito

Advertise: August 6 and August 13, 2026

Haverhill Gazette

AUTHORIZATION

Cedardale, Inc. owner of the property at 931 Boston Road, Haverhill, Massachusetts, as evidenced by a Deed recorded with the Essex South District Registry of Deeds at Book 6023, Page 614, hereby authorizes **Pentucket North Development, LLC** to file a Planned Development Application for a portion of said property with the Haverhill City Council.

Executed this 29th day of April, 2026

Cedardale, Inc.

John E. Veasey Jr.

John E. Veasey, Jr., President

g:\global\ [illegible]\authorization 042526.gdp.docx

FOR REGISTRY USE ONLY

I CERTIFY THAT THIS PLAN CONFORMS TO THE RULES AND REGULATIONS OF THE REGISTER OF DEEDS.

Michael J. Sergi 1/6/98
DATE

NOTES

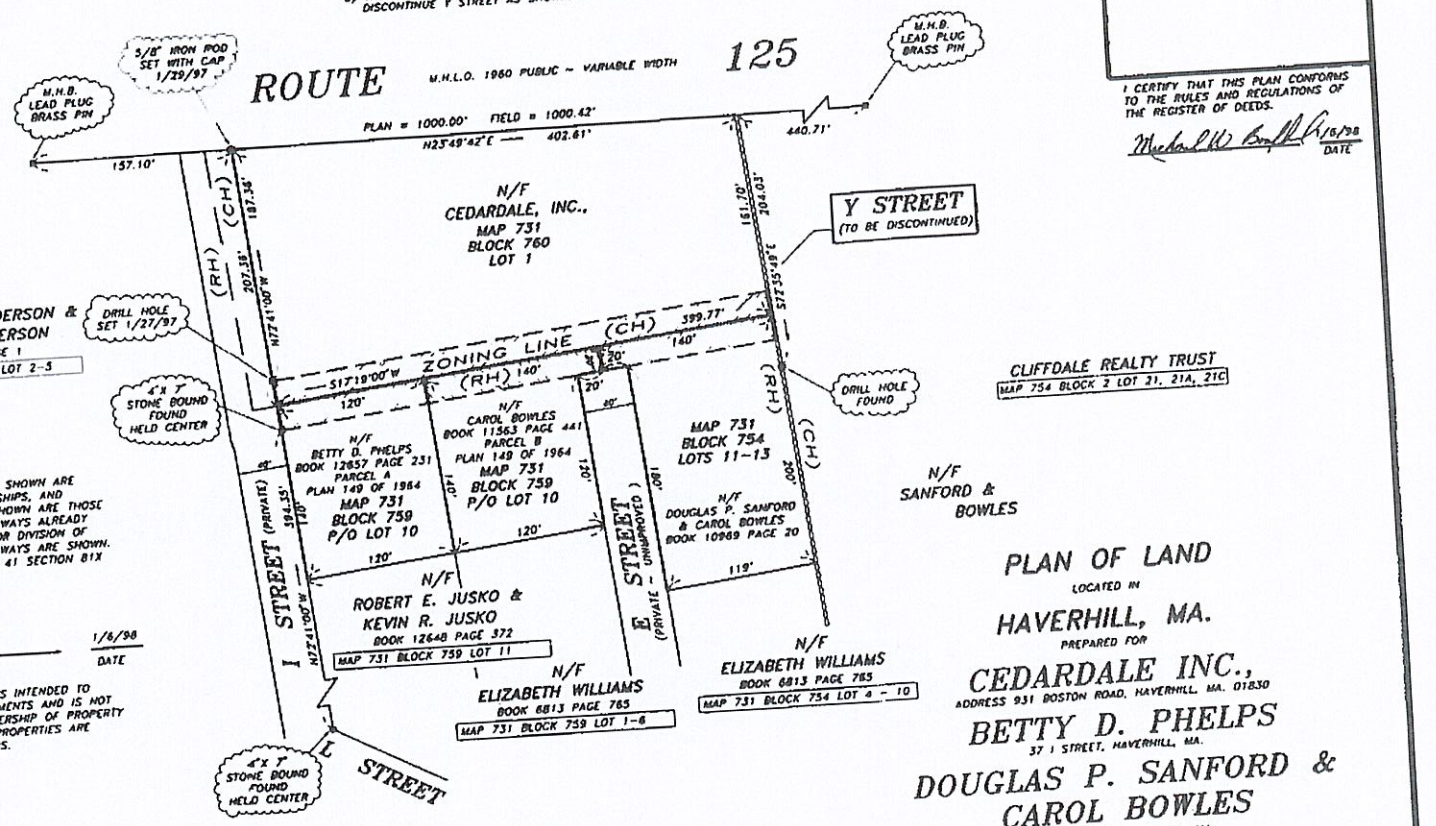
1) AREAS INCLUDE THAT PORTION OF Y STREET TO BE DISCONTINUED.

2) THE PURPOSE OF THIS PLAN IS THE DISCONTINUE Y STREET AS SHOWN.

REFERENCE PLANS

M.H.L.O. PL. BK. 95 PL. 53
S.E.R.D. PL. BK. 7 PL. 11
S.E.R.D. 1964 PL. 149

M.H.L.O. 1960



I CERTIFY THAT THE PROPERTY LINES SHOWN ARE THE LINES DIVIDING EXISTING OWNERSHIPS, AND THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED, AND NO NEW LINES FOR DIVISION OF EXISTING OWNERSHIPS OR FOR NEW WAYS ARE SHOWN. CHAPTER 41 SECTION 81X

1/6/98
DATE

MICHAEL J. SERGI P.L.S.

THE CERTIFICATION SHOWN ABOVE IS INTENDED TO MEET REGISTRY OF DEEDS REQUIREMENTS AND IS NOT A CERTIFICATION TO TITLE OR OWNERSHIP OF PROPERTY SHOWN. OWNERSHIP OF ADJOINING PROPERTIES ARE ACCORDING TO ASSESSORS RECORDS.

MAP/BLOCK/LOT	AREA	REFERENCE DEED	RECORD OWNER
MAP 731 BLOCK 754 LOT 11-13	24,324 SQ.FT.±	BK. 10969 PG 20	DOUGLAS P SANFORD & CAROL BOWLES
MAP 731 BLOCK 759 LOT P/O 10	16,800 SQ.FT.±	BK. 12657 PG 231	BETTY D. PHELPS
MAP 731 BLOCK 759 LOT P/O 10	17,200 SQ.FT.±	BK. 11563 PG 441	CAROL BOWLES
MAP 731 BLOCK 760 LOT 1	73,794 SQ.FT.±	BK. 13956 PG 249	CEDARDALE INC.

PLAN OF LAND

LOCATED IN

HAVERHILL, MA.

PREPARED FOR

CEDARDALE INC.,
ADDRESS 931 BOSTON ROAD, HAVERHILL, MA. 01830

BETTY D. PHELPS
37 I STREET, HAVERHILL, MA.

DOUGLAS P. SANFORD & CAROL BOWLES
53 E STREET HAVERHILL, MA.

SCALE: 1" = 60' DATE: JANUARY 6, 1998

60 0 60 120 FT

CHRISTIANSEN & SERGI PROFESSIONAL ENGINEERS LAND SURVEYORS
180 SUMMER ST. HAVERHILL, MA. 01830 TEL. 508-373-0310

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DRAWING No. 98013007

LAW OFFICES OF
Phillips, Gerstein & Channen, LLP
25 Kenoza Avenue ■ Haverhill, MA 01830
Tel: (978) 374-1131 ■ Fax: (978) 372-3086
www.pgclawoffice.com

Herbert P. Phillips (1933 - 2017)
Michael A. Gerstein
Russell S. Channen

Of Counsel:
Jane M. Owens Triano

April 28, 2026

Timothy J. Jordan, President
Haverhill City Council
City Hall
4 Summer Street
Haverhill, MA 01830

Re: Special Permit Planned Development (PD) District
Planned Residential Development District (PRD)
Applicant: Pentucket North Development, LLC
Owner: Cedardale, Inc.
PID: 754-2-21

Dear President Jordan:

Please be advised that this office represents the Applicant, Pentucket North Development, LLC (hereinafter "Pentucket North"), regarding its request for a Special Permit to take a portion of land currently owned by Cedardale, Inc. and located off of Boston Road, Haverhill, Massachusetts and have it rezoned from Commercial Highway to a Planned Residential District (hereinafter "PRD").

Pentucket North Development, LLC is owned and managed by Ronald Mailloux, a well-known, local developer. Mr. Mailloux is seeking to purchase such land to build six duplex lots and two single units. Attached to this narrative is a portion of the City of Haverhill Geo Map showing the Rectangular sized lot where a portion would be sold to Pentucket North for said development.

Pentucket North believes that this development is precisely the type for which Chapter 255 Section 8.5 (Planned Development (PD) District was enacted.

Although situated within a residential area, the proposed parcel is currently zoned Commercial Highway.

Approving the Special Permit would result in housing for fourteen (14) new families. The area is currently sprinkled with single family homes and condominiums. The proposed development would fit in nicely with the characteristic of the neighborhood. There would be easy access to the development off of I Street and not create additional traffic woes on Route 125 or on Boston Road. Each Unit would have two parking spaces.

The plans provide the necessary access for fire and safety vehicles. There would be an increase to the City's tax base without an undue burden on City services. Finally, the development would not have a negative effect on the environment.

Chapter 255 Section 8 was enacted to permit an entity such as Pentucket North Development, LLC to propose to the City Council a development that did not require minimum lot size or areas and to provide some flexibility in the development of individual tracts of land.

The City Council previously approved an Application under this Section for Princeton Properties development on the neighboring "Diburro site". Although on a smaller scale, Pentucket North believes that the development of this parcel is also an appropriate use pursuant to Chapter 255 Section 8.5.

The Morin-Cameron Group, Inc. has prepared detailed plans which are submitted and incorporated herein by reference.

Based upon the above and the submitted plans, the Applicant, Pentucket North Development, LLC requests that this Council approve its application to rezone a portion of land currently owned by Cedardale, Inc. from Commercial Highway to Planned Residential District along with the proposed Development.

Pentucket North Development, LLC waives the statutory 120 day hearing requirement.

Respectfully submitted,
Pentucket North Development, LLC
By its Attorney,

Russell S. Channen, Esquire

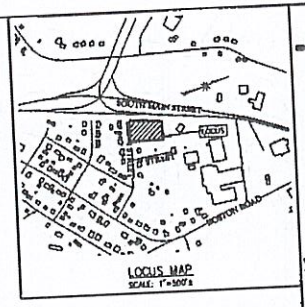
g:\gloria_russ\r-estate\mailloux, ron\haverhill city special permit 042826 gdp docx

1 = Lot in Question

SITE DEVELOPMENT PLANS

FOR A
MULTI-FAMILY DEVELOPMENT
LOCATED AT
931 BOSTON ROAD
HAVERHILL, MASSACHUSETTS

(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)

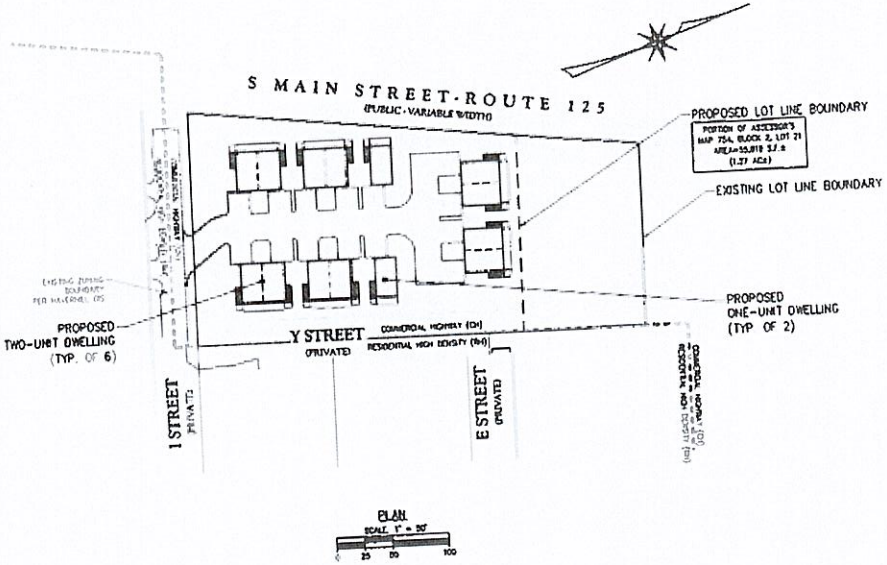


LOCUS MAP
SCALE: 1"=500'±

ZONING DISTRICT: COMMERCIAL HIGHWAY (CH)
PROPOSED ZONING DISTRICT: PLANNED RESIDENTIAL DEVELOPMENT DISTRICT (PDD)
(PENDING CITY COUNCIL APPROVAL)

SCHEDULE OF PLAN SET DRAWINGS:

SHEET 1 OF 11	COVER SHEET
SHEET 2 OF 11	SITE CONTEXT PLAN
SHEET 3 OF 11	EXISTING CONDITIONS PLAN
SHEET 4 OF 11	SITE PREPARATION & EROSION CONTROL
SHEET 5 OF 11	SITE LAYOUT PLAN
SHEET 6 OF 11	GRADING, DRAINAGE & UTILITY PLAN
SHEET 7 OF 11	DETAILS
SHEET 8 OF 11	DETAILS
SHEET 9 OF 11	STORMWATER DETAILS
SHEET 10 OF 11	STORMWATER DETAILS
SHEET 11 OF 11	STORMWATER DETAILS
SHEET A0.0	SITE PLAN
SHEET A1.1	1ST FLOOR PLAN DUPLEX BUILDING
SHEET A1.2	2ND FLOOR PLAN DUPLEX BUILDING
SHEET A1.3	3RD FLOOR PLAN DUPLEX BUILDING
SHEET A1.4	ROOF PLAN DUPLEX BUILDING
SHEET A2.1	ELEVATIONS DUPLEX BUILDING
SHEET A2.2	ELEVATIONS DUPLEX BUILDING
SHEET A2.3	STREET ELEVATIONS
SHEET A1.1B	1ST & 2ND FLOOR PLAN SINGLE BUILDING
SHEET A1.2B	3RD FLOOR & ROOF PLAN SINGLE BUILDING
SHEET A2.1B	ELEVATIONS SINGLE BUILDING
SHEET L-100	LANDSCAPE PLAN



PLAN
SCALE: 1" = 50'

APPLICANT:
PENTUCKET NORTH DEVELOPMENT LLC
C/O RONALD J. MAILLOUX JR.
55 CHASE STREET
METHUEN, MA 01844

OWNER:
CEDARDALE, INC
931 BOSTON ROAD
HAVERHILL, MA 01835
BOOK 8023, PAGE 614

CIVIL ENGINEER/SURVEYOR:
THE MORIN-CAMERON GROUP, INC
88 ELM STREET
DANVERS, MA 01923
PHONE: 978-777-8588

ARCHITECT:
SCOTT BROWN ARCHITECTS
48 MARKET STREET
NEWBURYPORT, MA 01950
PHONE: 978-465-3535

LANDSCAPE DESIGNER:
CORLISS LANDSCAPE & IRRIGATION
31 ESSEX ROAD
IPSWICH, MA 01938
PHONE: 978-359-4224

DIG SAFE
MA - RI - ME - NH - VT
CALL
TOLL FREE
1-888-344-7233
UTILITIES UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM

NOTE:
UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED UPON VISIBLE ABOVE GROUND UTILITIES AND RECORD INFORMATION OF BELOW GROUND UTILITIES AND ARE APPROXIMATE ONLY. CONTRACTOR IS RESPONSIBLE FOR TAKING ALL NECESSARY PRECAUTIONS BEFORE BEGINNING ANY EXCAVATION.

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
88 ELM STREET, DANVERS, MASSACHUSETTS 01923
P: 978-777-8588 • WWW.MORIN-CAMERON.COM

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: SPC
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 28, 2008

NO.	REVISIONS DESCRIPTION	DATE

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

COVER SHEET

DRAWING NO. 1 OF 11

PROJ. #4318
DRAWING 4318_MAIN.dwg

SITE CONTEXT PLAN

DRAWING NO.

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 211)

REVISIONS

NO.	DESCRIPTION	DATE

SURVEY BY: MCG
DRAFTED BY: JLD
CHECKED BY: RMS
APPROVED BY: SPC
SCALE: AS NOTED

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS LAND USE PLANNERS

LEGEND

CONTOURS
- MAJOR
- MINOR

CHAIN LINK FENCE
FIRE HYDRANT
GUY WIRE
IRRIGATION CONTROL VALVE
LIGHT POLE
OVERHEAD WIRE
PROPERTY LINE
SANITARY SEWER MANHOLE
SANITARY SEWER MAIN/SERVICE
SQUARE CATCH BASIN
STORM SEWER/DRAINAGE
TREE LINE
UTILITY POLE — UP
WATER GATE — WG
WATER SPRINKLER MANHOLE

GENERAL NOTE:

1. THESE PLANS ARE PREPARED FOR OUR CLIENTS USE FOR THE SPECIFIC PURPOSE OF OBTAINING PERMITS AND LOCAL APPROVALS, AND ARE NOT TO BE USED OR RELIED UPON AS A CONSTRUCTION DOCUMENT OR ANY OTHER USE BY OTHER WITHOUT THE WRITTEN CONSENT OF THE MORIN-CAMERON GROUP INC.

PLAN NOTES:

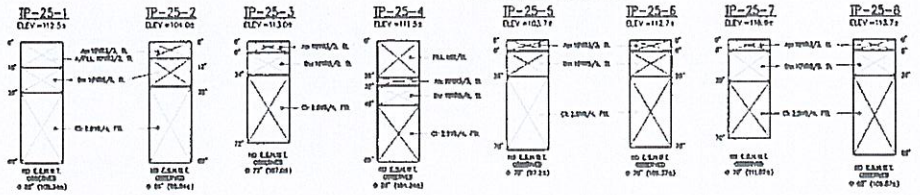
1. THE EXISTING CONDITIONS DEPICTED HEREON ARE BASED ON INFORMATION PROVIDED BY OH THE GROUND SURVEY BY THE MORIN-CAMERON GROUP, INC., ON AUGUST 19, 2025.
2. ABUTTER INFORMATION SHOWN HEREON WAS TAKEN FROM THE HAVERHILL GIS DATABASE.
3. THE PROPERTY BOUNDARY IS BASED ON A PLAN ENTITLED "PLAN OF LAND, LOCATED IN HAVERHILL, MA" PREPARED BY CHRISTIANSEN & SEROI, DATED JANUARY 8, 1998 AND RECORDED AT THE SOUTH ESSEX DISTRICT REGISTRY OF DEEDS IN BOOK 14530, PAGE 429.
4. ELEVATIONS HEREIN REFER TO VERTICAL DATUM NAVD88.
5. PROJECT SITE LOCATED WITHIN ZONING AREA COMMERCIAL HIGHWAY (CH).
6. PROJECT SITE IS NOT LOCATED WITHIN A WETLANDS AREA.
7. PROJECT SITE IS NOT LOCATED WITHIN A FEMA FLOOD ZONE.

FLOOD NOTE:

THE SUBJECT PROPERTY IS LOCATED IN A ZONE X AREA OF MINIMAL FLOOD HAZARD ABOVE 500-YEAR FLOOD LEVEL AS ILLUSTRATED ON THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO. 25009C0009D, WHICH HAS AN EFFECTIVE DATE OF JULY 8, 2025.

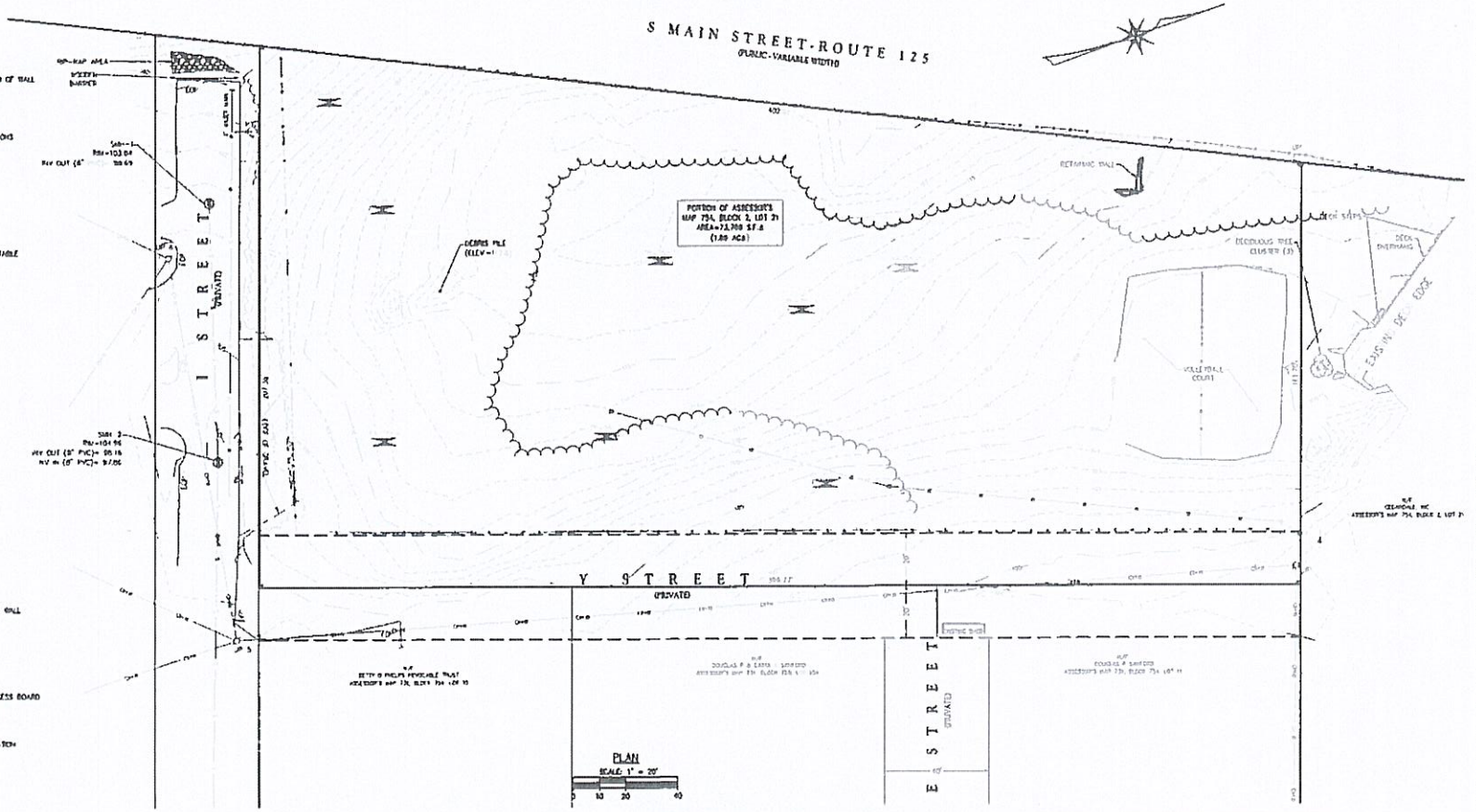
SOIL LOGS

DATE PERFORMED: NOVEMBER 13, 2025
PERFORMED BY: WILL BONVILLA, SE #14030



ABBREVIATIONS:

AC	ACRES
APPROX	APPROXIMATE
BIT	BITUMINOUS
BLDG	BUILDING
BVW	BORDERING VEGETATED WETLAND
BW	FINISH GRADE ADJACENT TO BOTTOM OF WALL
CCB	CAPE COD BERM
CB	CATCH BASIN
CF	CUBIC FEET
CI	CAST IRON
CLDI	CEMENT LINED DUCTILE IRON
CMR	CODE OF MASSACHUSETTS REGULATIONS
CONC	CONCRETE
CY	CUBIC YARD
DI	DUCTILE IRON
DIA	DIAMETER
DMH	DRAIN MANHOLE
DS	DOWNSTREAM
DYL	DOUBLE YELLOW LINE
ELEC	ELECTRIC
EL/ELEV	ELEVATION
EOG	EDGE OF GRAVEL
EOP	EDGE OF PAVEMENT
ESHWT	ESTIMATED SEASONAL HIGH WATER TABLE
EXIST	EXISTING
FD	FINAL GRADE
FT	FEET
GAR	GARAGE
GG	GAS GATE
HDPE	HIGH DENSITY POLYETHYLENE
Ø	ROUND DIAMETER
IN	INCH
INV	INVERT
L	LENGTH
LB	POUNDS
MAX	MAXIMUM
MCC	MONOLITHIC CONCRETE CURB
MIN	MINIMUM
N/F	NOW OR FORMERLY
OC	ON CENTER
OHW	OVERHEAD WIRES
PE	POLYETHYLENE
±	PLUS OR MINUS
PCC	PRECAST CONCRETE CURB
RCP	RIGID CONCRETE PIPE
REC	RECORD
PROP	PROPOSED
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
R	RADIUS
RC	RELATIVE COMPACTION
REQ'D	REQUIRED
ROW	RIGHT OF WAY
S	SLOPE
SF	SQUARE FEET
SGD	SAND, GAS AND OIL SEPARATOR
SMH	SEWER MANHOLE
SQ	SQUARE
TBD	TO BE DETERMINED
TC	TOP OF CURB/TRANSITION CURB
TW	FINISH GRADE ADJACENT TO TOP OF WALL
TYP	TYPICAL
UGE	UNDERGROUND ELECTRIC
UNK	UNKNOWN
VAR	VARIANCE
VCC	VERTICAL GRANITE CURB
VIF	VERIFY IN FIELD
LSA	LANDSCAPE AREA
LF	LINEAR FEET
MAAB	MASSACHUSETTS ARCHITECTURE ACCESS BOARD
MEP	MECHANICAL ELECTRICAL PLUMBING
MCC	MONOLITHIC CONCRETE CURB
MM	MILLIMETER
NF	NOT FOUND
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
U/S	UPSTREAM
WF	WETLANDS FLAG
WG	WATER GATE
WQU	WATER QUALITY UNIT
WSO	WATER SHUTOFF
W/	WITH



The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS

NO.	DESCRIPTION	DATE
REVISIONS		

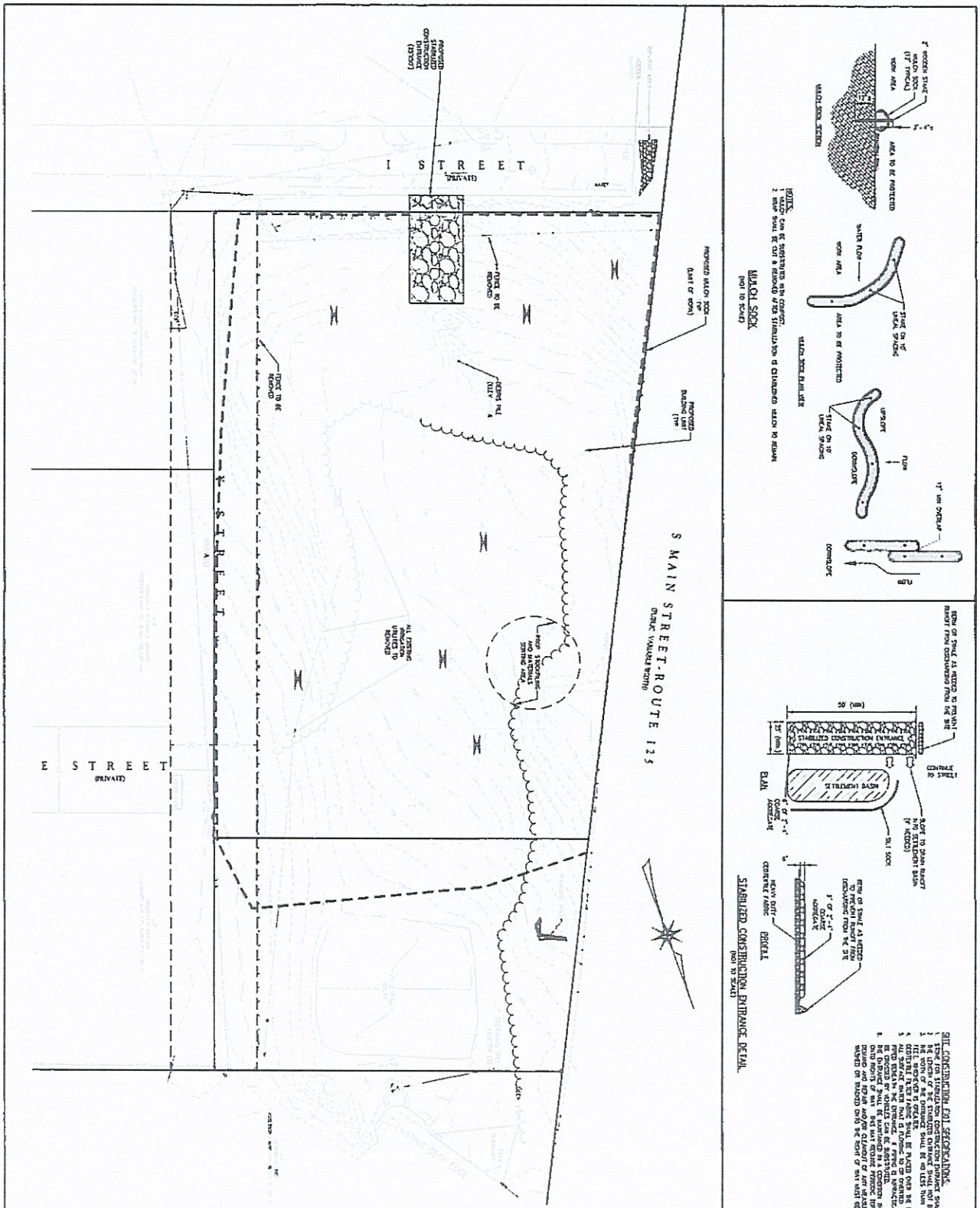
SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: MAS
APPROVED BY: JPC
SCALE: AS NOTED
DATE: APRIL 28, 2026

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 734, BLOCK 2, LOT 21)
PREPARED FOR:
DEVELOPMENT GROUP, LLC

EXISTING CONDITIONS PLAN

DRAWING NO. 3 OF 11

DRAWING A3.18_MAIN.dwg



SITE CONSTRUCTION SEQUENCE/NOTES

1. PRIOR TO ANY CONSTRUCTION, THE CONSTRUCTION ENTRANCE SHALL BE 24'-0" STONE.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET.
3. THE WIDTH OF THE ENTRANCE SHALL BE NO LESS THAN THE WIDTH OF THE ACCESS OR EGRESS ROAD, OR 10 FEET, WHICHEVER IS GREATER.
4. GEOTEXTILE FILTER FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
5. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED ACROSS THE ENTRANCE UNDER THE STONE. IF PIPING IS IMPRACTICAL, A BERM WITH MINIMUM 1 TO 1 SLOPES MAY CAN BE CONSTRUCTED WITH STONE AS LONG AS SEDIMENT IS PREVENTED FROM ENTERING ANY STREET.
6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
7. WHEEL WASHING SHALL BE DONE ON AN AREA STABILIZED WITH STONE, AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
8. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
9. ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN A LEGAL MANNER.
10. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN 14 DAYS OF FINAL GRADING OR THE CESSATION OF CONSTRUCTION ACTIVITY, WHICHEVER IS SOONER.
11. ANY CHANGES TO THE APPROVED PLAN MUST BE APPROVED BY THE CONSERVATION COMMISSION.
12. THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION.
13. ALL CONSTRUCTION ACTIVITIES SHALL BE CONFINED TO THE LIMIT OF WORK LINE.
14. ALL EXISTING UTILITIES SHALL BE PROTECTED DURING CONSTRUCTION.
15. ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED.
16. ALL CATCH BASINS SHALL BE PROTECTED WITH SILT SACKS.
17. ALL EXISTING CATCH BASINS AND DRAINAGE STRUCTURES SHALL BE CLEANED AT THE END OF CONSTRUCTION.
18. ALL DISTURBED AREAS SHALL BE STABILIZED WITH LOAM AND SEED.
19. ALL EXISTING CATCH BASINS AND DRAINAGE STRUCTURES SHALL BE CLEANED AT THE END OF CONSTRUCTION.
20. ALL DISTURBED AREAS SHALL BE STABILIZED WITH LOAM AND SEED.

SITE PREPARATION & EROSION CONTROL

DRAWING NO. 4 OF 11

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 75H, BLOCK 2, LOT 31)
PREPARED FOR

NO.	REVISIONS DESCRIPTION	DATE

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: MAS
APPROVED BY: SPC
SCALE: AS NOTED

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS

PLANNED DEVELOPMENT (PD) SUBMITTAL TABLE

TOTAL LAND AREA	55,620 SF
DEVELOPABLE SITE AREA	55,620 SF
COMMON OR USABLE OPEN SPACE	28,640 SF
SITE COVERAGE OF BUILDINGS	10,000 SF
IMPERVIOUS SURFACE AREA	33,788 SF
IMPERVIOUS SURFACE RATIO	0.420 (42.8%)
GROSS FLOOR AREA OF ALL NON RESIDENTIAL BUILDINGS	0 SF
FLOOR AREA RATIO	0.181 (18.1%)
DENSITY OF DWELLING UNITS	3,972.8 SF/UNIT
NUMBER OF OFF-STREET PARKING SPACES	28 SPACES

BUILDING HEIGHTS

BUILDING	(A) AVERAGE FINISHED GRADE ELEVATION BASED ON BUILDING CORNERS (FT)	(B) GARAGE ENTRANCE ELEVATION (FT)	(C) MEAN ROOF HEIGHT ABOVE GARAGE ENTRANCE ELEVATION (FT)	(D) ELEVATION OF MEAN ROOF HEIGHT (FT) (B+C)	PROPOSED BUILDING HEIGHT (FT) (D-A)
1	110.10	110.7	28.10	138.80	28.70
2	113.80	113.0	28.10	141.10	27.30
3	115.80	115.3	25.75	141.05	25.45
4	117.45	118.2	28.10	146.30	27.50
5	113.10	114.7	28.10	142.80	27.70
6	115.20	115.3	25.75	141.05	25.75
7	114.00	113.0	28.10	141.10	27.30
8	110.00	109.0	28.10	137.10	27.10

BUILDING HEIGHT NOTE:

BUILDING HEIGHT IS CALCULATED AS THE VERTICAL DISTANCE FROM THE AVERAGE FINISHED GRADE (AVERAGE OF FINISHED GROUND ELEVATION AT THE MAIN CORNERS OF THE STRUCTURE) TO THE HIGHEST POINT OF THE ROOF. TOP OF THE HIGHEST ROOF BEAM (FLAT ROOF), PEAK OF A MANSARD ROOF, OR MEAN LEVEL BETWEEN EAVES AND RIDGE (GABLE, HIP, SHED, CAMBREL, PYRAMID, OR SIMILAR ROOFS). MAXIMUM ALLOWABLE HEIGHTS ARE ESTABLISHED IN TABLE 2 (DIMENSIONAL REGULATIONS) BY ZONING DISTRICT, DEFINED PER HAVERHILL ZONING ORDINANCE § 11.0 (DEFINITIONS).

SNOW STORAGE NOTE:

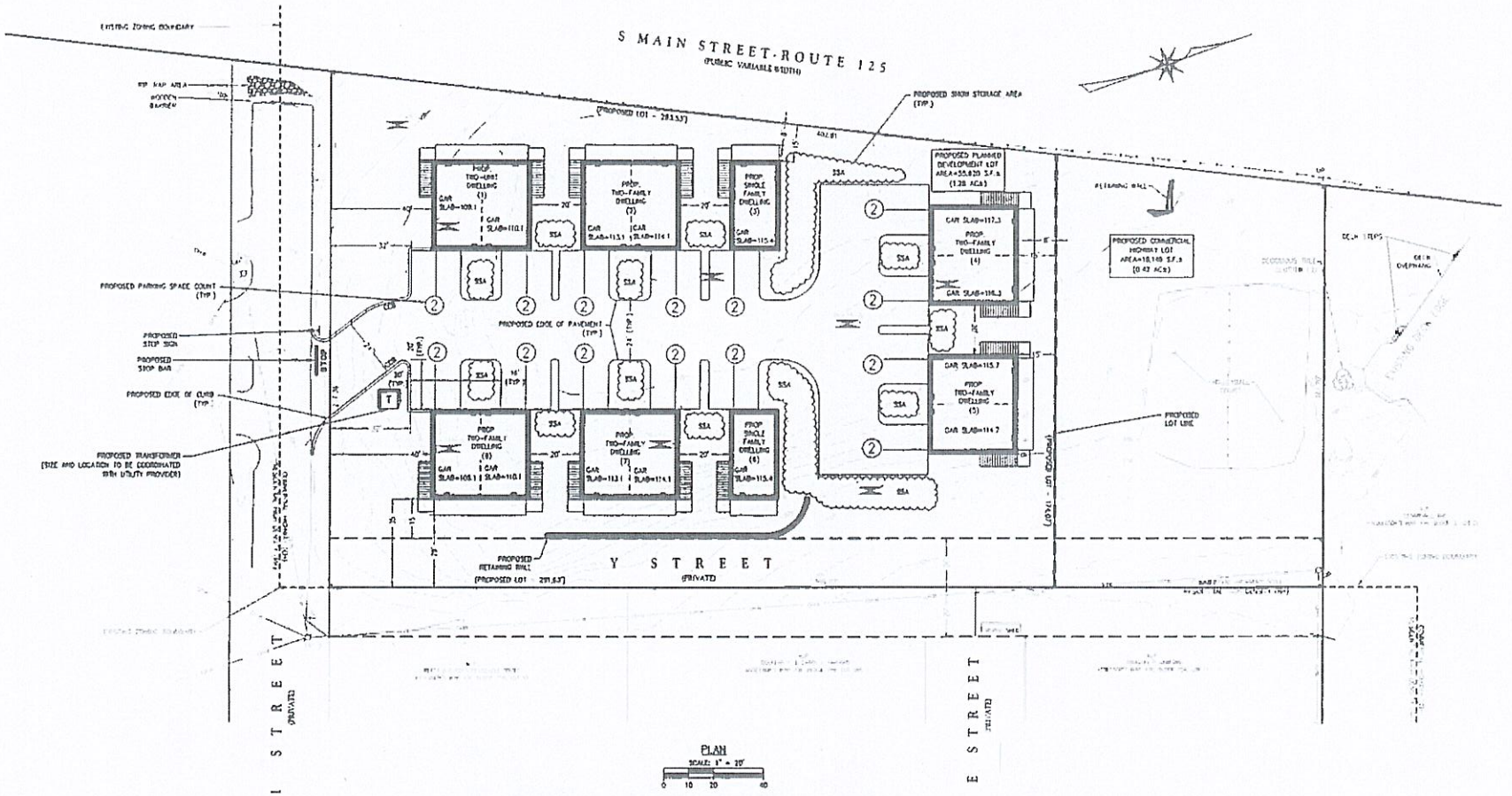
EXCESS SNOW TO BE REMOVED FROM THE SITE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

PARKING SPACE COUNT SUMMARY

	NUMBER OF SPACES
SURFACE	28
GARAGE	14
RATIO (14 UNITS)	3 SPACES/ UNIT

ZONING TABLE – PLANNED DEVELOPMENT (PD)

SETBACK	RESIDENTIAL HIGH DENSITY (RH) 1-FAM	RESIDENTIAL HIGH DENSITY (RH) 2-FAM	COMMERCIAL HIGHWAY (CH)	PROPOSED PD LOT
LOT AREA (MIN.)	7,500 SF	9,800 SF	23,000 SF	55,620 SF±
LOT AREA REQUIRED PER DWELLING UNIT (MIN.)	N/A	N/A	N/A	3,973 SF±
LOT FRONTAGE (MIN.)	75'	80'	175'	207.31'
LOT DEPTH (MIN.)	100'	100'	100'	291'
FRONT SETBACK (MIN.)	20'	20'	20'	40'
SIDE SETBACK (MIN.)	10'	10'	10'	15'
REAR SETBACK (MIN.)	30'	30'	15'	15'
BUILDING HEIGHT (MAX.)	35'	35'	40'	<40'
BUILDING HEIGHT – STORIES (MAX.)	2.5	2.5	3.0	<3.0
BUILDING COVERAGE (% MAX.)	25%	25%	80%	18.1%
FLOOR AREA RATIO (FAR, MAX.)	N/A	N/A	0.50	≤0.50
OPEN SPACE, (% MIN)	45%	45%	25%	51%



The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
18 HAMPSHIRE STREET, MANCHESTER, NH
18 LOWELL STREET, METHUEN, MA

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: SLS
APPROVED BY: DPC
SCALE: AS NOTED
DATE: APRIL 28, 2020

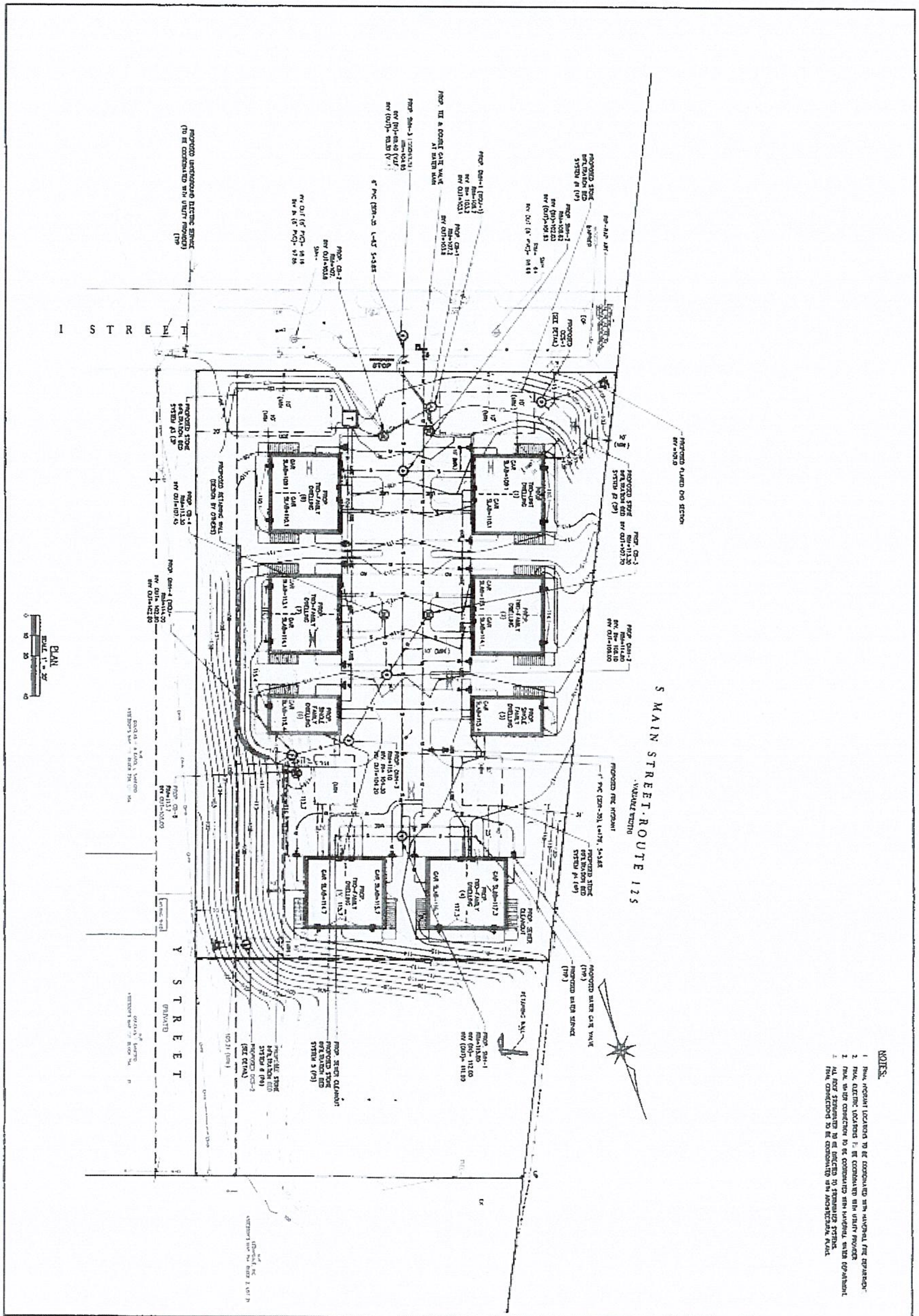
NO.	DESCRIPTION	DATE
	REVISIONS	

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 71)
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

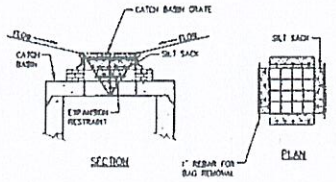
SITE LAYOUT PLAN

DRAWING NO. 5 OF 11

PROJ. #4316
DRAWING 4316_MAIN.dwg



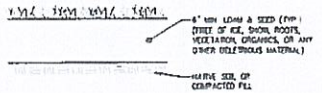
GRADING, DRAINAGE & UTILITIES DRAWING NO. 6 OF 11	SITE DEVELOPMENT PLANS IN HAVERHILL, MASSACHUSETTS 931 BOSTON ROAD (PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21) PREPARED FOR PENTUCKET NORTH DEVELOPMENT LLC	REVISIONS NO. DESCRIPTION DATE	SURVEY BY: MCG DRAFTED BY: DTS CHECKED BY: DAS APPROVED BY: SPC SCALE: AS NOTED DATE: APRIL 28, 2020	The Morin-Cameron GROUP, INC. CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS LAND SURVEYORS | LAND USE PLANNERS



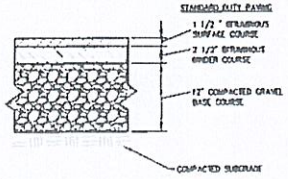
SILT SACK NOTES:

1. INSTALL SILT SACKS IN EXISTING CATCH BASINS. INSTALL SILT SACKS IN NEW CATCH BASINS AFTER INSTALLATION.
2. GRATES TO BE PLACED OVER SILT SACKS.
3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED WHEN DEPTH OF SEDIMENT IS within 6" OF GRATE.

SILT SACK
(NOT TO SCALE)



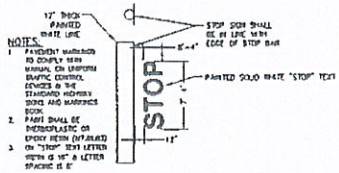
LOAM & SEED
(NOT TO SCALE)



NOTES:

1. PAVEMENT SHALL BE TYPE I, CLASS I, BITUMINOUS CONCRETE
2. PAVEMENT THICKNESS AFTER ROLLING
3. SUBGRADE TO BE INSPECTED PRIOR TO INSTALLATION OF PAVEMENT SUBBASE. IF UNCOMPACTED FILL OR UNSUITABLE SOIL IS PRESENT, IT SHALL BE REMOVED TO UNDISTURBED NATIVE SOIL AND REPLACED WITH STRUCTURAL FILL COMPACTED TO 95% R.C.

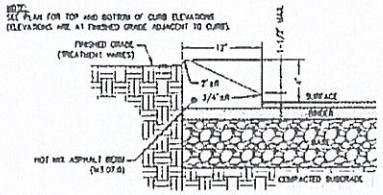
TYPICAL PAVEMENT SECTION
(NOT TO SCALE)



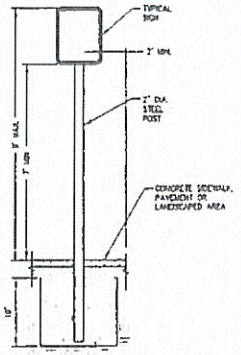
NOTES:

1. PAVEMENT MARKINGS TO COMPLY WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES & THE STANDARD HIGHWAY SIGNS AND MARKINGS BOOK.
2. PAINT SHALL BE THERMOPLASTIC OR EPOXY RESIN (WHITE).
3. ON "STOP" TEXT LETTER WIDTH IS 10" & LETTER SPACING IS 8"

STOP BAR
(NOT TO SCALE)



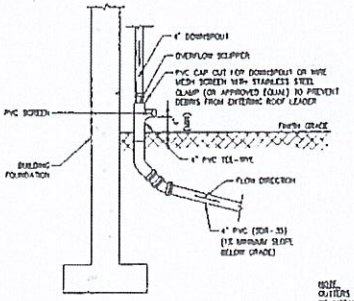
CAPE COD BERM
(NOT TO SCALE)



SIGN POST FOR SIGNS IN PARKING AREAS
(NOT TO SCALE)

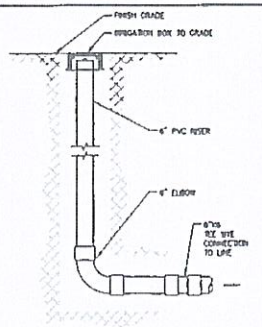
M.U.T.C.D. LEGEND	WIDTH	HEIGHT	SYMBOL
R1-1	30"	30"	

SIGN KEY
(NOT TO SCALE)

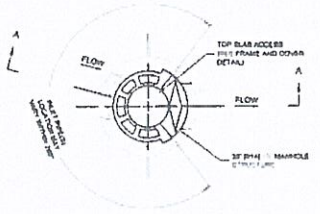


DOWN SPOUT ROOF LEADER
NOT TO SCALE

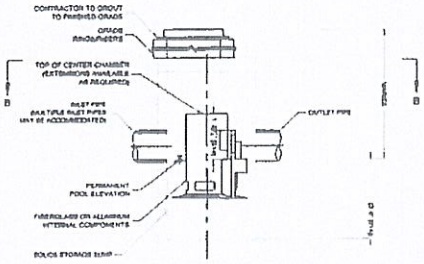
NOTE:
GUTTERS AND DOWNSPOUTS SHALL BE INSTALLED TO COLLECT ALL ROOF RUNOFF FROM THE HOUSE & CONVEY IT TO THE INFILTRATION AREAS.



SEWER CLEANOUT
(NOT TO SCALE)



PLAN VIEW B-B
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

CONTECH CS-3 (WQU-1 & WQU-2)
(NOT TO SCALE)

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS LANDSCAPE ARCHITECTS
1 SHATTUCK ROAD, HAVERHILL, MA 01832
T: 978-374-0505 F: 978-373-0168 WWW.MORINCAMERON.COM

REVISIONS		
NO.	DESCRIPTION	DATE

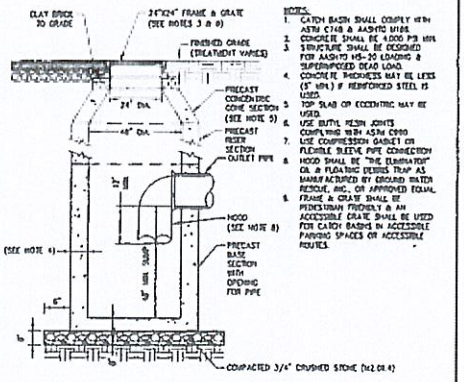
SURVEY BY: MCG
DRAFTED BY: DJS
CHECKED BY: RAS
APPROVED BY: DPC
SCALE: AS NOTED
DATE: APRIL 26, 2019

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
(PORTION OF ASSESSORS MAP 734, BLOCK 2, LOT 21)
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

DETAILS

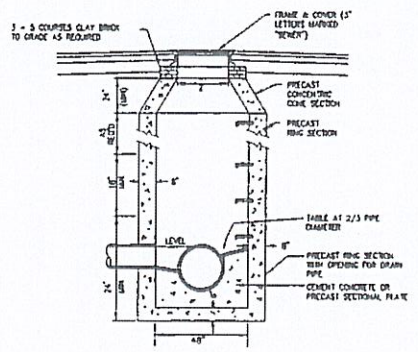
DRAWING NO. 7 OF 11

FILE: (4316 DRAWING 4316_MAIN.dwg)



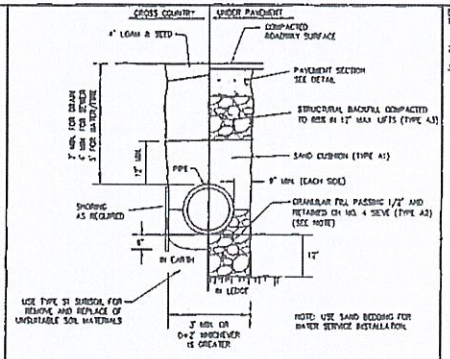
NOTES:
1. CATCH BASIN SHALL COMPLY WITH ASTM C748 & AASHTO M105.
2. CONCRETE SHALL BE 4,000 PSI MIN.
3. STRUCTURE SHALL BE DESIGNED FOR AASHTO HS-20 LOADING & SUPERIMPOSED DEAD LOAD.
4. CONCRETE THICKNESS MAY BE LESS (5" MIN.) IF REINFORCED STEEL IS USED.
5. TOP SLAB OR ECCENTRIC MAY BE USED.
6. USE BUTYL RESIN JOINTS COMPLYING WITH ASTM C990.
7. USE COMPRESSION GASKET OR FLEXIBLE SLEEVE PIPE CONNECTION.
8. HOOD SHALL BE "TYPE ELIMINATOR" OR A FLOATING DEBRIS TRAP AS MANUFACTURED BY GROUND WATER REMOVE, INC., OR APPROVED EQUAL.
9. FRAME & GRATE SHALL BE PEDESTRIAN FRIENDLY & AN ACCESSIBLE GRATE SHALL BE USED FOR CATCH BASINS IN ACCESSIBLE PARKING SPACES OR ACCESSIBLE ROUTES.

CATCH BASIN
(NOT TO SCALE)



NOTE: OUTLET INVERT IS A MINIMUM 0.10' LOWER THAN INLET INVERT.

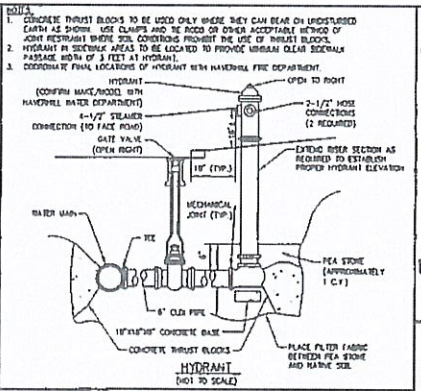
SEWER MANHOLE DETAIL
(NOT TO SCALE)



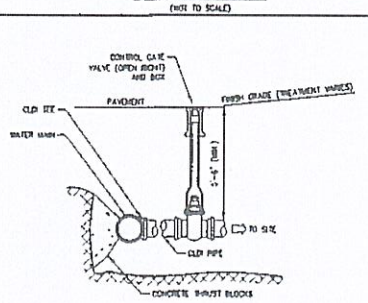
NOTE: USE SAND BEDDING FOR WATER SERVICE INSTALLATION.

UTILITY TRENCH DETAIL
(NOT TO SCALE)

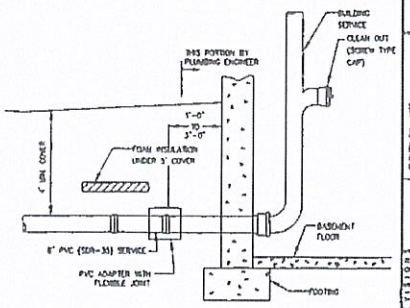
NOTES:
1. CONCRETE THRUST BLOCKS TO BE USED ONLY WHERE THEY CAN BEAR ON UNDISTURBED EARTH AS SHOWN. USE CLAMPS AND TIE RODS OR OTHER ACCEPTABLE METHOD OF JOINT RESTRAINT WHERE SOIL CONDITIONS PREVENT THE USE OF THRUST BLOCKS.
2. HYDRANT IN SIDEWALK AREAS TO BE LOCATED TO PROVIDE MINIMUM CLEAR SIDEWALK PASSAGE WIDTH OF 5 FEET AT HYDRANT.
3. COORDINATE FINAL LOCATIONS OF HYDRANT WITH HAVERHILL FIRE DEPARTMENT.



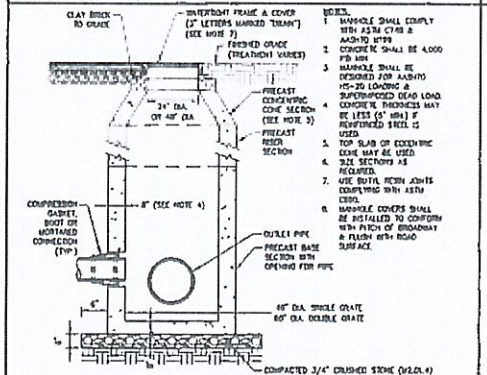
HYDRANT
(NOT TO SCALE)



WATER MAIN GATE VALVE CONNECTION
(NOT TO SCALE)

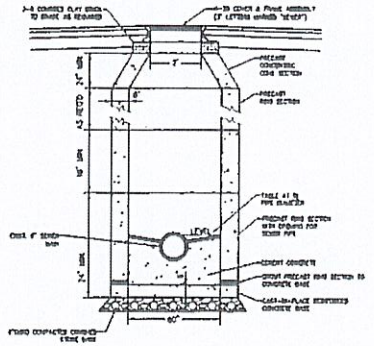


TYPICAL BUILDING SEWER SERVICE
(NOT TO SCALE)



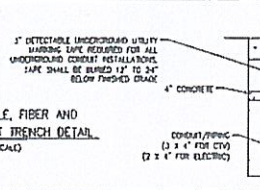
NOTES:
1. MANHOLE SHALL COMPLY WITH ASTM C748 & AASHTO M199.
2. CONCRETE SHALL BE 4,000 PSI MIN.
3. MANHOLE SHALL BE DESIGNED FOR AASHTO HS-20 LOADING & SUPERIMPOSED DEAD LOAD.
4. CONCRETE THICKNESS MAY BE LESS (5" MIN.) IF REINFORCED STEEL IS USED.
5. TOP SLAB OR ECCENTRIC CONE MAY BE USED.
6. SIZE SECTIONS AS REQUIRED.
7. USE BUTYL RESIN JOINTS COMPLYING WITH ASTM C990.
8. MANHOLE COVERS SHALL BE INSTALLED TO CONFORM WITH PITCH OF BROADWAY & FLUSH WITH ROAD SURFACE.

DRAIN MANHOLE
(NOT TO SCALE)



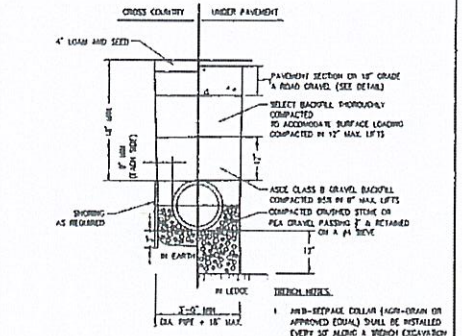
NOTES:
1. EXISTING SEWER MAIN LOCATION, SIZE AND MATERIAL SHALL BE VERIFIED IN FIELD.
2. IF LEDGE ENCOUNTERED BELOW EXISTING SEWER MAIN, REINFORCING DOWELS SHALL BE SET A MIN. OF 8" INTO EXISTING LEDGE PRIOR TO CASTING BASE OF DOG HOUSE MANHOLE.

SEWER MANHOLE DETAIL (DOGHOUSE)
(NOT TO SCALE)



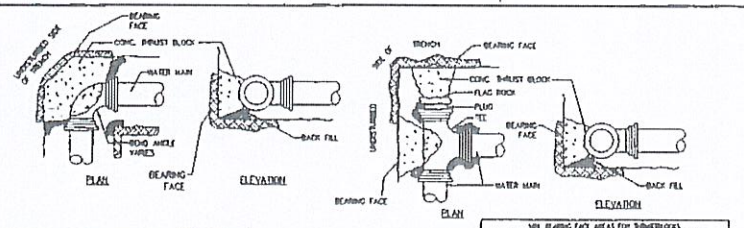
TELEPHONE, CABLE, FIBER AND ELECTRICAL CONDUIT TRENCH DETAIL
(NOT TO SCALE)

ELECTRICAL CONDUIT TRENCH DETAIL
NOTES:
1. ADJUST FOR ANY LOCAL MODIFICATIONS TO NFPA 70/NEC.
2. COORDINATE CONDUITS WITH APPLICABLE SERVICE PROVIDERS.



TRENCH NOTES:
1. INTERCEPTOR COLLAR (AGRI-DRAIN OR APPROVED EQUAL) SHALL BE INSTALLED EVERY 50' ALONG A TRENCH EXCAVATION WHEN THE SLOPE EXCEEDS 4%.
2. SHEETING, IF USED, SHALL BE CUT OFF 12 INCHES (12") ABOVE TOP OF PIPE OR CONDUIT.

TYPICAL DRAIN TRENCH DETAIL
(NOT TO SCALE)



NOTES:
1. ALL WATER MAIN FITTINGS, BENDS, TEES, PLUGS ETC. SHALL BE RESTRAINED W/ THRUST BLOCKS EXCEPT WHERE NOTED.
2. ALL THRUST BLOCKS & COLLARS SHALL BE INSTALLED SO THAT THEY BEAR AGAINST UNDISTURBED EARTH.
3. MINIMUM COMPRESSIVE STRENGTH OF THRUST BLOCK CONCRETE SHALL BE 3,000 P.S.I.
4. KEEP CONCRETE CLEAR OF MECHANICAL JOINTS.

THRUST BLOCK DETAIL
(NOT TO SCALE)

MIN. BEARING FACE AREAS FOR THRUSTBLOCKS

	90°	45°	22.5°	11.25°	PLUGS	CAPS	HYDRANTS
6"-8"	9	5	4	4	4	4	4
10"-12"	12	8	5	5	8	6	6

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS TRAFFIC ENGINEERS
9 BLANCHARD ROAD, BURLINGTON, MA 01803
781-272-1555 • 1-800-SMG-MAIL

SURVEY BY: MCE
DRAFTED BY: GTS
CHECKED BY: MAS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 28, 2020

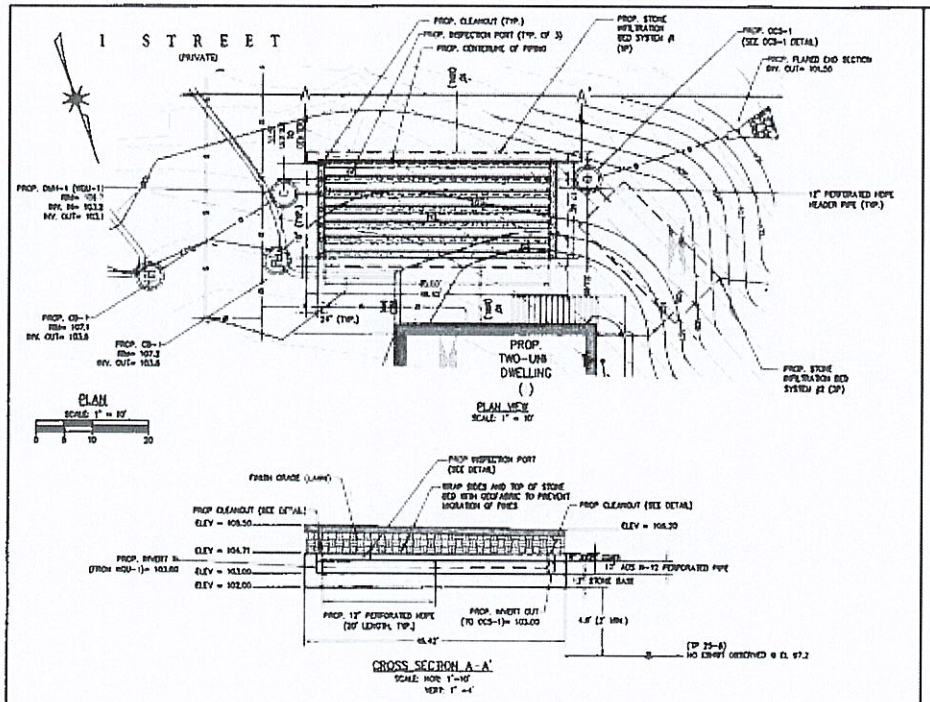
NO.	DATE	DESCRIPTION
1	8/17/2020	PLANNING BOARD SUBMISSION

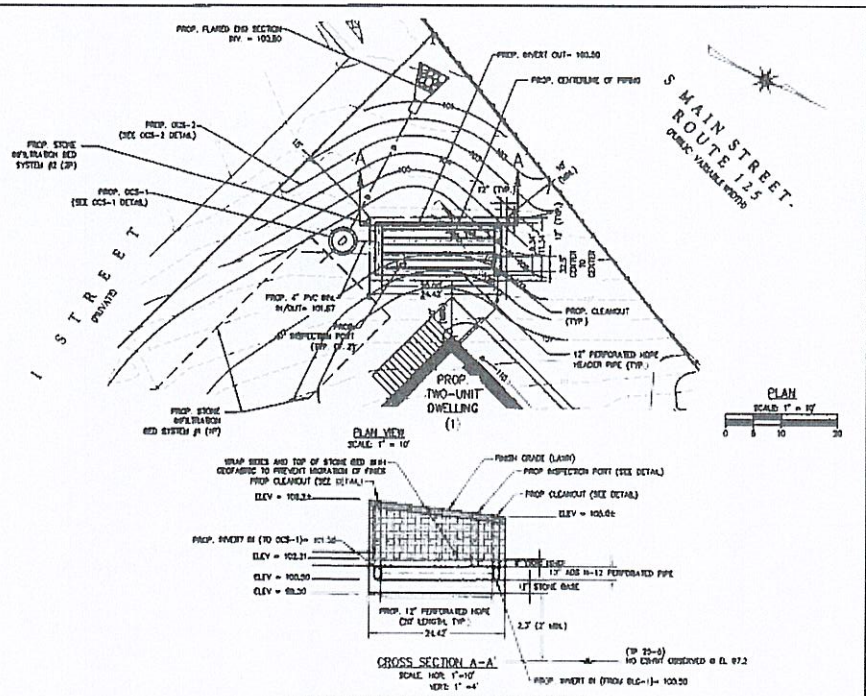
SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 734, BLOCK 2, LOT 21)
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

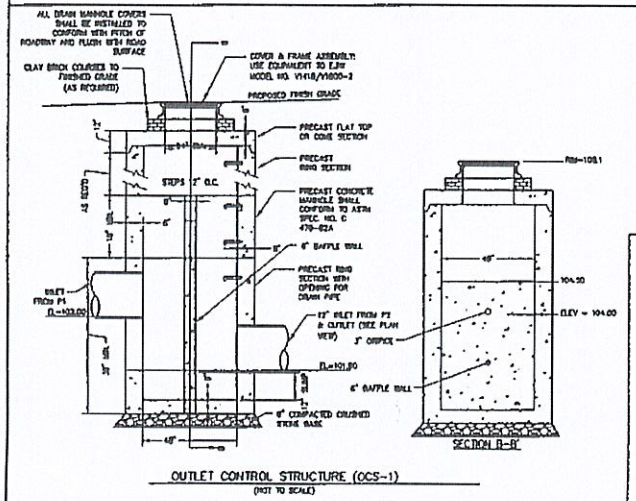
DETAILS

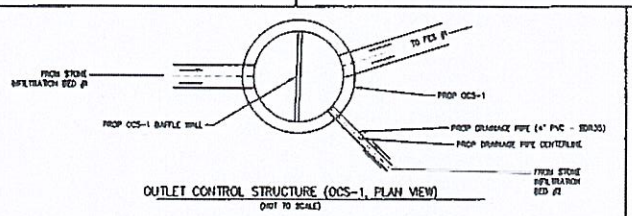
DRAWING NO. 8 OF 11

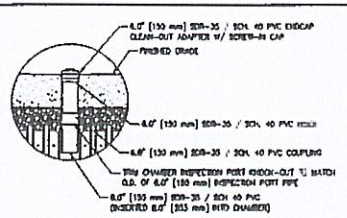
FINAL #4318
DRAWING 4318_SIAD.dwg

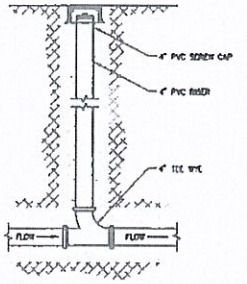












The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
9 RESEARCH DRIVE, WOBURN, MASSACHUSETTS 01801
T: 781-935-6889 F: 781-935-2896 www.morincameron.com

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: DTS
APPROVED BY: JMC
SCALE: AS NOTED
DATE: APRIL 28, 2023

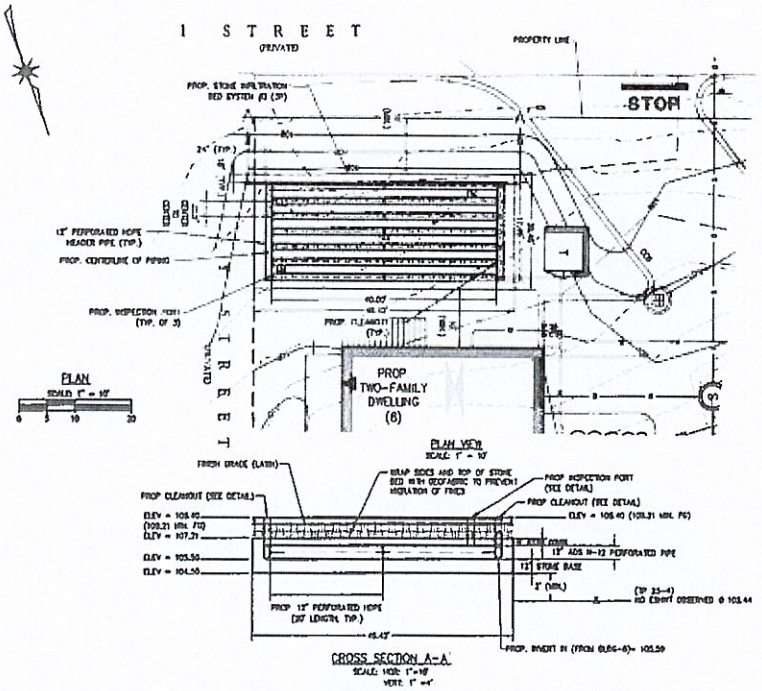
NO.	DESCRIPTION	DATE
1		

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
(PORTION OF ASSESSORS MAP 75A, BLOCK 2, LOT 21)
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

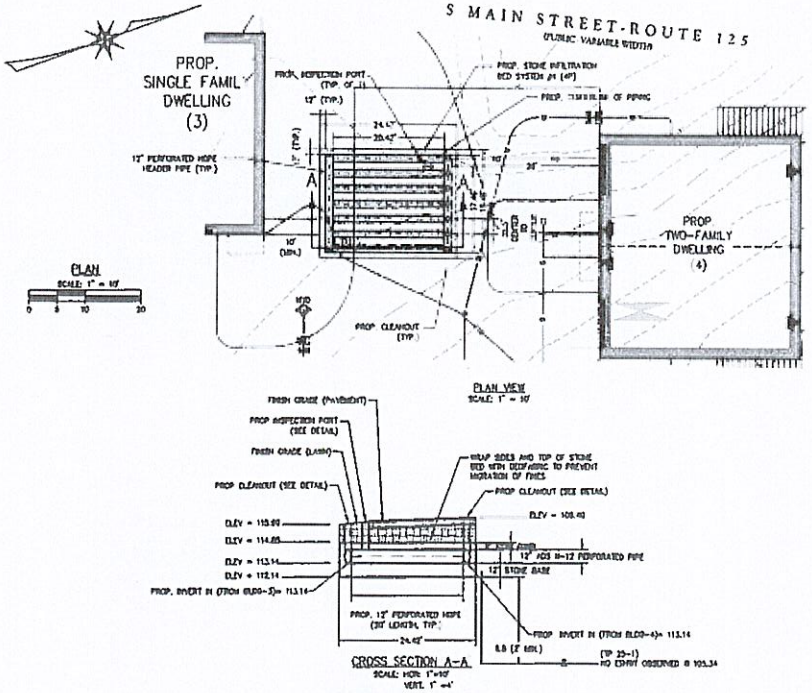
STORMWATER DETAILS

DRAWING NO. 9 OF 11

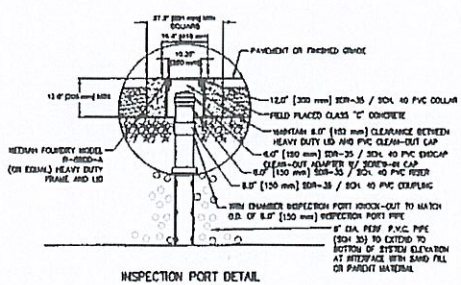
PROJ. #1318
DRAWING 1318_SWPLAN.dwg



STONE INFILTRATION BED SYSTEM #3 DETAIL (3P)
(46.42' LENGTH X 20.46' WIDTH)
SCALE: AS NOTED



STONE INFILTRATION BED SYSTEM #4 DETAIL (4P)
(24.42' LENGTH X 19.46' WIDTH)
SCALE: AS NOTED



INSPECTION PORT DETAIL
(NOT TO SCALE)

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
[illegible]

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: DNS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 28, 2020

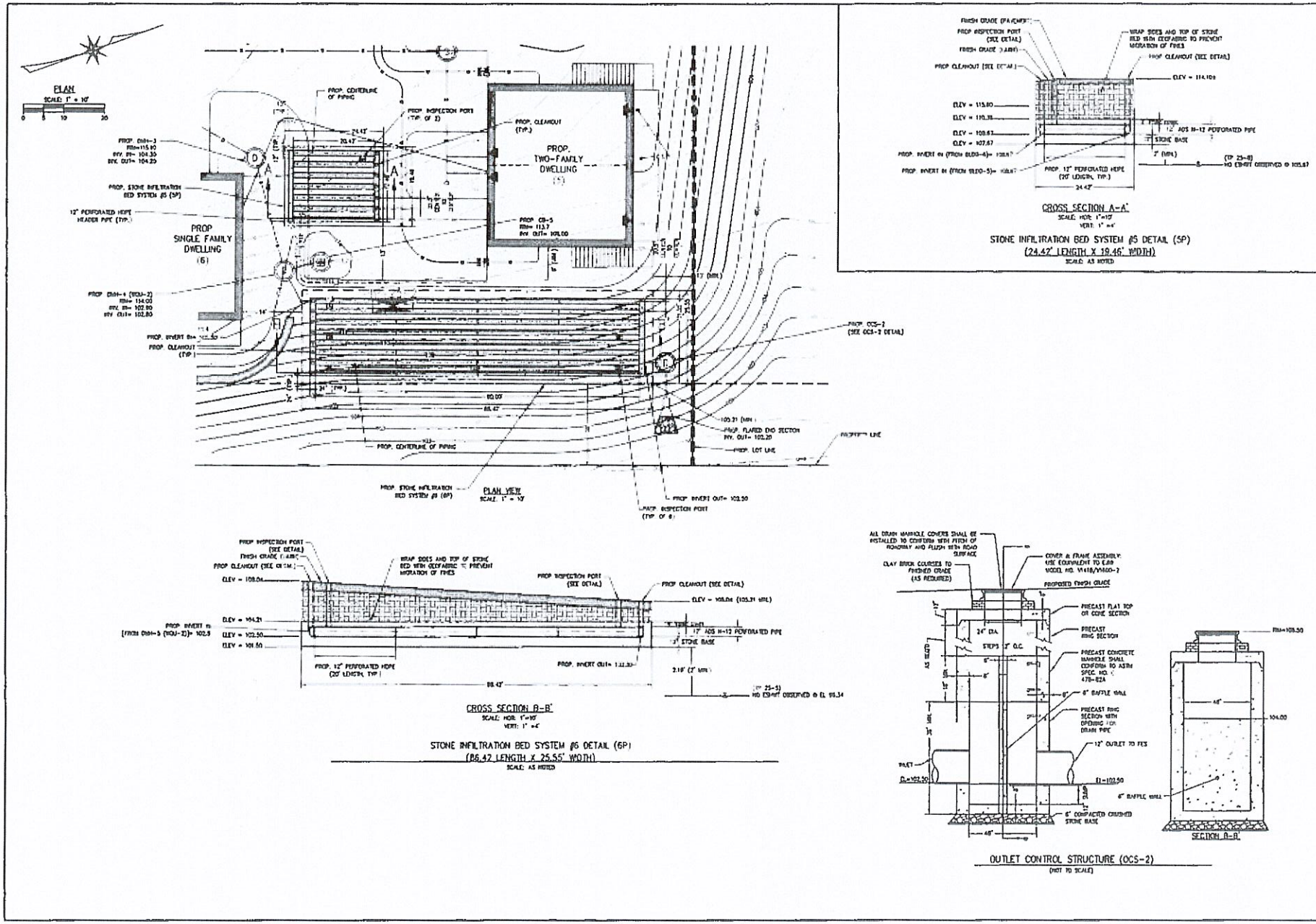
REVISIONS
NO. DESCRIPTION DATE

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT [illegible])
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

STORMWATER DETAILS

DRAWING NO. 10 OF 11

PROJ. #4319
DRAWING: 4319_MAIN.dwg



The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS LAND USE PLANNERS

SURVEY BY: WCG
DRAFTED BY: DTS
CHECKED BY: BAS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 20, 2020

REVISIONS
NO. DESCRIPTION DATE

SITE DEVELOPMENT PLANS
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

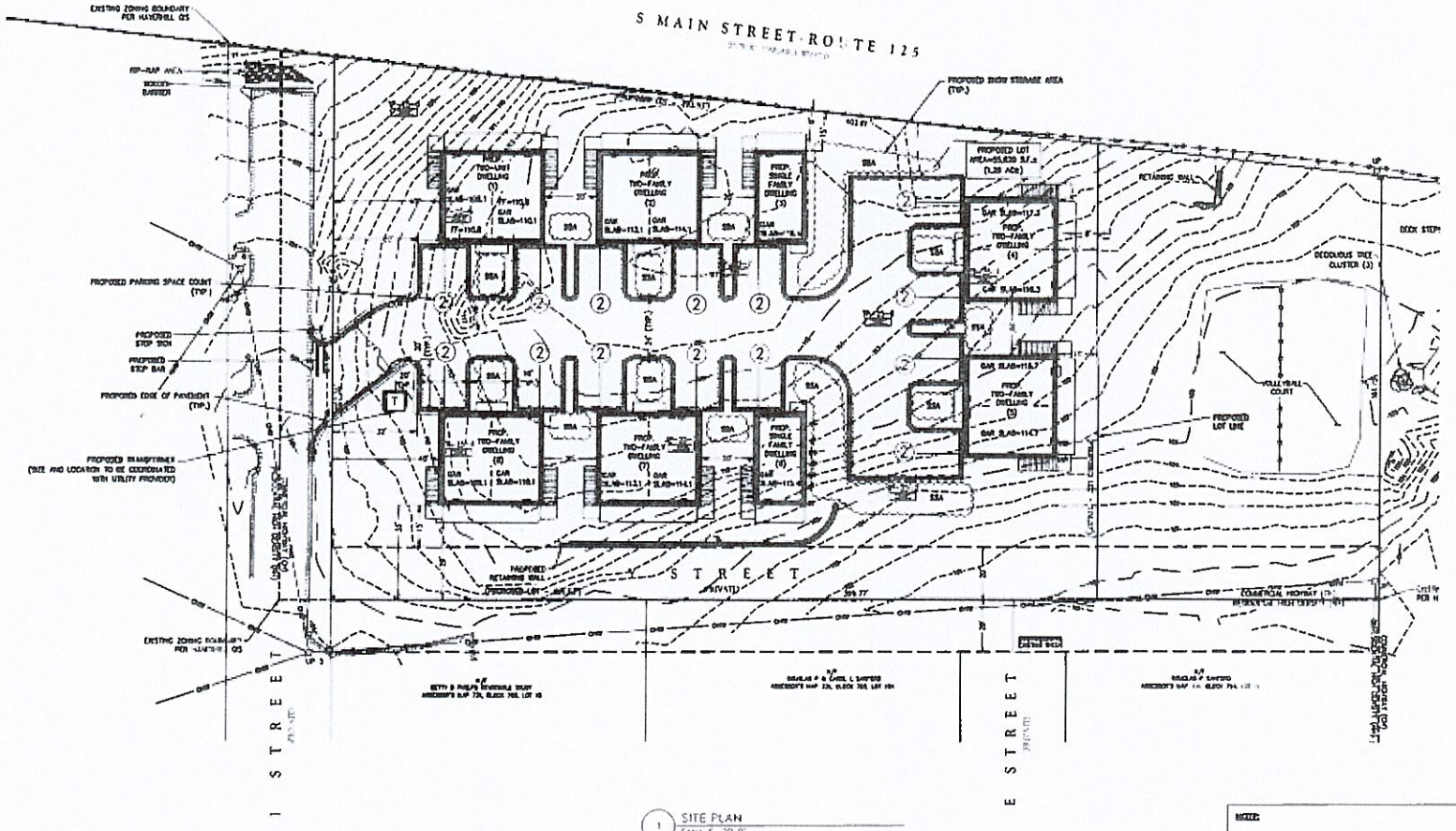
STORMWATER DETAILS

DRAWING NO. 11 OF 11

PROJ. #4310
DRAWING 4310_MAIN.dwg

DRAWING LIST

SHEET NUM	SHEET TITLE	DATE	REVISION	REVISION DATE	REVISION NOTE
A0.0	SITE PLAN	1-23-26			
A1.1	FIRST FLOOR PLAN DUPLEX BUILDING	1-23-26			
A1.2	SECOND FLOOR PLAN DUPLEX BUILDING	1-23-26			
A1.3	ROOF PLAN DUPLEX BUILDING	1-23-26			
A2.1	ELEVATIONS DUPLEX BUILDING	1-23-26			
A2.2	ELEVATIONS DUPLEX BUILDING	1-23-26			
A3.1A	1ST & 2ND FLOOR PLAN SINGLE BUILDING	1-23-26			
A3.1B	3RD FLOOR & ROOF PLAN SINGLE BUILDING	1-23-26			
A3.2	ELEVATIONS SINGLE BUILDING	1-23-26			
A3.3	STREET ELEVATIONS	1-23-26			



1 SITE PLAN
Scale: 1" = 20'-0"

NOTE:
SITE PLAN IS FOR REFERENCE ONLY BASED UPON INFORMATION AS PROVIDED IN THE 5 LOT DEVELOPMENT PLANS DATED 1-23-26 AS PREPARED BY THE MORIN CAMERON GROUP INC

0 10 20 30 40 50 FT

SCOTT BROWN ARCHITECTS
49 MARKET STREET
NEWBURYPORT, MA 01950
T 978.465.0500
WWW.SCOTTBROWNARCHITECT.COM

MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & RELEASE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	K.K.	1-23-26

Scale: AS NOTED

SITE PLAN

A0.0

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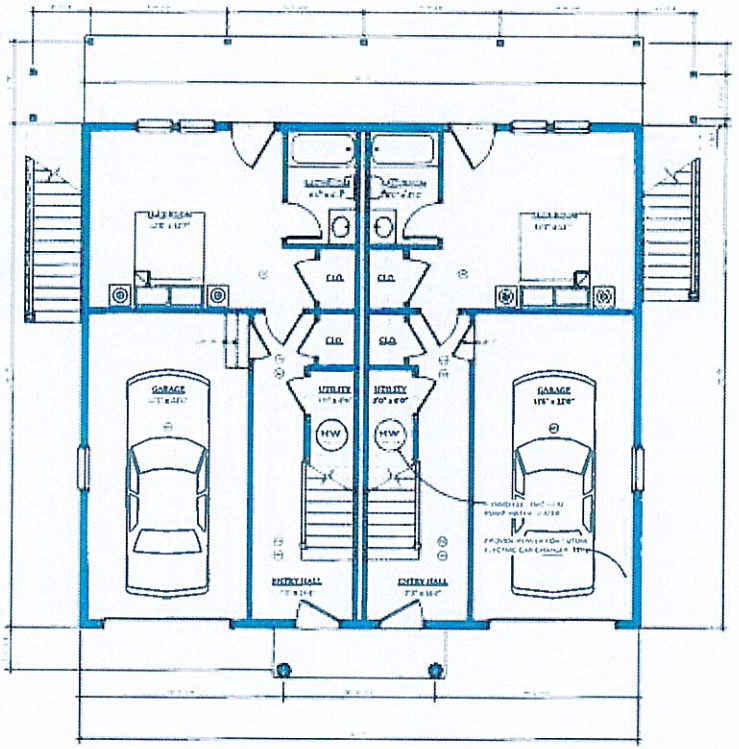

1 FIRST FLOOR PLAN
Scale 1/4" = 1'-0"

NOTE:
FLOOR PLANS SHOWN MAY BE APPROVED DEPENDING ON UNIT LOCATION ON SITE

FIRST FLOOR SQ. FT. (EXCL. GARAGE)	445 SQ. FT.
SECOND FLOOR SQ. FT.	720 SQ. FT.
THIRD FLOOR SQ. FT.	485 SQ. FT.
TOTAL SQUARE FOOTAGE **	1,648 SQ. FT.

**AREA TAKEN TO EXTERIOR SHEATHING

0 5 10 15 FT

SCOTT BROWN
ARCHITECTS

48 MARKET STREET
NEWBURYPORT, MA 01950
T 978 465 [illegible]
WWW.SCOTTBROWNARCHITECT.COM

MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

1ST FLOOR PLAN
DUPLEX BUILDING

A1.1

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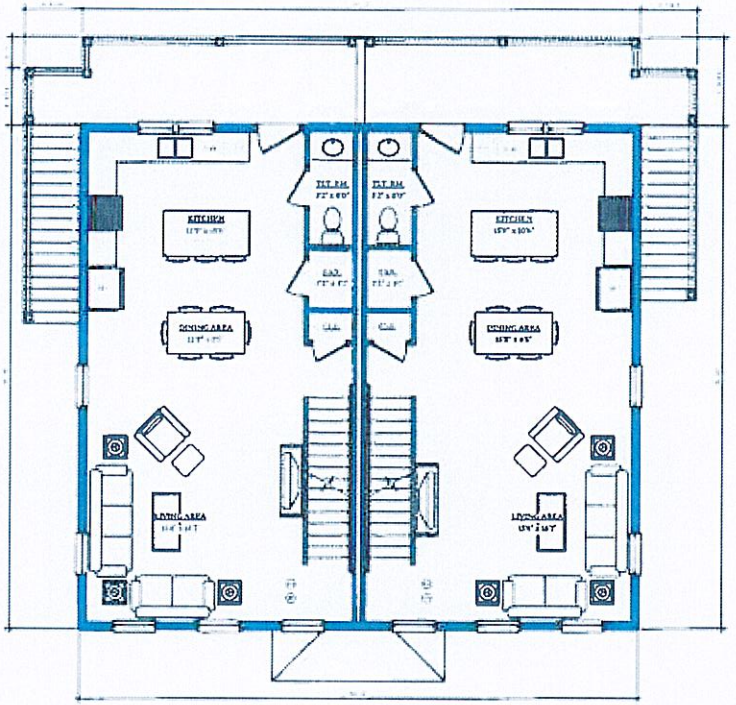

1 SECOND FLOOR PLAN
Scale: 1/4" = 1'-0"

FLOOR PLANS SHOWN MAY BE REVERSED DEPENDING ON LOT LOCATION ON SITE

0 5 10 15 FT

SCOTT BROWN ARCHITECTS

18 MARKET STREET
NEWBURYPORT, MA 01950
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X	3-23-26

Scale: AS NOTED

2ND FLOOR PLAN DUPLEX BUILDING

A1.2

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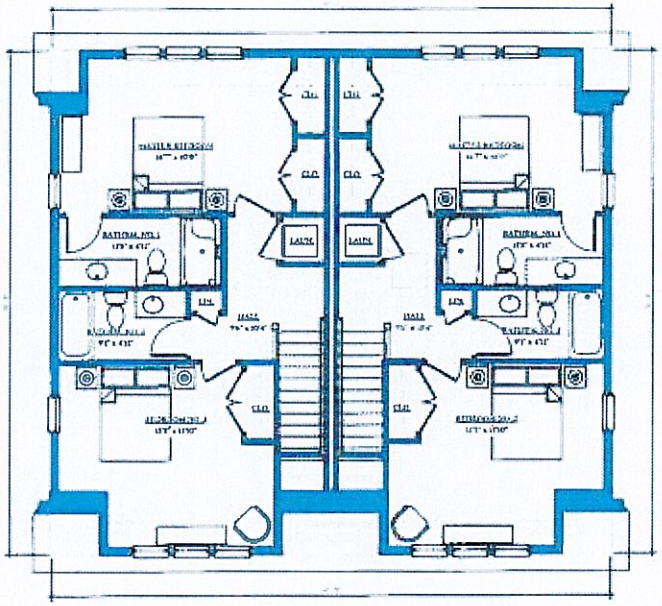

1 THIRD FLOOR PLAN
Scale: 1/4" = 1'-0"

NOTE:
FLOOR PLANS SHOWN MAY BE MIRRORED DEPENDING ON LOT LOCATION ON SITE.

0 1 4 8 16 FT

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48 MARKET STREET
NEWBURYPORT, MA 01950
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	K.K.	3-23-26

Scale: AS NOTED

3RD FLOOR PLAN DUPLEX BUILDING

A1.3

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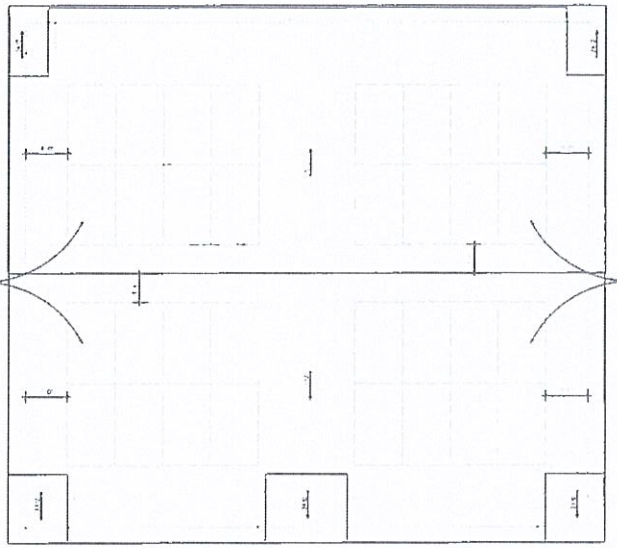

1 ROOF PLAN
SCALE: 1/4" = 1'-0"

0 5 10 15 FT

SCOTT H. BROWN ARCHITECTS
48 MARKET STREET
NEWBURYPORT, MA 01950
T 978 465 1545
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	K.K.	3-23-26

Scale: AS NOTED

ROOF PLAN DUPLEX BUILDING

A1.4

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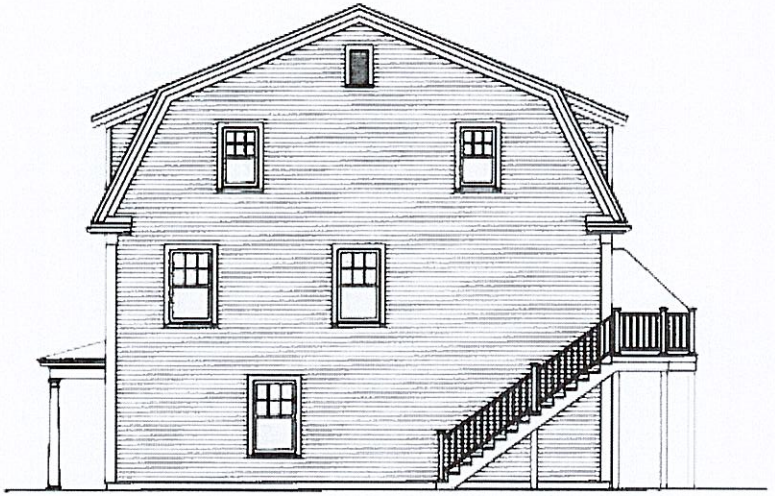

2 RIGHT SIDE ELEVATION
1/4" = 1'-0"

1 FRONT ELEVATION
1/4" = 1'-0"

SCOTT BROWN
ARCHITECTS
MARKET STREET
NEWBURYPORT, MA 01950
WWW.SCOTTBROWNARCHITECT.COM

MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

ELEVATIONS DUPLEX BUILDING

A2.1

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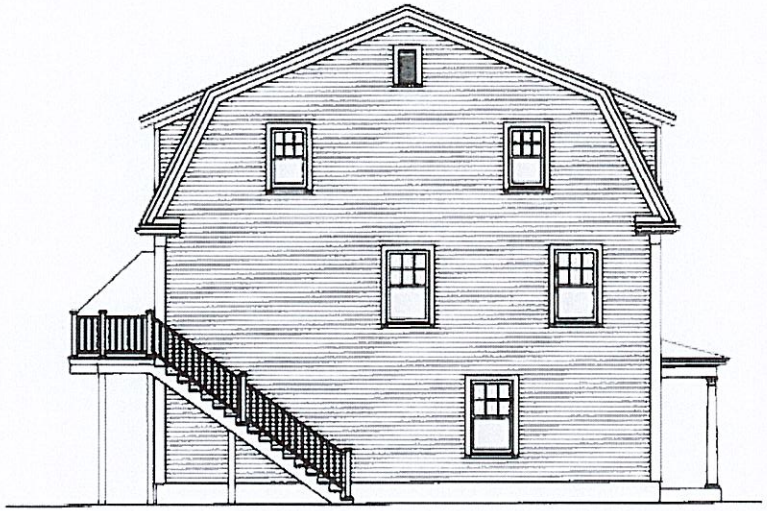

2 LEFT SIDE ELEVATION
1/4" = 1'-0"

1 REAR ELEVATION
1/4" = 1'-0"

0 5 10 FT

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T 978.465.1500
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

ELEVATIONS DUPLEX BUILDING

A2.2

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1 STREET ELEVATIONS
3/16" = 1'-0"

0 5 10 15 FT

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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

STREET ELEVATIONS

A2.3

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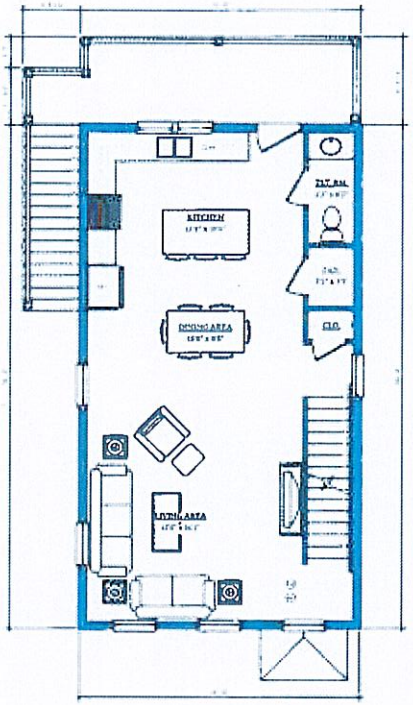
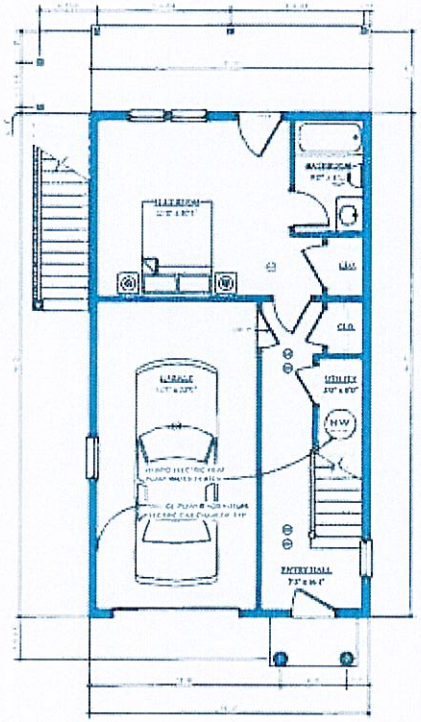


1 SECOND FLOOR PLAN
Scale 1/4" = 1'-0"



1 FIRST FLOOR PLAN
Scale 1/4" = 1'-0"

FLOOR PLANS SHOWN MAY BE ARRANGED DIFFERENTLY ON SITE

FIRST FLOOR SQ. FT (EXCL. GARAGE)	445 SQ. FT
SECOND FLOOR SQ. FT	739 SQ. FT
THIRD FLOOR SQ. FT	469 SQ. FT
TOTAL SQUARE FOOTAGE **	1,653 SQ. FT

**AREA TAKEN TO EXTERIOR SHEATHING

0 5 10 15 FT

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T 978 465 1555
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

1ST & 2ND FLOOR PLAN SINGLE BUILDING

A1.1B

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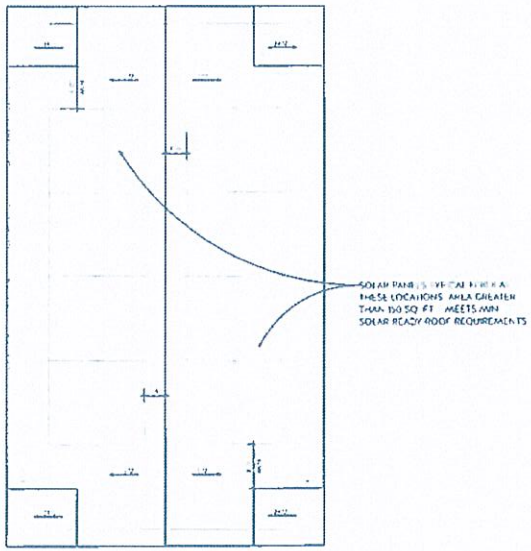
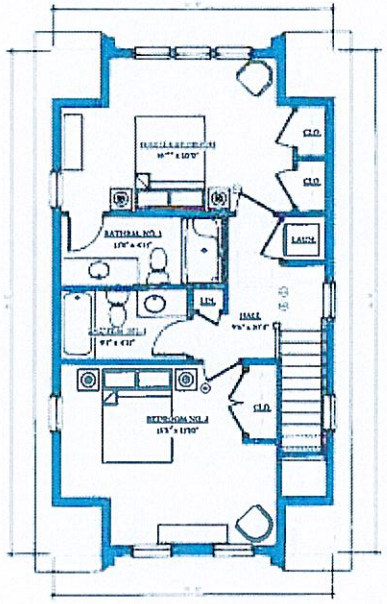


1 ROOF PLAN
Scale 1/4" = 1'-0"



1 THIRD FLOOR PLAN
Scale 1/4" = 1'-0"

FLOOR PLANS SHOWN MAY BE MIRRORED
DEPENDING ON UNIT LOCATION ON SITE

0 5 10 15 FT

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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

3RD FLOOR & ROOF PLAN SINGLE BUILDING

A1.2B

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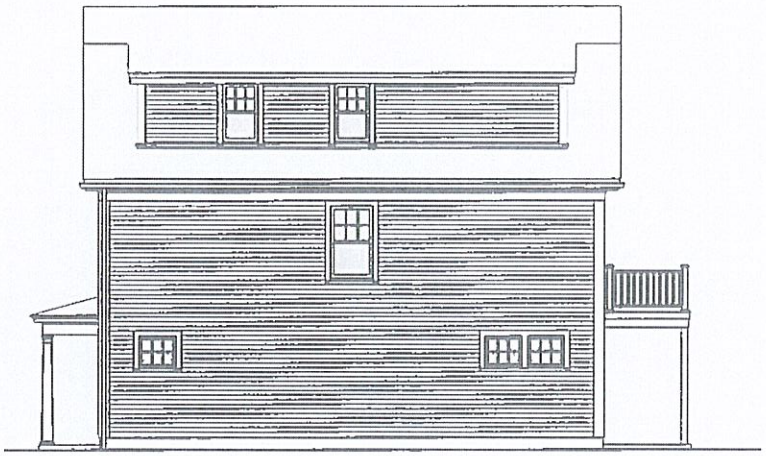
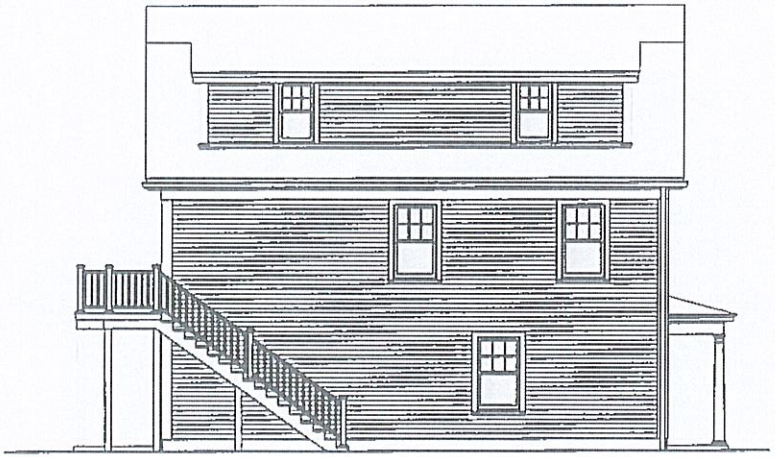
4 REAR ELEVATION
1/4" = 1'-0"



3 RIGHT SIDE ELEVATION
1/4" = 1'-0"



2 LEFT SIDE ELEVATION
1/4" = 1'-0"

1 FRONT ELEVATION
1/4" = 1'-0"

0 5 10 FT

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ARCHITECTS
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

ELEVATIONS SINGLE BUILDING

A2.1B

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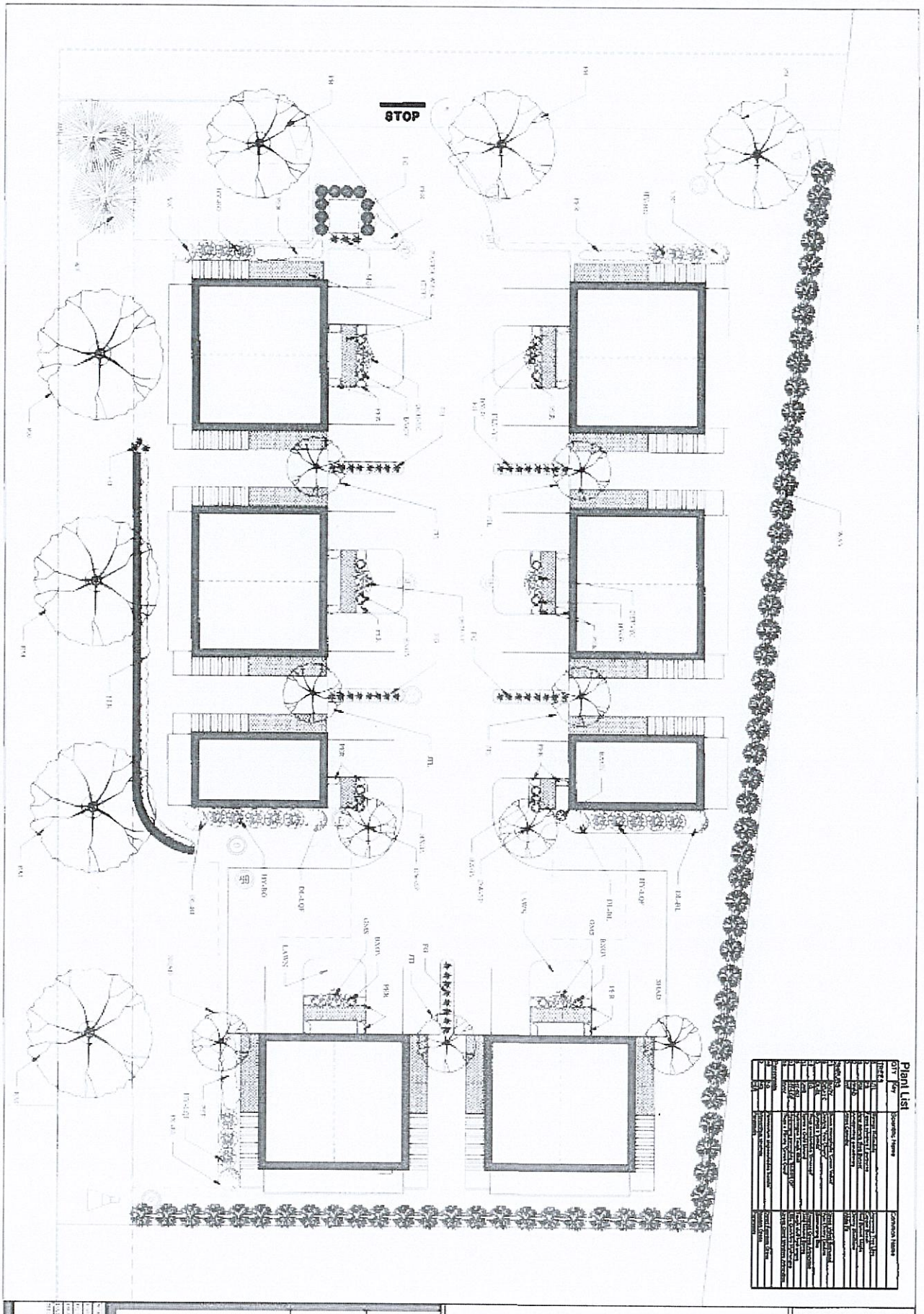


L-100

LANDSCAPE PLAN

I Street

4 Nonno Drive West Newbury, MA 01985

Corliss

31 Essex Road
Ipswich, MA 01938

PLANNED DEVELOPMENT (PD) SUBMITTAL TABLE

TOTAL LAND AREA	55,820 SF
DEVELOPABLE SITE AREA	30,820 SF
COMMON OR USABLE OPEN SPACE	28,640 SF
SITE COVERAGE OF BUILDINGS	10,080 SF
IMPERVIOUS SURFACE AREA	23,700 SF
IMPERVIOUS SURFACE RATIO	0.430 (42.5%)
GROSS FLOOR AREA OF ALL HIGH RESIDENTIAL BUILDINGS	0 SF
FLOOR AREA RATIO	0.101 (10.1%)
DENSITY OF DWELLING UNITS	3,972± SF/UNIT
NUMBER OF OFF-STREET PARKING SPACES	38 SPACES

BUILDING HEIGHTS

BUILDING	(A) AVERAGE FINISHED GRADE ELEVATION BASED ON BUILDING CORNERS (FT)	(B) GARAGE ENTRANCE ELEVATION (FT)	(C) MEAN ROOF HEIGHT ABOVE GARAGE ENTRANCE ELEVATION (FT)	(D) ELEVATION OF MEAN ROOF HEIGHT (FT) (B+C)	PROPOSED BUILDING HEIGHT (FT) (D-A)
1	110.10	110.7	28.10	138.80	28.70
2	113.80	113.0	28.10	141.10	27.30
3	113.80	115.3	25.75	141.05	25.45
4	117.10	116.2	28.10	144.30	27.20
5	116.10	114.7	28.10	142.80	27.70
6	115.30	115.3	25.75	141.05	25.75
7	114.00	113.0	28.10	141.10	27.10
8	110.00	109.0	28.10	137.10	27.10

BUILDING HEIGHT NOTE:

BUILDING HEIGHT IS CALCULATED AS THE VERTICAL DISTANCE FROM THE AVERAGE FINISHED GRADE (AVERAGE OF FINISHED GROUND ELEVATION AT THE MAIN CORNERS OF THE STRUCTURE) TO THE HIGHEST POINT OF THE ROOF. TOP OF THE HIGHEST ROOF BEAM (FLAT ROOF), DECK OF A MANSARD ROOF, OR MEAN LEVEL BETWEEN EAVES AND RIDGE (GABLE, HIP, SHED, GAMBREL, PYRAMID, OR SIMILAR ROOFS). MAXIMUM ALLOWABLE HEIGHTS ARE ESTABLISHED BY TABLE 3 (DIMENSIONAL REGULATIONS) BY ZONING DISTRICT. DEFINITION PER HAVERHILL ZONING ORDINANCE § 11.0 (DEFINITIONS).

SNOW STORAGE NOTE:

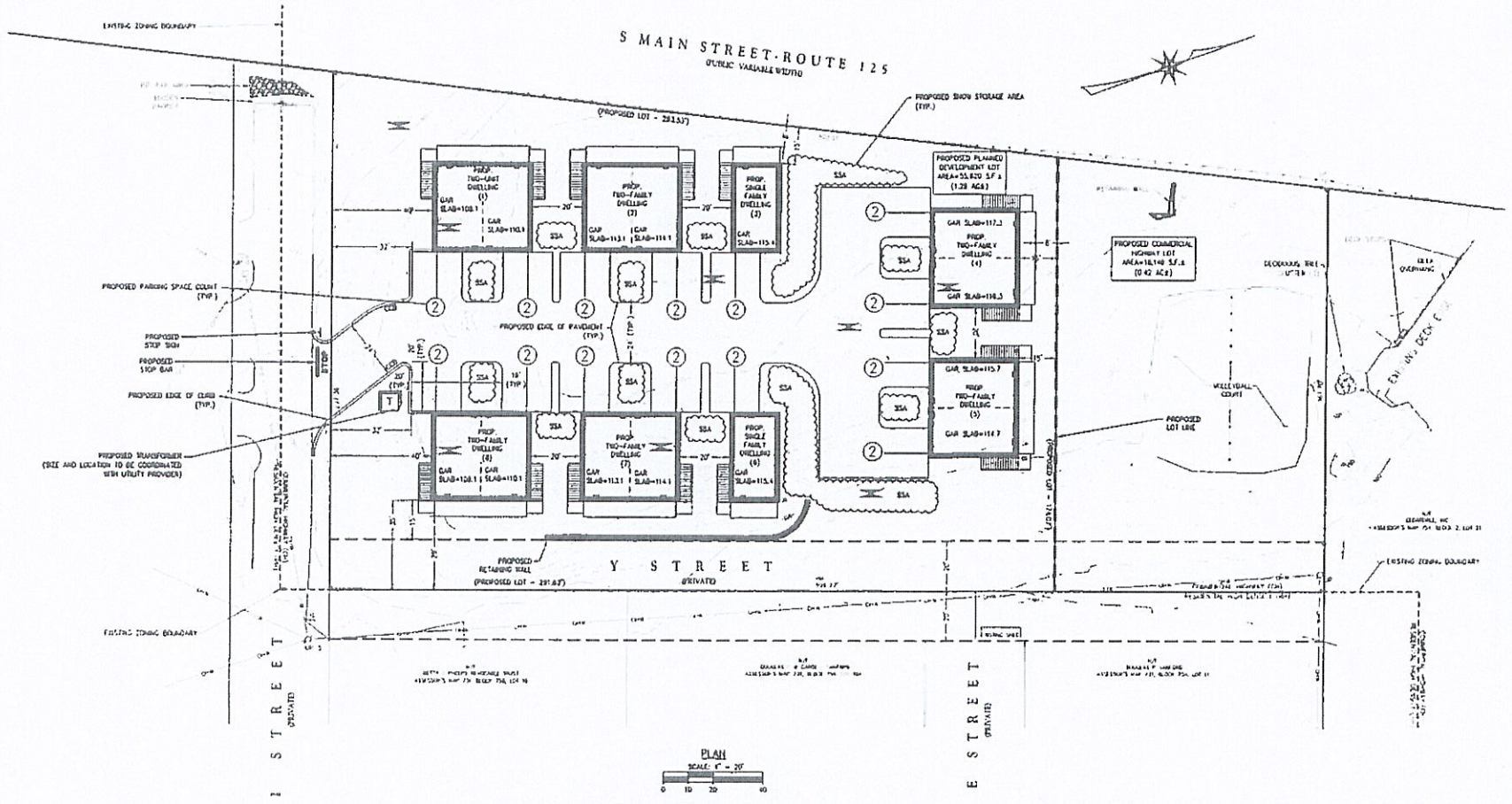
EXCESS SNOW TO BE REMOVED FROM THE SITE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

PARKING SPACE COUNT SUMMARY

	NUMBER OF SPACES
SURFACE	28
GARAGE	14
RATIO (14 UNITS)	3 SPACES/ UNIT

ZONING TABLE - PLANNED DEVELOPMENT (PD)

SETBACK	RESIDENTIAL HIGH DENSITY (RH) 1-FAM	RESIDENTIAL HIGH DENSITY (RH) 2-FAM	COMMERCIAL HIGHWAY (CH)	PROPOSED PD LOT
LOT AREA (MIN.)	7,500 SF	9,600 SF	21,500 SF	55,820 SF±
LOT AREA REQUIRED PER DWELLING UNIT (MIN.)	N/A	N/A	N/A	3,972 SF±
LOT FRONTAGE (MIN.)	75'	80'	175'	207.38'
LOT DEPTH (MIN.)	100'	100'	100'	291'
FRONT SETBACK (MIN.)	20'	20'	30'	40'
SIDE SETBACK (MIN.)	10'	10'	15'	15'
REAR SETBACK (MIN.)	30'	30'	15'	15'
BUILDING HEIGHT (MAX.)	35'	35'	40'	40'
BUILDING HEIGHT - STORIES (MAX.)	2.5	2.5	3.5	3.5
BUILDING COVERAGE (% MAX.)	25%	25%	NONE	18.1%
FLOOR AREA RATIO (FAR, MAX.)	N/A	N/A	0.50	0.50
OPEN SPACE, (% MIN.)	45%	40%	25%	71%



The Morin-Cameron Group, Inc.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
66 ELM STREET, SALEM, MASSACHUSETTS 01970
T: 978.741.0010 F: 978.744.6178

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: MAS
APPROVED BY: JPC
SCALE: AS NOTED
DATE: APRIL 22, 2022

NO	REVISIONS	DATE

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

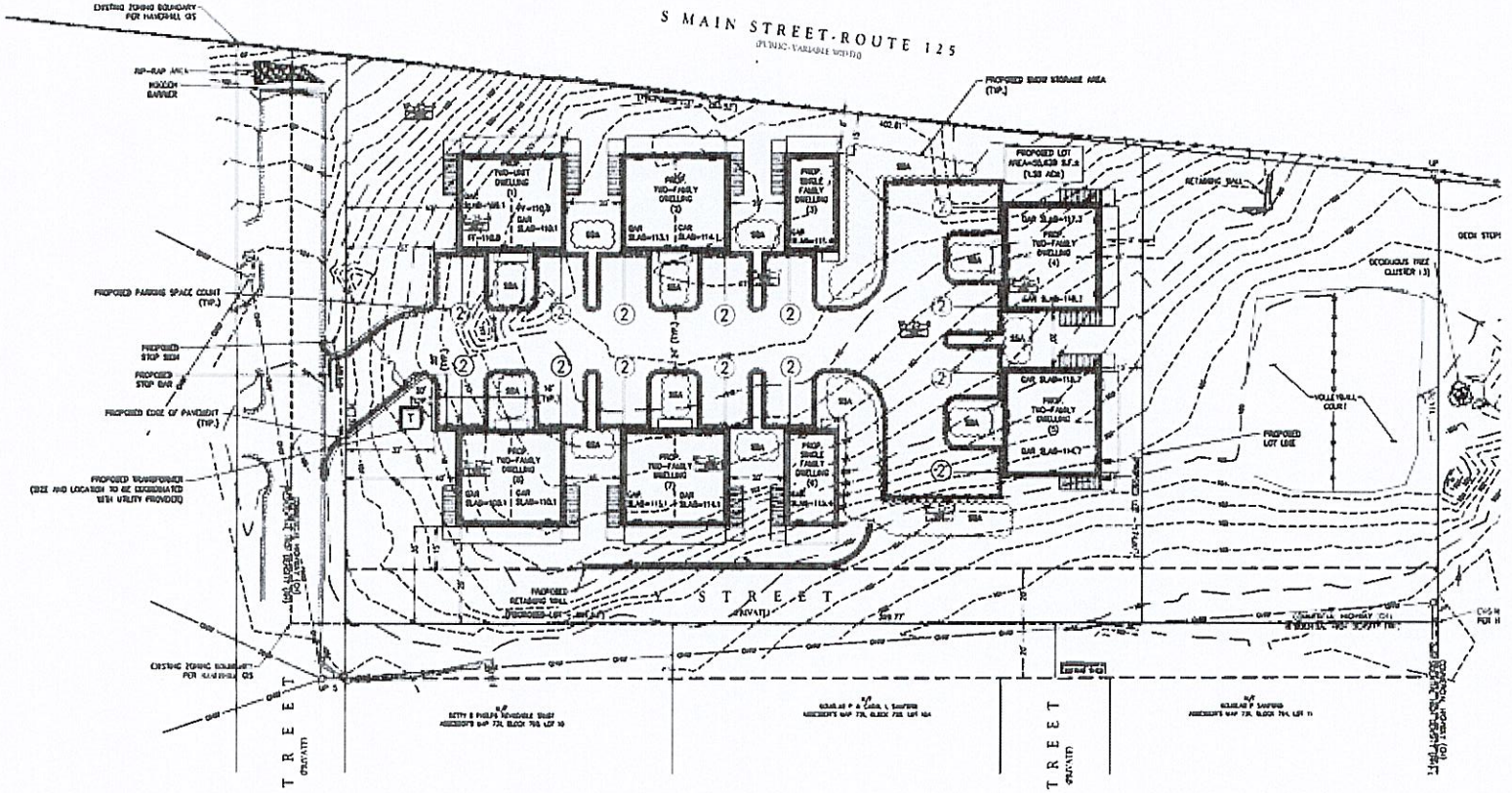
SITE LAYOUT PLAN

DRAWING NO. 5 OF 11

PROJ. #4378
DRAWING 4378_MAIN.dwg

DRAWING LIST

SHEET NUM	SHEET TITLE	DATE	REVISION	REVISION DATE	REVISION NOTE
A0.0	SITE PLAN	[illegible]			
A1.1	1ST FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.2	2ND FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.3	3RD FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.4	ROOF PLAN DUPLEX BUILDING	[illegible]			
A2.1	ELEVATIONS DUPLEX BUILDING	[illegible]			
A2.2	ELEVATIONS DUPLEX BUILDING	[illegible]			
A1.10	1ST & 2ND FLOOR PLAN SINGLE BUILDING	[illegible]			
A1.20	3RD FLOOR & ROOF PLAN SINGLE BUILDING	[illegible]			
A2.10	ELEVATIONS SINGLE BUILDING	[illegible]			
A2.1	STREET ELEVATIONS	[illegible]			



1 SITE PLAN
Scale 1" = 20'-0"

NOTE:
SITE PLAN IS FOR REFERENCE ONLY BASED UPON INFORMATION AS PROVIDED IN THE SITE DEVELOPMENT PLANS DATED 1-12-26 AS PREPARED BY THE MORIN CAMERON GROUP INC

SCOTT BROWN

[illegible] MARKET STREET
NEWBURYPORT, MA 01950
[illegible]
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

SITE PLAN

A0.0

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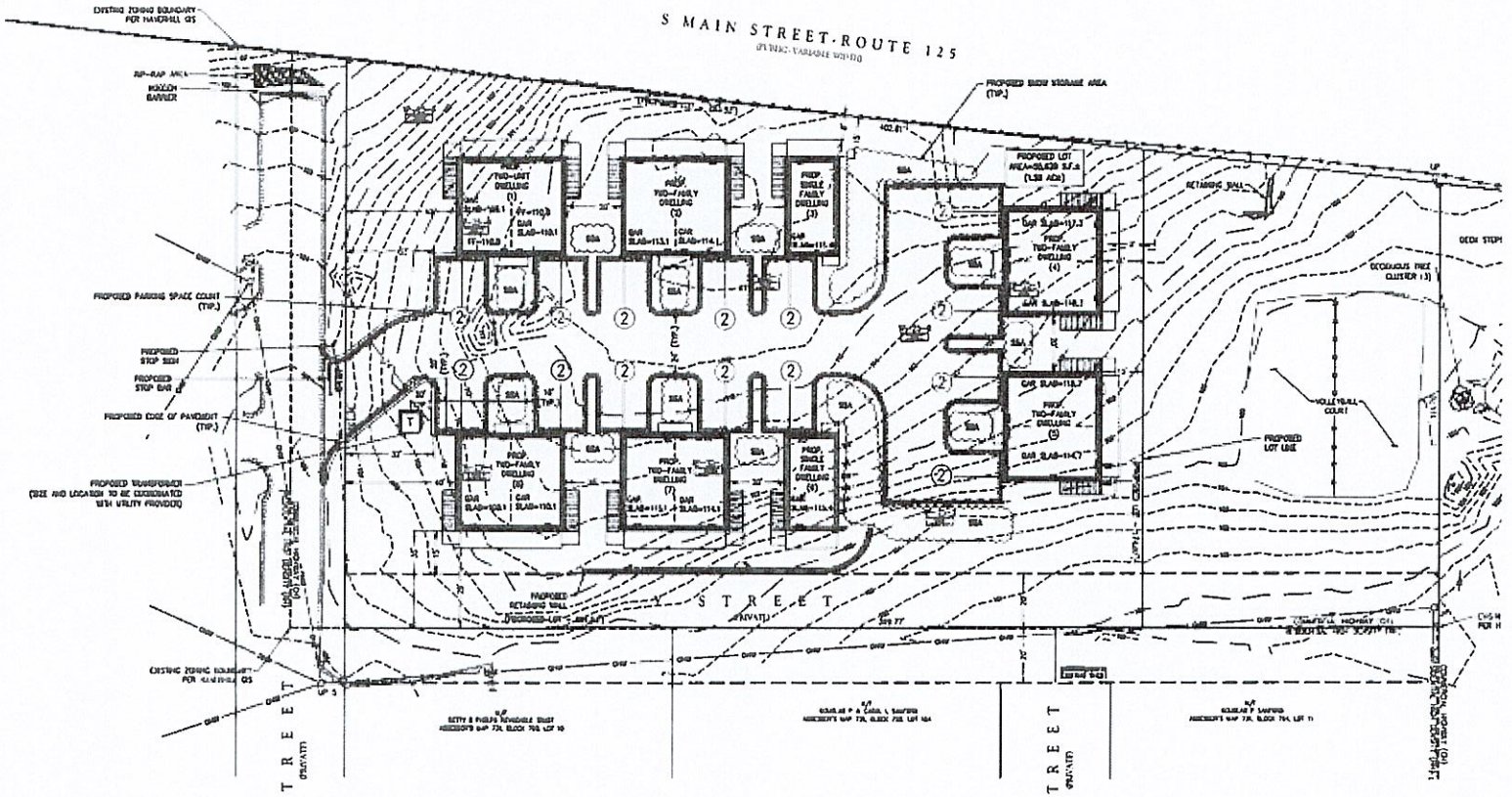
DRAWING LIST

SHEET NUM	SHEET TITLE	DATE	REVISION	REVISION DATE	REVISION NOTE
A0.0	SITE PLAN	[illegible]			
A1.1	1ST FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.2	2ND FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.3	3RD FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.4	ROOF PLAN DUPLEX BUILDING	[illegible]			
A2.1	ELEVATIONS DUPLEX BUILDING	[illegible]			
A2.2	ELEVATIONS DUPLEX BUILDING	[illegible]			
A1.5	1ST & 2ND FLOOR PLAN SINGLE BUILDING	[illegible]			
A1.6	3RD FLOOR & ROOF PLAN SINGLE BUILDING	[illegible]			
A2.3	ELEVATIONS SINGLE BUILDING	[illegible]			
A2.4	STREET ELEVATIONS	[illegible]			



1 SITE PLAN
Scale 1" = 20'-0"

NOTE:
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MULTI-FAMILY DEVELOPMENT
LOCATED AT
931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

SITE PLAN

A0.0

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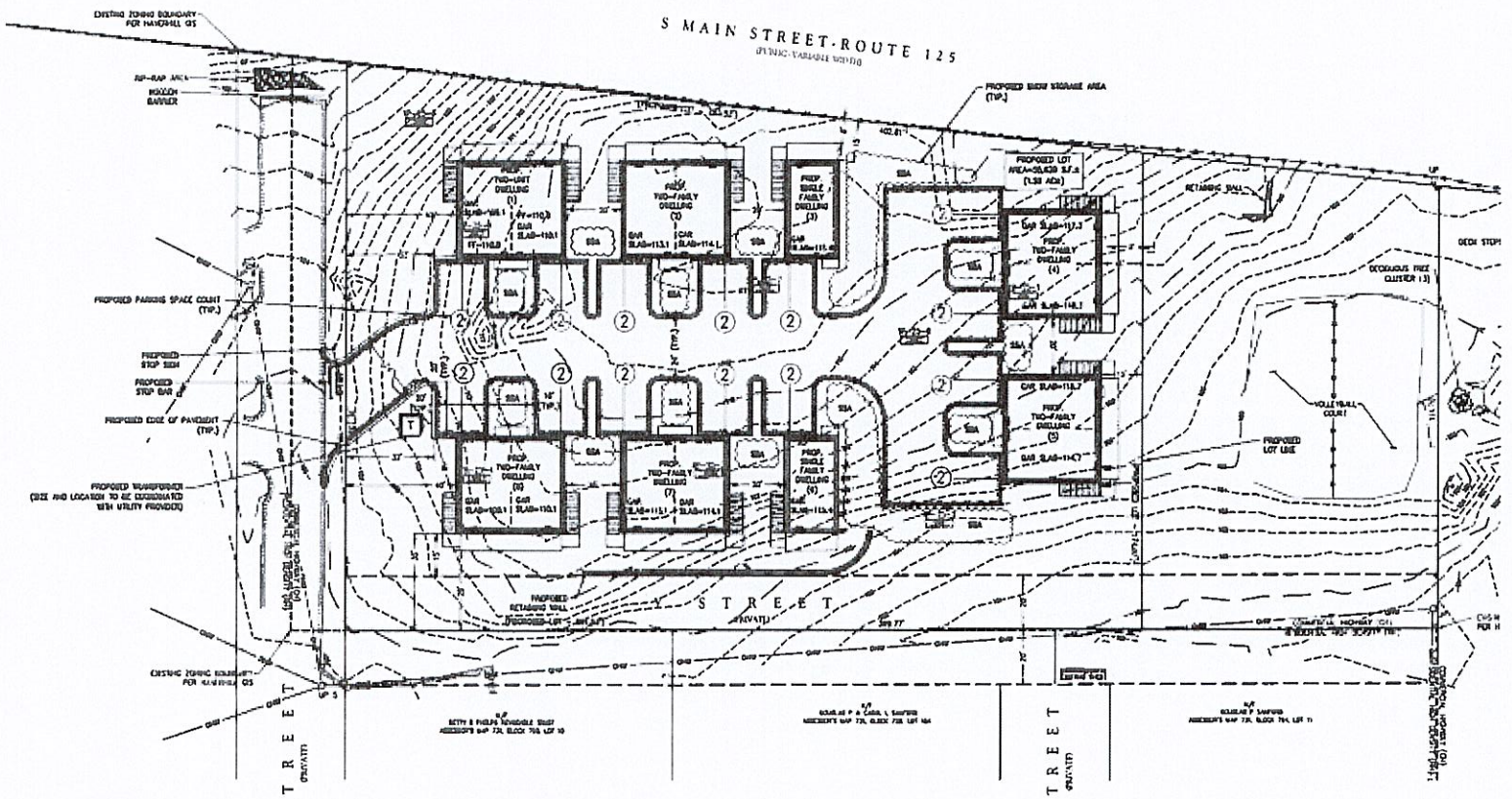
SITE CONTEXT PLAN DRAWING NO. 2 OF 11	SITE DEVELOPMENT PLANS IN HAVERHILL, MASSACHUSETTS 931 BOSTON ROAD (PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21) PREPARED FOR: PENTUCKET NORTH DEVELOPMENT LLC	REVISIONS NO. DESCRIPTION DATE	SURVEY BY: MCG DRAFTED BY: DES CHECKED BY: BAS APPROVED BY: SPC SCALE: AS NOTED DATE: APRIL 30, 2026		The Morin-Cameron GROUP, INC. CIVIL ENGINEERS	ENVIRONMENTAL CONSULTANTS LAND SURVEYORS	LAND USE PLANNERS

DRAWING LIST

SHEET NUM	SHEET TITLE	DATE	REVISION	REVISION DATE	REVISION NOTE
A0.0	SITE PLAN	[illegible]			
A1.1	1ST FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.2	2ND FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.3	3RD FLOOR PLAN DUPLEX BUILDING	[illegible]			
A1.4	ROOF PLAN DUPLEX BUILDING	[illegible]			
A2.1	ELEVATIONS DUPLEX BUILDING	[illegible]			
A2.2	ELEVATIONS DUPLEX BUILDING	[illegible]			
A2.3	1ST & 2ND FLOOR PLAN SINGLE BUILDING	[illegible]			
A2.4	3RD FLOOR & ROOF PLAN SINGLE BUILDING	[illegible]			
A2.5	ELEVATIONS SINGLE BUILDING	[illegible]			
A2.6	STREET ELEVATIONS	[illegible]			



1 SITE PLAN
Scale 1" = 20'-0"

NOTE:
SITE PLAN IS FOR REFERENCE ONLY BASED UPON INFORMATION AS PROVIDED IN THE SITE DEVELOPMENT PLANS DATED 1-12-26 AS PREPARED BY THE MORIN CAMERON GROUP INC

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ARCHITECTS
[illegible] MARKET STREET
NEWBURYPORT, MA 01950
[illegible]
WWW.SCOTTBROWNARCHITECT.COM

MULTI-FAMILY DEVELOPMENT
LOCATED AT
931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

SITE PLAN

A0.0

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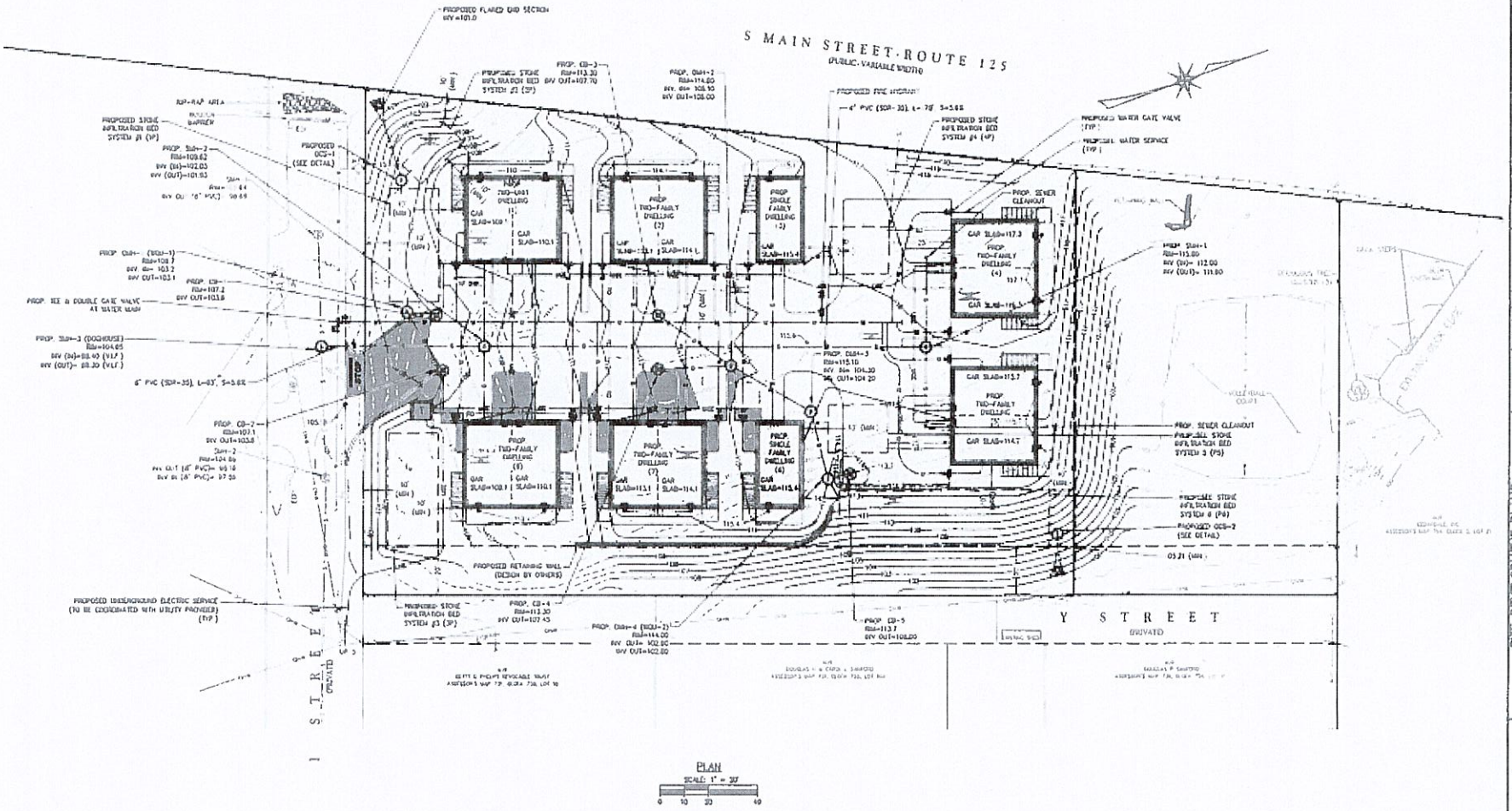

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LAND SURVEYORS | LAND USE PLANNERS

NO	REVISIONS	DATE

SURVEY BY: MCG
DRAFTED BY: DTS
DESIGNED BY: MAS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 22, 2020

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
SHOWN ON ASSESSOR'S MAP 734 BLOCK 2, LOT 21
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

GRADING, DRAINAGE & UTILITIES

DRAWING NO. 6 OF 11

PROJ. #4346
DRAWING #346_MAIN.dwg

TRAFFIC STUDY

Pentucket North Development, LLC hereby requests a waiver for the Traffic Study in connection with this Application.

In support of this request, the undersigned states that the proposed development will be situated at the end of I Street which connects with Boston Road. There will be no traffic entering to or from the development from Route 125. With only eight buildings and 14 units, the additional traffic on Boston Road and I Street will be minimal.

Based upon the same, Pentucket North Development, LLC requests a waiver of a Traffic Study.

ZONING COMPLIANCE/WAIVERS

In accordance with the Zoning Table shown on Sheet 5 (Site Layout Plan) of the Site Development Plans, no Waivers are necessary based upon the Current Zoning Requirements for the Commercial Highway District.

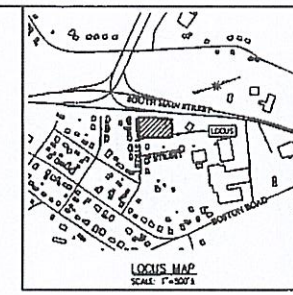
FULL SET OF SITE DEVELOPMENT PLANS

To the extent that any required uploads did not include the appropriate plan, attached hereto is a full set of the Site Development Plans which should provide the Council with all the required information necessary for review.

SITE DEVELOPMENT PLANS

FOR A
MULTI-FAMILY DEVELOPMENT
LOCATED AT
931 BOSTON ROAD
HAVERHILL, MASSACHUSETTS

(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)

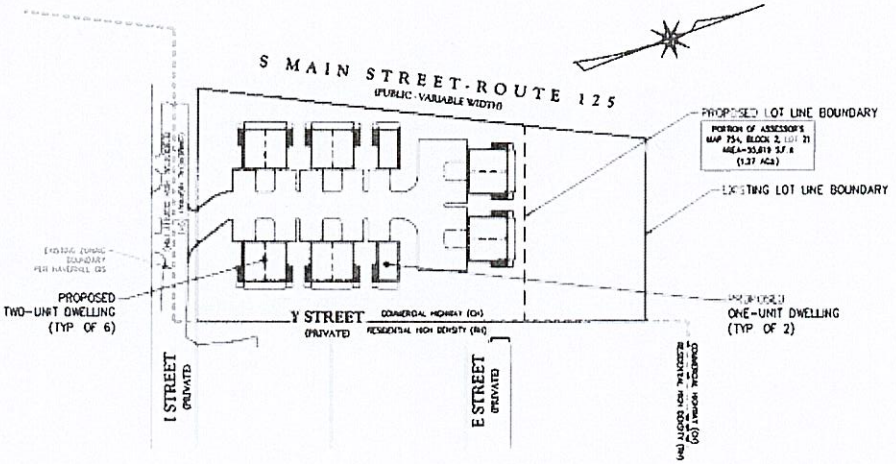


LOCUS MAP
SCALE: 1"=500'±

SCHEDULE OF PLAN SET DRAWINGS:

SHEET 1 OF 11	COVER SHEET
SHEET 2 OF 11	SITE CONTEXT PLAN
SHEET 3 OF 11	EXISTING CONDITIONS PLAN
SHEET 4 OF 11	SITE PREPARATION & EROSION CONTROL
SHEET 5 OF 11	SITE LAYOUT PLAN
SHEET 6 OF 11	GRADING, DRAINAGE & UTILITY PLAN
SHEET 7 OF 11	DETAILS
SHEET 8 OF 11	DETAILS
SHEET 9 OF 11	STORMWATER DETAILS
SHEET 10 OF 11	STORMWATER DETAILS
SHEET 11 OF 11	STORMWATER DETAILS
SHEET A0.0	SITE PLAN
SHEET A1.1	1ST FLOOR PLAN DUPLEX BUILDING
SHEET A1.2	2ND FLOOR PLAN DUPLEX BUILDING
SHEET A1.3	3RD FLOOR PLAN DUPLEX BUILDING
SHEET A1.4	ROOF PLAN DUPLEX BUILDING
SHEET A2.1	ELEVATIONS DUPLEX BUILDING
SHEET A2.2	ELEVATIONS DUPLEX BUILDING
SHEET A2.3	STREET ELEVATIONS
SHEET A1.1B	1ST & 2ND FLOOR PLAN SINGLE BUILDING
SHEET A1.2B	3RD FLOOR & ROOF PLAN SINGLE BUILDING
SHEET A2.1B	ELEVATIONS SINGLE BUILDING
SHEET L-100	LANDSCAPE PLAN

ZONING DISTRICT: COMMERCIAL HIGHWAY (CH)
PROPOSED ZONING DISTRICT: PLANNED RESIDENTIAL DEVELOPMENT DISTRICT (PDD)
(PENDING CITY COUNCIL APPROVAL)



PLAN
SCALE: 1" = 50'
0 25 50 100

APPLICANT:
PENTUCKET NORTH DEVELOPMENT LLC
C/O RONALD J. MAILLOUX SR
85 CHASE STREET
METHUEN, MA 01844

OWNER:
CEDARDALE, INC
931 BOSTON ROAD
HAVERHILL, MA 01835
BOOK 6023, PAGE 614

CIVIL ENGINEER/SURVEYOR:
THE MORIN-CAMERON GROUP, INC.
88 ELM STREET
DANVERS, MA 01923
PHONE 978-777-6588

ARCHITECT:
SCOTT BROWN ARCHITECTS
48 MARKET STREET
NEWBURYPORT, MA 01850
PHONE 978-465-3535

LANDSCAPE DESIGNER:
CORLISS LANDSCAPE & IRRIGATION
31 ESTEX ROAD
IPSWICH, MA 01935
PHONE 978-356-4224

DIG SAFE
MA-RI-ME-NH-VT
CALL TOLL FREE
1-888-344-7233
UTILITIES UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM

NOTE:
UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED UPON VISIBLE ABOVE GROUND UTILITIES AND RECORD INFORMATION OF BELOW GROUND UTILITIES AND ARE APPROXIMATE ONLY. CONTRACTOR IS RESPONSIBLE FOR TAKING ALL NECESSARY PRECAUTIONS BEFORE BEGINNING ANY EXCAVATION.

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS LAND USE PLANNERS
88 ELM STREET, DANVERS, MASSACHUSETTS 01923
P 978-777-6588, F 978-777-6588.COM

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: MAS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 20, 2020

REVISIONS
NO. DESCRIPTION DATE

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

COVER SHEET
DRAWING NO. 1 OF 11

PROJ. #4316
DRAWING 4316_MAP4.dwg

SITE CONTEXT PLAN DRAWING NO. 2 OF 11	SITE DEVELOPMENT PLANS IN HAVERHILL, MASSACHUSETTS 931 BOSTON ROAD (PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21) PREPARED FOR: PENTUCKET NORTH DEVELOPMENT LLC	REVISIONS NO. DESCRIPTION DATE	SURVEY BY: MCC DRAFTED BY: DTS CHECKED BY: WHS APPROVED BY: SPC SCALE: AS NOTED DATE: APRIL 28, 2022		The Morin-Cameron GROUP, INC. CIVIL ENGINEERS / ENVIRONMENTAL CONSULTANTS LAND SURVEYORS / LAND USE PLANNERS

LEGEND

CONTOURS
- MAJOR
- MINOR

CHAIN LINK FENCE
FIRE HYDRANT
GUY WIRE
IRRIGATION CONTROL VALVE
LIGHT POLE
OVERHEAD WIRE
PROPERTY LINE
SANITARY SEWER MANHOLE
SANITARY SEWER MAIN/SERVICE
SQUARE CATCH BASIN
STORM SEWER/DRAINAGE
TREE LINE
UTILITY POLE
WATER GATE
WATER SPRINKLER MANHOLE

GENERAL NOTE:

1. THESE PLANS ARE PREPARED FOR OUR CLIENTS [illegible] FOR THE SPECIFIC PURPOSE OF OBTAINING PERMITS AND LOCAL APPROVALS, AND ARE NOT [illegible] BE USED OR RELIED UPON AS A CONSTRUCTION DOCUMENT OR ANY OTHER USE BY OTHER WITHOUT THE WRITTEN CONSENT OF THE MORIN-CAMERON GROUP, INC.

PLAN NOTES:

1. THE EXISTING CONDITIONS DEPICTED HEREON ARE BASED ON INFORMATION PROVIDED BY ON THE GROUND SURVEY BY THE MORIN-CAMERON GROUP, INC., ON AUGUST 19, 2025.
2. ABUTTER INFORMATION SHOWN HEREON WAS TAKEN FROM THE HAVERHILL GIS DATABASE.
3. THE PROPERTY BOUNDARY [illegible] BASED ON A PLAN ENTITLED "PLAN OF LAND, LOCATED IN HAVERHILL, MA" PREPARED BY CHRISTIANSEN & SERGI, DATED JANUARY 6, 1998 AND RECORDED AT THE SOUTH ESSEX DISTRICT REGISTRY OF [illegible] IN BOOK 14530, PAGE 429.
4. ELEVATIONS HEREON REFER TO VERTICAL DATUM NAVD88.
5. PROJECT SITE LOCATED WITHIN ZONING AREA COMMERCIAL HIGHWAY (CH).
6. PROJECT SITE IS NOT LOCATED WITHIN A WETLANDS AREA.
7. PROJECT SITE IS NOT LOCATED WITHIN A FEMA FLOOD ZONE.

FLOOD NOTE:

THE SUBJECT PROPERTY [illegible] LOCATED IN A ZONE X, AREA OF MINIMAL FLOOD HAZARD ABOVE 500-YEAR FLOOD LEVEL, AS ILLUSTRATED ON THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO. 25009C0008G, WHICH HAS AN EFFECTIVE DATE [illegible] JULY 16, 2014.

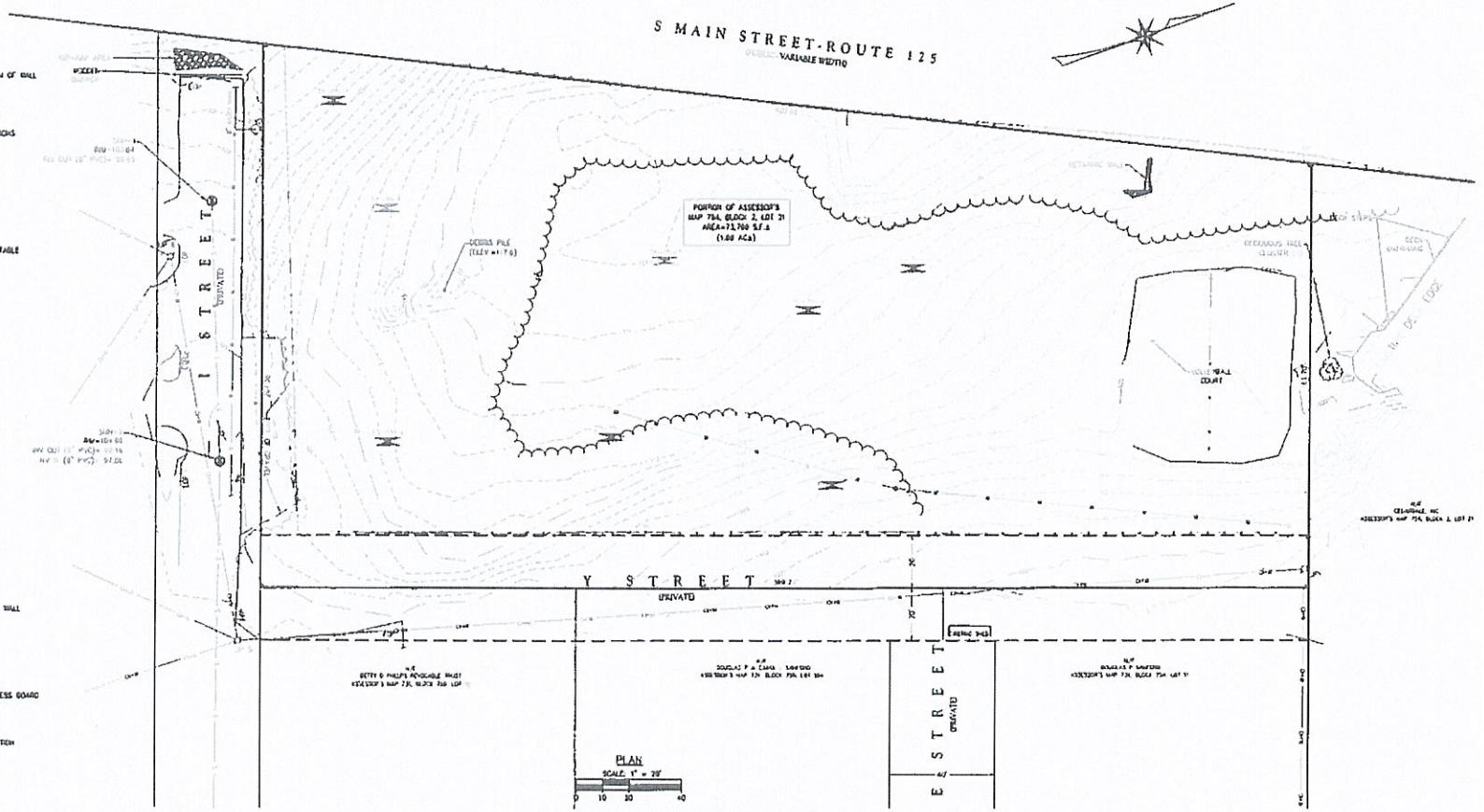
SOIL LOGS

DATE PERFORMED: NOVEMBER [illegible], 2025
PERFORMED BY: BILL SCHOUTEN, SE #14030

TP-25-1 | TP-25-2 | TP-25-3 | TP-25-4 | TP-25-5 | TP-25-6 | TP-25-7 | TP-25-8

ABBREVIATIONS:

AC	ACRES
APPROX	APPROXIMATE
BIT	BITUMINOUS
BLDG	BUILDING
BVW	BORDERING VEGETATED WETLAND
BW	FINISH GRADE ADJACENT TO BOTTOM OF WALL
CCB	CAPE COD BERM
CB	CATCH BASIN
CF	CUBIC FEET
CI	CAST IRON
CLDI	CEMENT LINED DUCTILE IRON
CMR	CODE OF MASSACHUSETTS REGULATIONS
CONC	CONCRETE
CY	CUBIC YARD
DI	DUCTILE IRON
DIA	DIAMETER
DMH	DRAIN MANHOLE
DS	DOWNSTREAM
DYL	DOUBLE YELLOW LINE
ELEC	ELECTRIC
EL/ELEV	ELEVATION
EOG	EDGE OF GRAVEL
EOP	EDGE OF PAVEMENT
ESHWT	ESTIMATED SEASONAL HIGH WATER TABLE
EXIST	EXISTING
FG	FINAL GRADE
FT	FEET
GAR	GARAGE
GG	GAS GATE
HDPE	HIGH DENSITY POLYETHYLENE
HS	HAND SPACED
IN	INCH
INV	INVERT
L	LENGTH
LB	POUNDS
MAX	MAXIMUM
MCC	MONOLITHIC CONCRETE CURB
MIN	MINIMUM
N/F	NOW OR FORMERLY
OC	ON CENTER
OHW	OVERHEAD WIRES
PE	POLYETHYLENE
PL	PLUS OR MINUS
PCC	PRECAST CONCRETE CURB
RCP	REINFORCED CONCRETE PIPE
REC	RECORD
PROP	PROPOSED
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
R	RADIUS
RC	RELATIVE COMPACTION
REQ'D	REQUIRED
ROW	RIGHT OF WAY
S	SLOPE
SF	SQUARE FEET
SGCB	SLOPED GRANITE CURB
SMH	SEWER MANHOLE
SQ	SQUARE
TBD	TO BE DETERMINED
TC	TOP OF CURB/TRANSITION CURB
TW	FINISH GRADE ADJACENT TO TOP OF WALL
TYP	TYPICAL
UGE	UNDERGROUND ELECTRIC
UMH	UNKNOWN
VAR	VARIANCE
VGC	VERTICAL GRANITE CURB
VIF	VERIFY IN FIELD
WA	WATER AREA
LF	LINEAR FEET
MAAB	MASSACHUSETTS ARCHITECTURAL ACCESS BOARD
MEP	MECHANICAL ELECTRICAL PLUMBING
MCC	MONOLITHIC CONCRETE CURB
ML	MILLIMETER
NF	NOT FOUND
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
US	UPSTREAM
WF	WETLAND FLAG
WG	WATER GATE
WQU	WATER QUALITY UNIT
WSO	WATER SHUTOFF
W/	WITH



The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS ENVIRONMENTAL PLANNERS
LAND SURVEYORS TRANSPORTATION PLANNERS
16 ELM STREET, ANDOVER, MASSACHUSETTS
978-475-7621 FAX 978-475-8518

SURVEY BY: MCG
DRAFTED BY: TJS
CHECKED BY: TMS
APPROVED BY: DPC
SCALE: AS NOTED
DATE: APRIL 14, 2026

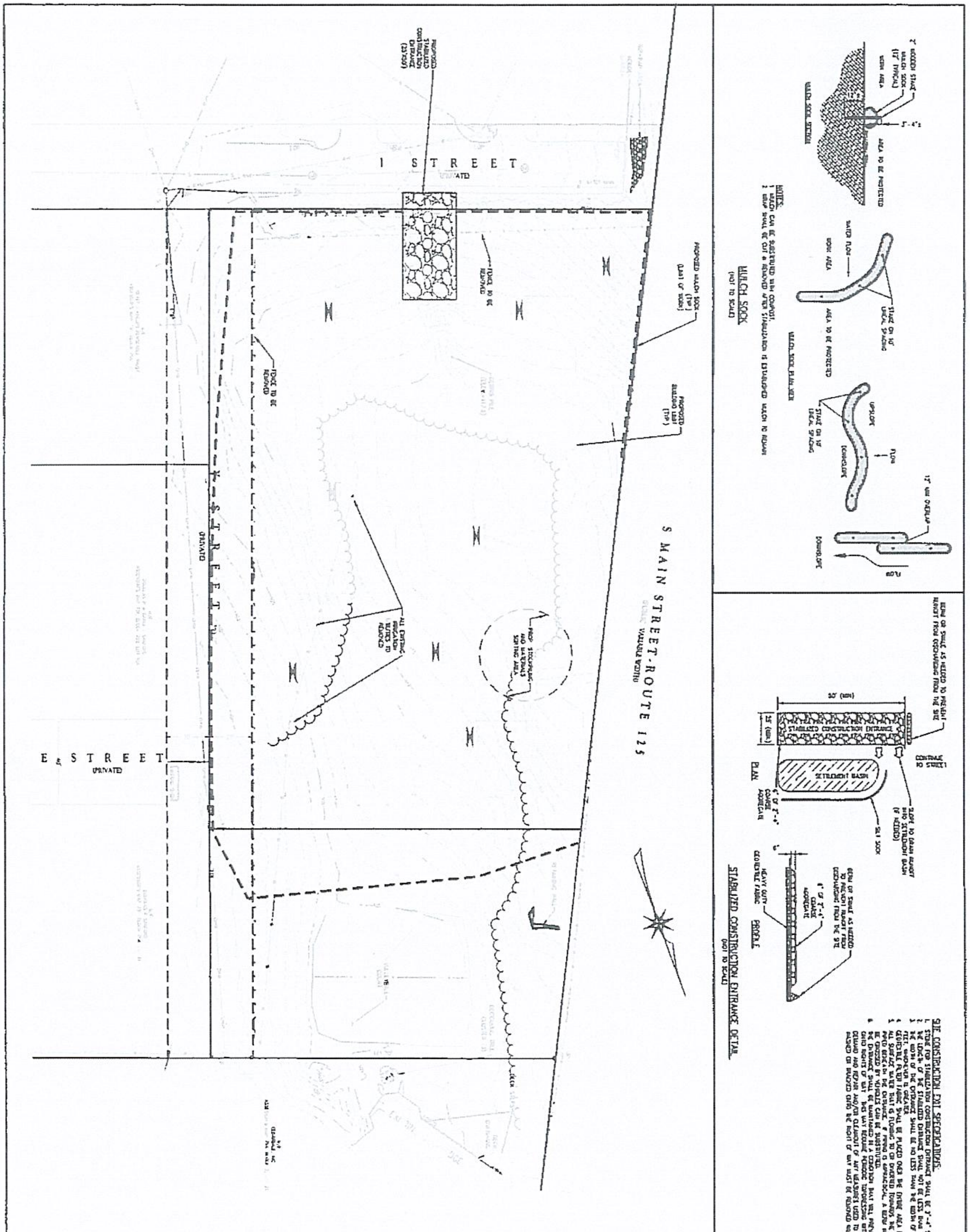
NO	REVISIONS	DATE

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

EXISTING CONDITIONS PLAN

SHEET NO. 3 OF 11

PROJECT #4346
DRAWING #346_Sheet 3.dwg



SITE PREPARATION & EROSION CONTROL

DRAWING NO.
4 OF 11

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

REVISIONS

NO.	DESCRIPTION	DATE

SURVEY BY: MCG
DRAFTED BY: [illegible]
CHECKED BY: MAS
APPROVED BY: [illegible]
SCALE: AS [illegible]
DATE: APRIL 20, 2014

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS

PLANNED DEVELOPMENT (PD) SUBMITTAL TABLE

TOTAL LAND AREA	55,630 SF
DEVELOPABLE SITE AREA	55,630 SF
COMMON OR USABLE OPEN SPACE	25,640 SF
SITE COVERAGE OF BUILDINGS	10,000 SF
IMPERVIOUS SURFACE AREA	23,700 SF
IMPERVIOUS SURFACE RATIO	0.426 (42.6%)
GROSS FLOOR AREA OF ALL NON RESIDENTIAL BUILDINGS	0 SF
FLOOR AREA RATIO	0.181 (18.1%)
DENSITY OF DWELLING UNITS	3,972± SF/UNIT
NUMBER OF OFF-STREET PARKING SPACES	28 SPACES

BUILDING HEIGHTS

BUILDING	(A) AVERAGE FINISHED GRADE ELEVATION BASED ON BUILDING CORNERS (FT)	(B) GARAGE ENTRANCE ELEVATION (FT)	(C) MEAN ROOF HEIGHT ABOVE GARAGE ENTRANCE ELEVATION (FT)	(D) ELEVATION OF MEAN ROOF HEIGHT (FT) (B+C)	PROPOSED BUILDING HEIGHT (FT) (D-A)
1	110.10	110.7	28.10	138.80	28.70
2	113.80	113.0	28.10	141.10	27.30
3	115.80	113.3	25.75	141.05	25.45
4	117.10	118.2	28.10	144.30	27.20
5	115.10	114.7	28.10	142.80	27.70
6	115.30	115.3	25.75	141.05	25.75
7	114.00	113.0	28.10	141.10	27.10
8	110.00	108.0	28.10	137.10	27.10

BUILDING HEIGHT NOTE:

BUILDING HEIGHT IS CALCULATED AS THE VERTICAL DISTANCE FROM THE AVERAGE FINISHED GRADE (AVERAGE OF FINISHED GROUND ELEVATION AT THE MAIN CORNERS OF THE STRUCTURE) TO THE HIGHEST POINT OF THE ROOF. TOP OF THE HIGHEST ROOF BEAM (FLAT ROOF), DECK OF A MANSARD ROOF, OR MEAN LEVEL BETWEEN EAVES AND RIDGE (GABLE, HIP, SHED, GAMBREL, PYRAMID, OR SIMILAR ROOFS). MAXIMUM ALLOWABLE HEIGHTS ARE ESTABLISHED IN TABLE 2 (DIMENSIONAL REGULATIONS) BY ZONING DISTRICT, DEFINED FOR HAVERHILL ZONING ORDINANCE § 11.0 (DEFINITIONS).

SNOW STORAGE NOTE:

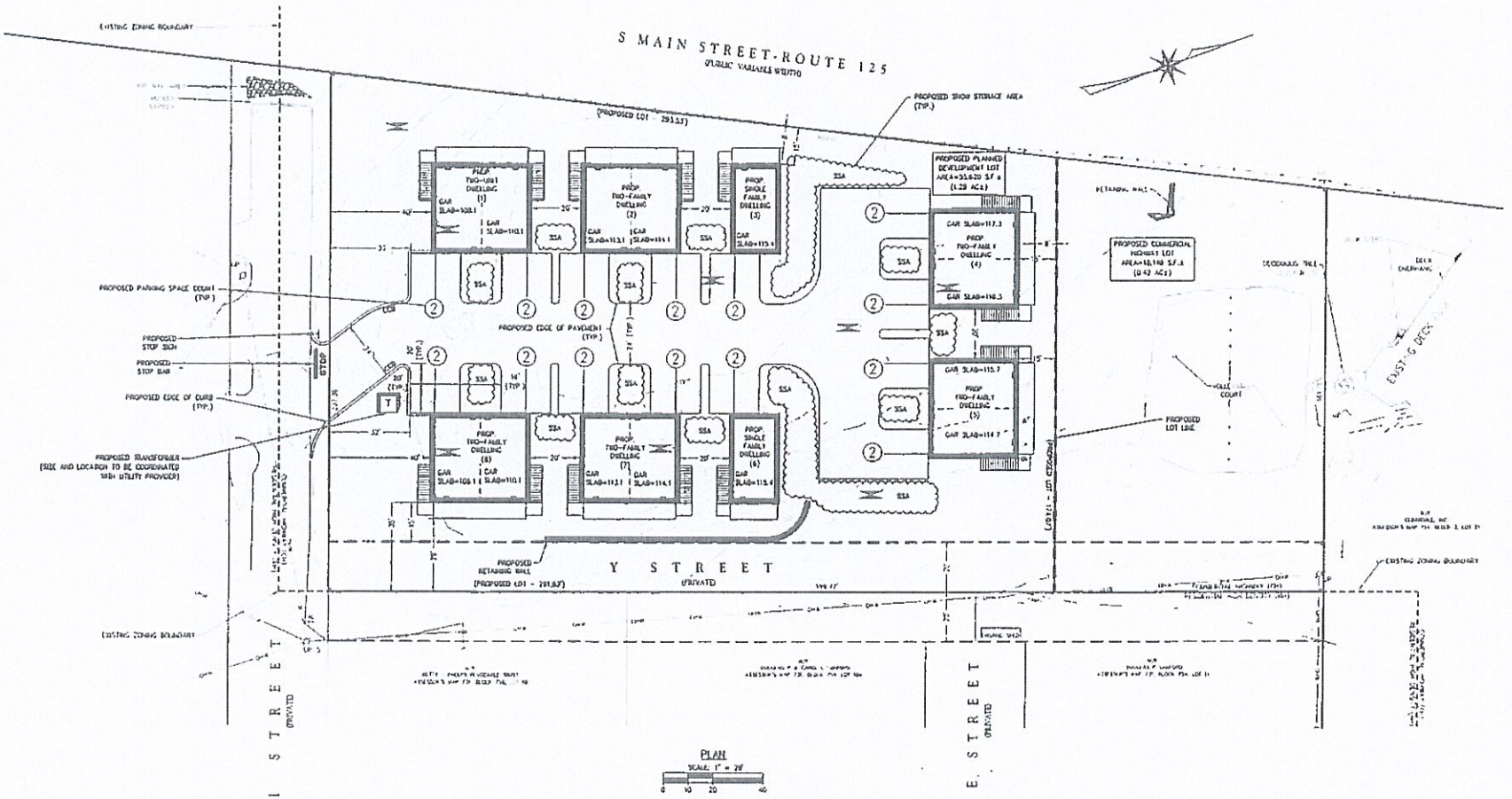
EXCESS SNOW TO BE REMOVED FROM THE SITE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

PARKING SPACE COUNT SUMMARY

	NUMBER OF SPACES
SURFACE	28
GARAGE	14
RATIO (14 UNITS)	2 SPACES/ UNIT

ZONING TABLE - PLANNED DEVELOPMENT (PD)

SETBACK	RESIDENTIAL HIGH DENSITY (RH) 1-FAM	RESIDENTIAL HIGH DENSITY (RH) 2-FAM	COMMERCIAL HIGHWAY (CH)	PROPOSED PD LOT
LOT AREA (MIN.)	7,200 SF	8,000 SF	22,500 SF	55,620 SF±
LOT AREA REQUIRED PER DWELLING UNIT (MIN.)	N/A	N/A	N/A	3,972 SF±
LOT FRONTAGE (MIN.)	75'	80'	175'	307.36'
LOT DEPTH (MIN.)	100'	100'	100'	291'
FRONT SETBACK (MIN.)	20'	20'	30'	40'
SIDE SETBACK (MIN.)	10'	10'	18'	15'
REAR SETBACK (MIN.)	30'	30'	15'	15'
BUILDING HEIGHT (MAX.)	35'	35'	45'	44'
BUILDING HEIGHT - STORIES (MAX.)	2.5	2.5	3.5	3.5
BUILDING COVERAGE (% MAX.)	25%	25%	NONE	18.1%
FLOOR AREA RATIO (FAR, MAX.)	N/A	N/A	0.50	40.50
OPEN SPACE, (% MIN.)	45%	45%	25%	34%



The Morin-Cameron Group, Inc.
CIVIL ENGINEERS · ENVIRONMENTAL CONSULTANTS
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66 Haverhill Street, Methuen, MA 01844
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SURVEY BY: MCG
DRAFTED BY: BTS
CREATED BY: KLS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 24, 2023

NO.	REVISIONS	DATE

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
631 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 75H, BLOCK 2, LOT 71)
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

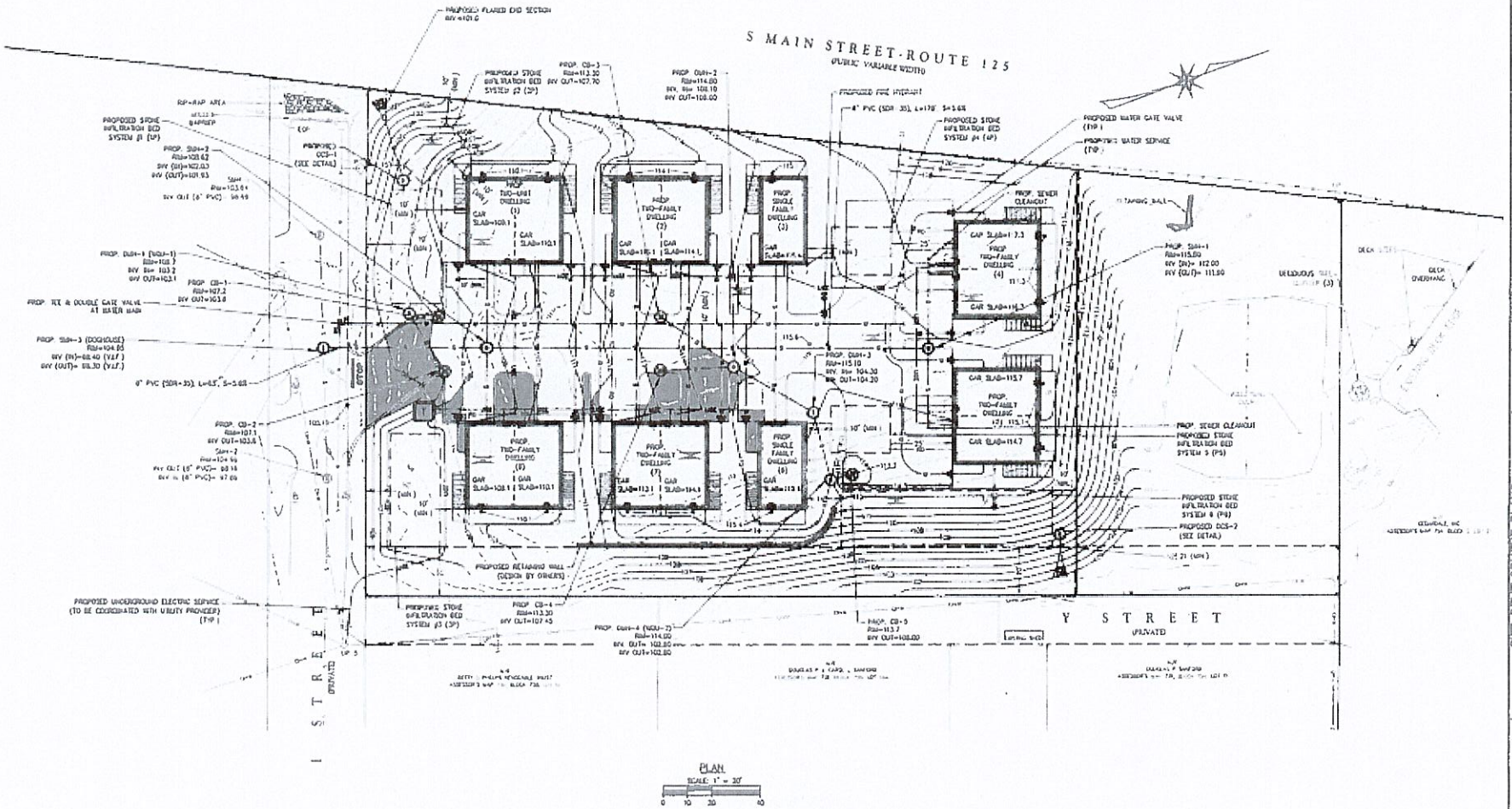
SITE LAYOUT PLAN

DRAWING NO. 5 OF 11

PROJ. #4316
DRAWING 4316_MAIN.dwg

NOTES:

1. FINAL HYDRANT LOCATIONS TO BE COORDINATED WITH HAVERHILL FIRE DEPARTMENT.
2. FINAL ELECTRIC LOCATIONS TO BE COORDINATED WITH UTILITY PROVIDER.
3. FINAL WATER CONNECTION TO BE COORDINATED WITH HAVERHILL WATER DEPARTMENT.
4. ALL ROOF STORMWATER TO BE DIRECTED TO STORMWATER SYSTEMS. FINAL CONNECTIONS TO BE COORDINATED WITH ARCHITECTURAL PLANS.



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

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS / ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS / LAND USE PLANNERS
[illegible]

NO.	REVISIONS DESCRIPTION	DATE

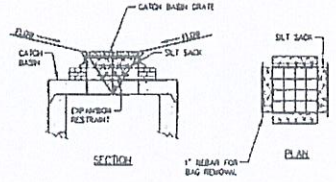
SURVEY BY: [illegible]
DRAFTED BY: [illegible]
CHECKED BY: [illegible]
DESIGNED BY: [illegible]
SCALE: AS NOTED
DATE: APRIL 20, 2023

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 79A, BLOCK 2, LOT 21)
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

GRADING, DRAINAGE & UTILITIES

DRAWING NO. 6 OF 11

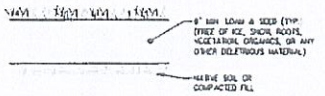
PROJ. #4318
DRAWING 4318_SMAIN.dwg



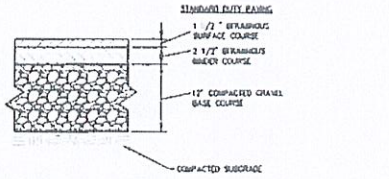
SILT SACK NOTES:

1. INSTALL SILT SACKS IN EXISTING CATCH BASINS. INSTALL SILT SACKS IN NEW CATCH BASINS AFTER INSTALLATION.
2. GRATES TO BE PLACED OVER SILT SACKS.
3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED WHEN DEPTH OF SEDIMENT IS within 6" OF GRATE.

SILT SACK
(NOT TO SCALE)



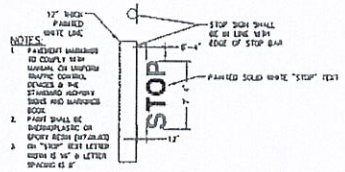
LOAM & SEED
(NOT TO SCALE)



NOTES:

1. PAVEMENT SHALL BE TYPE I, CLASS 1, BITUMINOUS CONCRETE
2. PAVEMENT THICKNESS AFTER ROLLING.
3. SUBGRADE TO BE INSPECTED PRIOR TO INSTALLATION OF PAVEMENT SUBBASE. IF UNCOMPACTED FILL OR UNSUITABLE SOIL IS PRESENT, IT SHALL BE REMOVED TO UNDISTURBED NATIVE SOIL AND REPLACED WITH STRUCTURAL FILL COMPACTED TO 95% R.C.

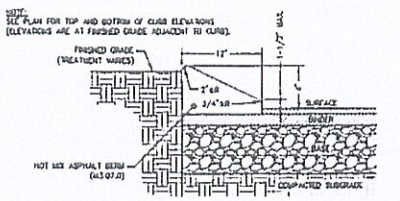
TYPICAL PAVEMENT SECTION
(NOT TO SCALE)



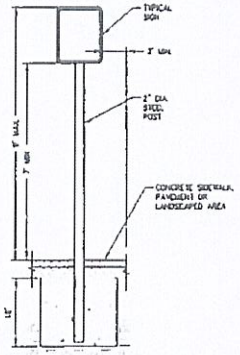
NOTES:

1. PAVEMENT MARKINGS TO COMPLY WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES & THE STANDARD HIGHWAY SIGNS AND MARKINGS BOOK.
2. PAINT SHALL BE THERMOPLASTIC OR EPOXY RESIN (M7.01.02)
3. ON "STOP" TEXT LETTER HEIGHT IS 36" & LETTER SPACING IS 8"

STOP BAR
(NOT TO SCALE)



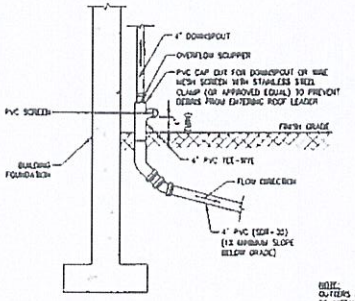
CAPE COD BERM
(NOT TO SCALE)



SIGN POST FOR SIGNS IN PARKING AREAS
(NOT TO SCALE)

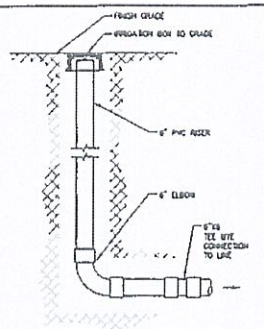
MUTCD LEGEND	WIDTH	HEIGHT	SYMBOL
R1-1	30"	30"	STOP

SIGN KEY
(NOT TO SCALE)

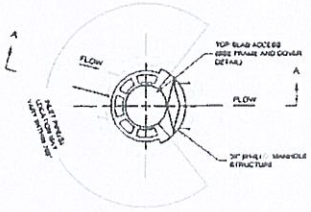


NOTE:
GUTTERS AND DOWNSPOUTS SHALL BE INSTALLED TO COLLECT ALL ROOF RUNOFF FROM THE HOUSE & CONVEY IT TO THE INFILTRATION AREAS.

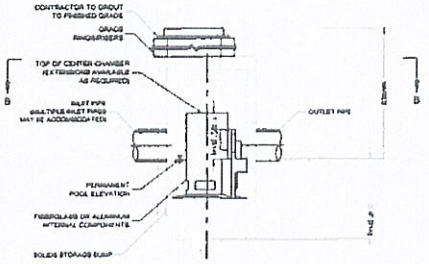
DOWN SPOUT ROOF LEADER
NOT TO SCALE



SEWER CLEANOUT
(NOT TO SCALE)



PLAN VIEW B-B
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

CONTECH CS-3 (WOU-1 & WOU-2)
(NOT TO SCALE)

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS, ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS, LAND USE PLANNERS
6 SAINT ANTHONY STREET, WOBURN, MA
T: (781) 935-6885 F: (781) 935-2307

NO	DATE	DESCRIPTION
1	4/15/09	REVISED PER PLANNING BOARD COMMENTS

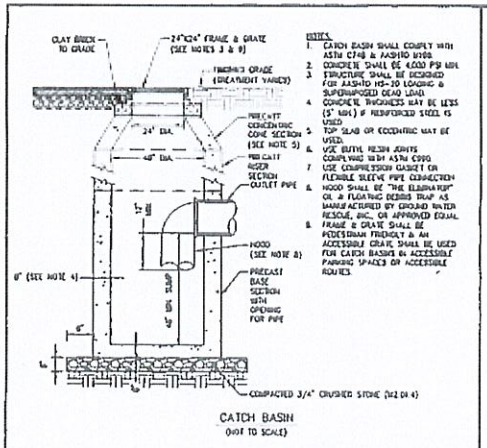
SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: RMS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 24, 2009

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
(PORTION OF ASSESSORS MAP 234, BLOCK 2, LOT 79)
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

DETAILS

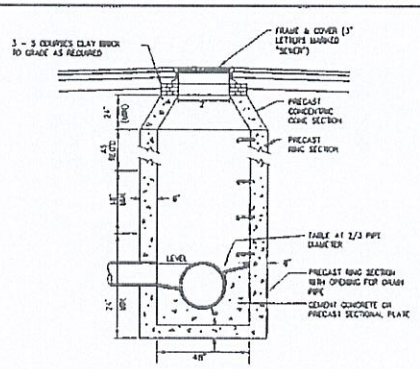
DRAWING NO. 7 OF 11

PROJ. #4316
DRAWING 4316_MAIN.dwg



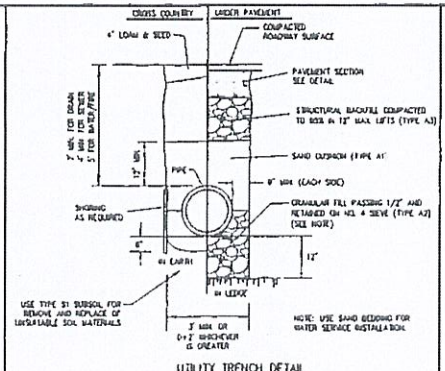
CATCH BASIN
(NOT TO SCALE)

NOTES:
1. CATCH BASIN SHALL COMPLY WITH ASTM C748 & AASHTO M199.
2. CONCRETE SHALL BE 4,000 PSI MIN.
3. STRUCTURE SHALL BE DESIGNED FOR AASHTO HS-20 LOADING & SUPERIMPOSED DEAD LOAD.
4. CONCRETE THICKNESS MAY BE LESS (5" MIN.) IF REINFORCED STEEL IS USED.
5. TOP SLAB OR ECCENTRIC MAY BE USED.
6. USE BUTYL RESIN JOINTS COMPLYING WITH ASTM C990.
7. USE COMPRESSION GASKET OR FLEXIBLE SLEEVE PIPE CONNECTION.
8. HOOD SHALL BE "THE ELIMINATOR" OR A FLOATING DEBRIS TRAP AS MANUFACTURED BY GROUND WATER RESOURCE, INC., OR APPROVED EQUAL.
9. FRAME & GRATE SHALL BE PEDESTRIAN FRIENDLY & AN ACCESSIBLE GRATE SHALL BE USED FOR CATCH BASINS IN ACCESSIBLE PARKING SPACES OR ACCESSIBLE ROUTES.



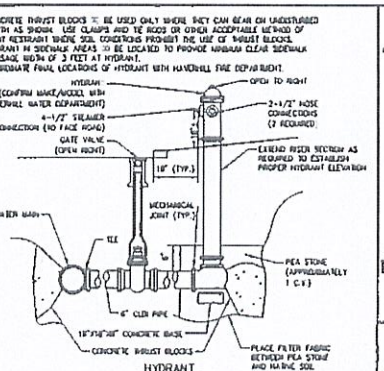
NOTE: OUTLET INVERT IS A MINIMUM 0.10' LOWER THAN INLET INVERT.

SEWER MANHOLE DETAIL
(NOT TO SCALE)

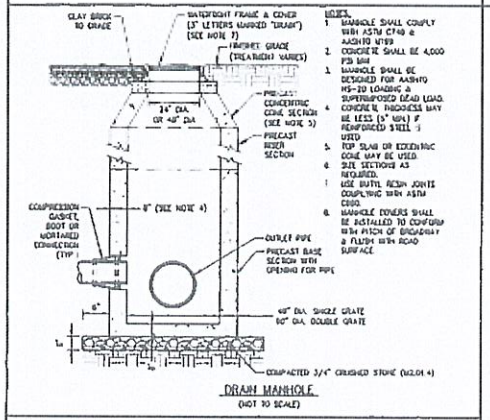


UTILITY TRENCH DETAIL
(NOT TO SCALE)

NOTES:
1. CONCRETE THRUST BLOCKS TO BE USED ONLY WHERE THEY CAN BEAR ON UNDISTURBED EARTH AS SHOWN. USE CLAMPS AND TIE RODS OR OTHER ACCEPTABLE METHOD OF JOINT RESTRAINT WHERE SOIL CONDITIONS PROHIBIT THE USE OF THRUST BLOCKS.
2. HYDRANT IN SIDEWALK AREAS TO BE LOCATED TO PROVIDE MINIMUM CLEAR SIDEWALK PASSAGE WIDTH OF 3 FEET AT HYDRANT.
3. COORDINATE FINAL LOCATIONS OF HYDRANT WITH HAVERHILL FIRE DEPARTMENT.

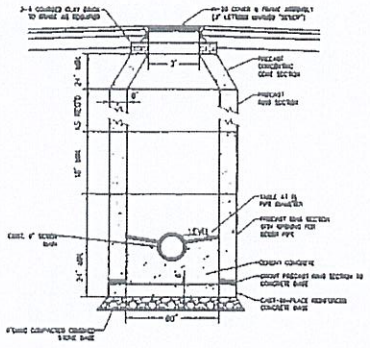


HYDRANT
(NOT TO SCALE)



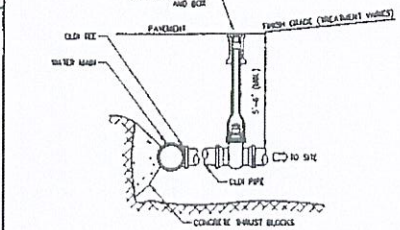
DRAIN MANHOLE
(NOT TO SCALE)

NOTES:
1. MANHOLE SHALL COMPLY WITH ASTM C748 & AASHTO M199.
2. CONCRETE SHALL BE 4,000 PSI MIN.
3. MANHOLE SHALL BE DESIGNED FOR AASHTO HS-20 LOADING & SUPERIMPOSED DEAD LOAD.
4. CONCRETE THICKNESS MAY BE LESS (5" MIN.) IF REINFORCED STEEL IS USED.
5. TOP SLAB OR ECCENTRIC CONE MAY BE USED.
6. PIPE SECTIONS AS REQUIRED.
7. USE BUTYL RESIN JOINTS COMPLYING WITH ASTM C990.
8. MANHOLE COVERS SHALL BE INSTALLED TO CONFORM WITH PITCH OF ROADWAY & FLUSH WITH ROAD SURFACE.

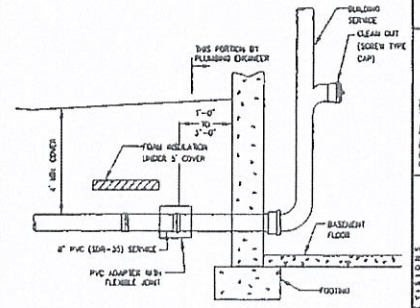


NOTES:
1. EXISTING SEWER MAIN LOCATION, SIZE AND MATERIAL SHALL BE VERIFIED IN FIELD.
2. 6" LEDGE ENTRANCEWAY BELOW EXISTING SEWER MAIN. REINFORCING DOWELS SHALL BE SET A MIN OF 6" INTO EXISTING LEDGE PRIOR TO CASTING BASE OF DOG HOUSE MANHOLE.

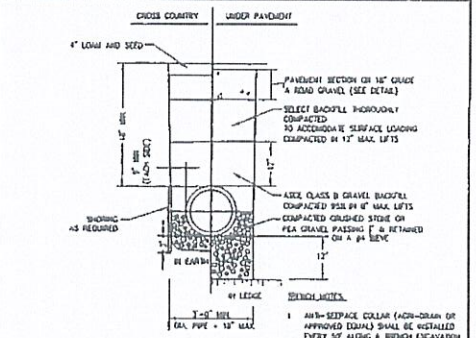
SEWER MANHOLE DETAIL (DOGHOUSE)
(NOT TO SCALE)



WATER MAIN GATE VALVE CONNECTION
(NOT TO SCALE)

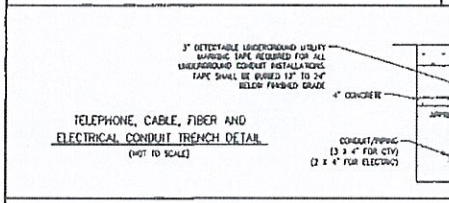


TYPICAL BUILDING SEWER SERVICE
(NOT TO SCALE)



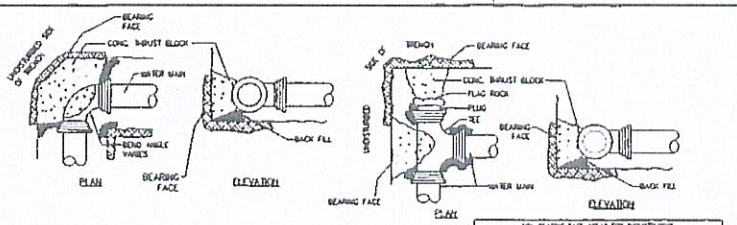
TRENCH NOTES:
1. ANTI-SEEPAGE COLLAR (ACRI-DRAIN OR APPROVED EQUAL) SHALL BE INSTALLED EVERY 50' ALONG A TRENCH EXCAVATION WHEN THE SLOPE EXCEEDS 5%.
2. SHEETING, IF USED, SHALL BE CUT OFF 12 INCHES (12") ABOVE TOP OF PIPE OR CONDUIT.

TYPICAL DRAIN TRENCH DETAIL
(NOT TO SCALE)



TELEPHONE, CABLE, FIBER AND ELECTRICAL CONDUIT TRENCH DETAIL
(NOT TO SCALE)

ELECTRICAL CONDUIT TRENCH DETAIL
NOTES:
1. ADJUST FOR ANY LOCAL MODIFICATIONS TO NFPA 70/NEC.
2. COORDINATE CONDUITS WITH APPLICABLE SERVICE PROVIDERS.



MIN. BEARING FACE AREAS FOR THRUST BLOCKS							
	90°	45°	22.5°	TEES	PLUGS	CAPS	HYDRANTS
0'-6"	8	5	3	6	6	6	4
0'-9"	13	8	5	8	8	8	6

NOTES:
1. ALL WATER MAIN FITTINGS, BENDS, TEES, PLUGS ETC. SHALL BE RESTRAINED W/ THRUST BLOCKS EXCEPT WHERE NOTED.
2. ALL THRUST BLOCKS & COLLARS SHALL BE INSTALLED SO THAT THEY BEAR AGAINST UNDISTURBED EARTH.
3. MINIMUM COMPRESSIVE STRENGTH OF THRUST BLOCK CONCRETE SHALL BE 3,000 P.S.I.
4. KEEP CONCRETE CLEAR OF MECHANICAL JOINTS.

THRUST BLOCK DETAIL
(NOT TO SCALE)

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LAND SURVEYORS / LANDSCAPE PLANNERS
1 DAL STREET, SUITE 1, HAVERHILL, MASS. 01830
P: 978-374-0505 F: 978-521-0253

SURVEY BY: MDS
DRAFTED BY: DTS
CHECKED BY: BMS
APPROVED BY: BMC
SCALE: AS NOTED
DATE: APRIL 26, 2005

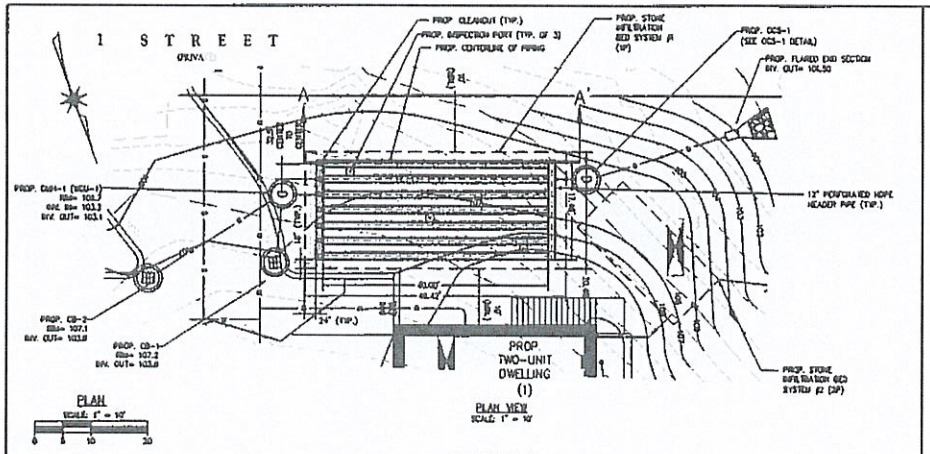
REVISIONS		
NO.	DESCRIPTION	DATE

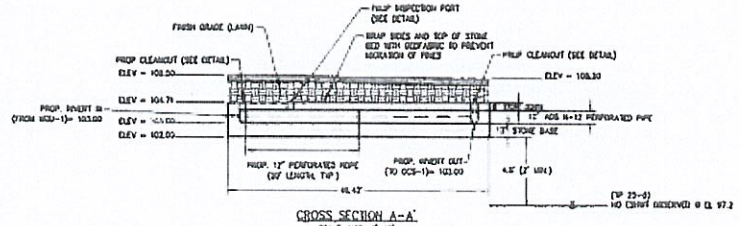
SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
631 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 79A, BLOCK 2 (LOT 21))
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

DETAILS

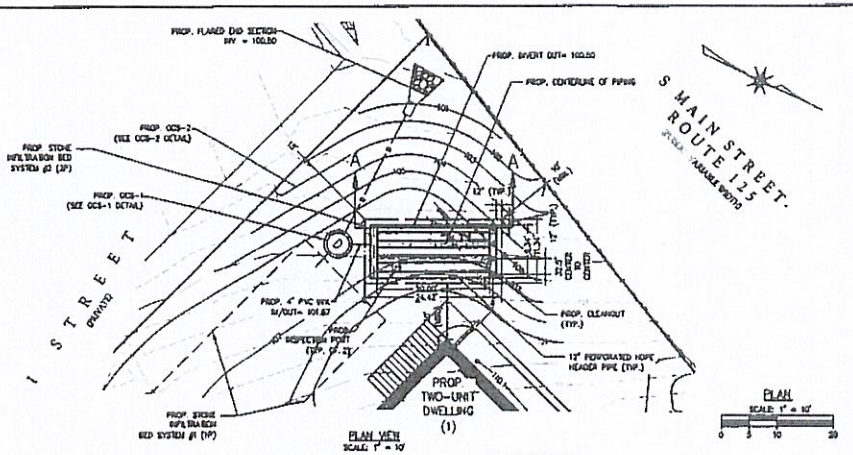
DRAWING NO. 8 OF 11

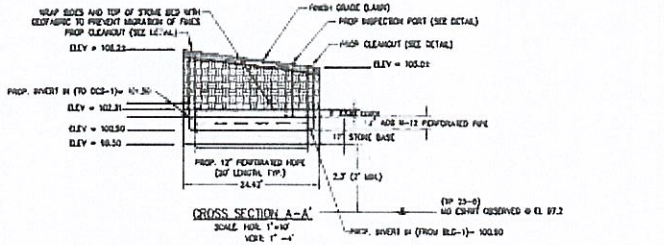
PROJ. #4368
DRAWING #4368_Mar8.dwg



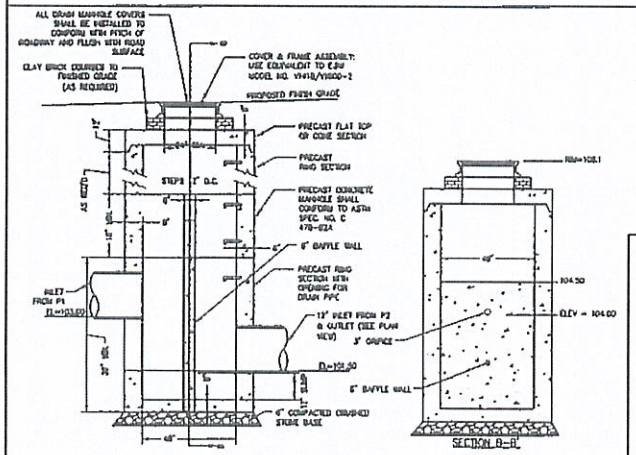


STONE INFILTRATION BED SYSTEM #1 DETAIL (1P)
(46.42' LENGTH X 20.46' WIDTH)
SCALE: AS NOTED

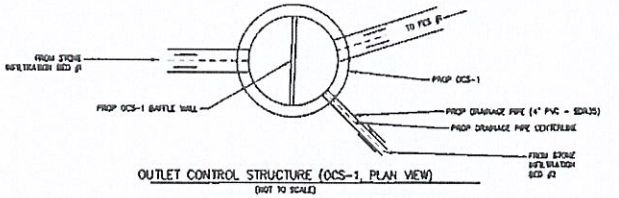




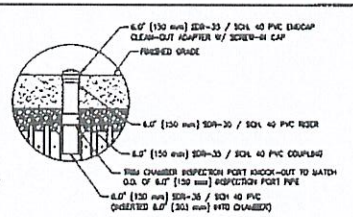
STONE INFILTRATION BED SYSTEM #2 DETAIL (SIS2)(2P)
(24.42' LENGTH X 11.34' WIDTH)
SCALE: AS NOTED



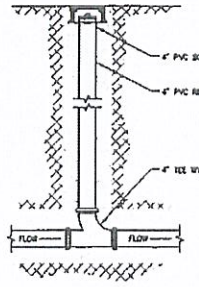
OUTLET CONTROL STRUCTURE (OCS-1)
(NOT TO SCALE)



OUTLET CONTROL STRUCTURE (OCS-1, PLAN VIEW)
(NOT TO SCALE)



INSPECTION PORT
NOT TO SCALE



CLEANOUT
(NOT TO SCALE)

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CIVIL ENGINEERS DEVELOPMENT CONSULTANTS
LAND SURVEYORS TRAFFIC & PARKING CONSULTANTS
66 ELM STREET, SALEM, NEW HAMPSHIRE 03079
P. 603-893-1911 F. 603-893-6110

REVISIONS
NO. | DESCRIPTION | DATE

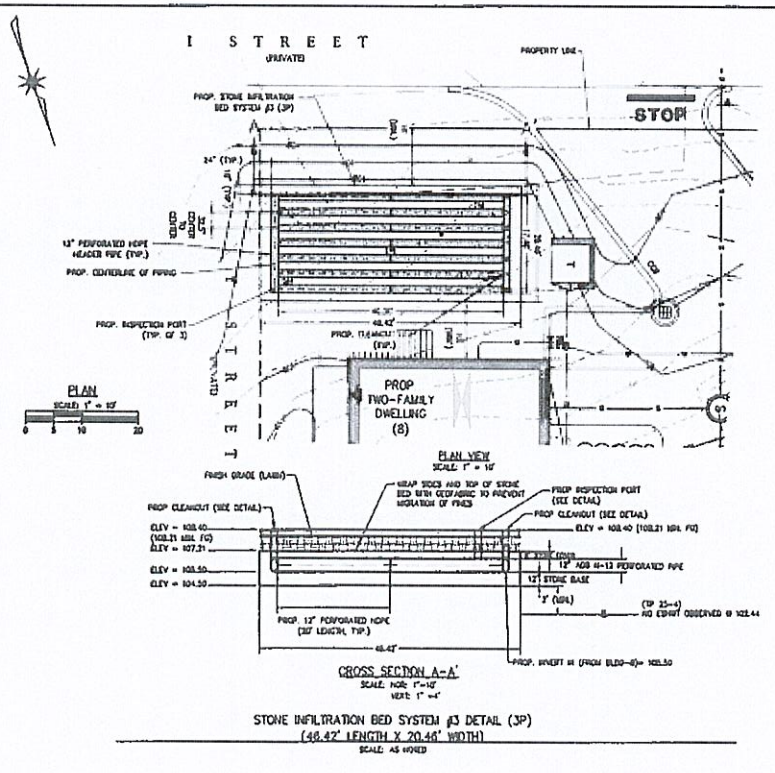
SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: BMS
APPROVED BY: SMC
SCALE: AS NOTED
DATE: APRIL 26, 2010

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
631 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 734, BLOCK 2, LOT 21)
PENTUCKET NORTH DEVELOPMENT LLC

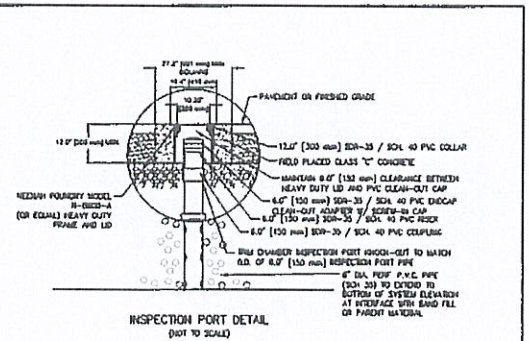
STORMWATER DETAILS

DRAWING NO. 9 OF 11

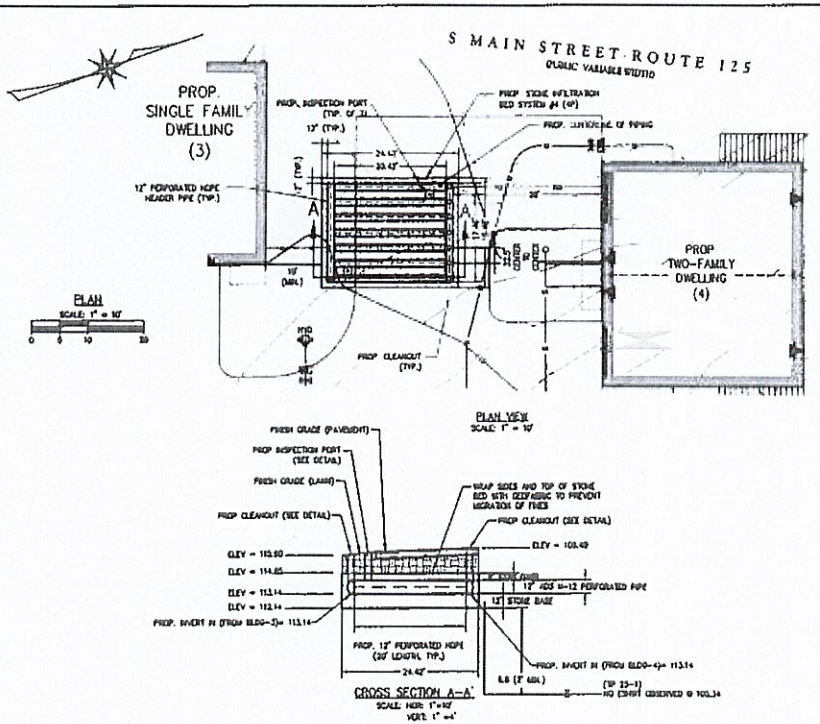
FROM #4300
DRAWING 4316_MAP4.dwg



STONE INFILTRATION BED SYSTEM #3 DETAIL (3P)
(46.42' LENGTH X 20.46' WIDTH)
SCALE: AS NOTED



INSPECTION PORT DETAIL
(NOT TO SCALE)



STONE INFILTRATION BED SYSTEM #4 DETAIL (4P)
(24.42' LENGTH X 19.46' WIDTH)
SCALE: AS NOTED

The Morin-Cameron Group, Inc.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
85 EXCHANGE STREET, LAWRENCE, MA 01840
P. 978-794-8666 F. 978-682-1610

SURVEY BY: MCG
DRAFTED BY: RTS
CHECKED BY: RMS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 22, 2020

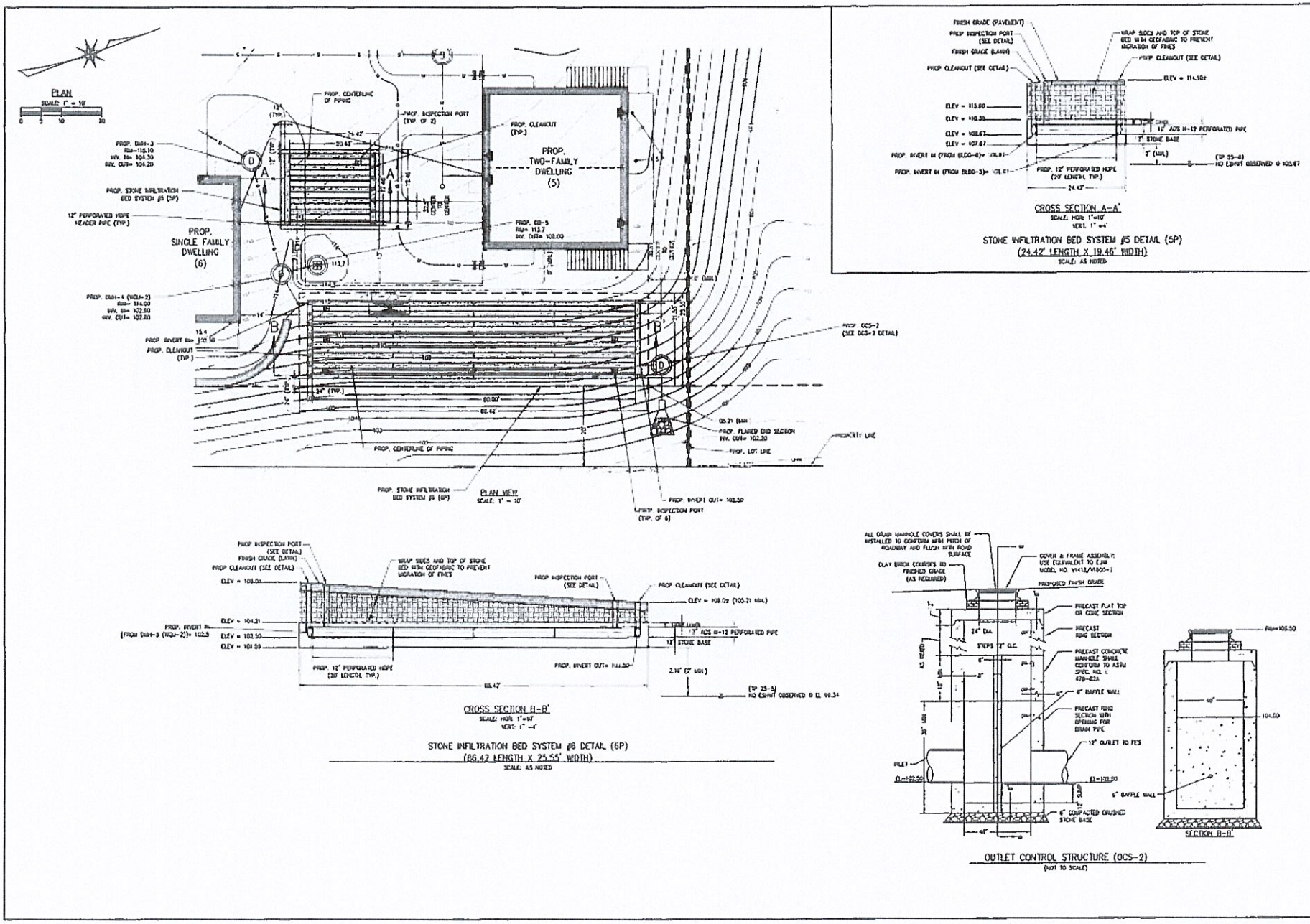
NO	REVISIONS DESCRIPTION	DATE

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
831 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 79H, BLOCK 2, LOT 21)
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

STORMWATER DETAILS

DRAWING NO: 10 OF 11

PROJ. #4218
DRAWING 4218_MAIN.dwg



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SITE DEVELOPMENT PLANS
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR:
PENTUCKET NORTH DEVELOPMENT LLC

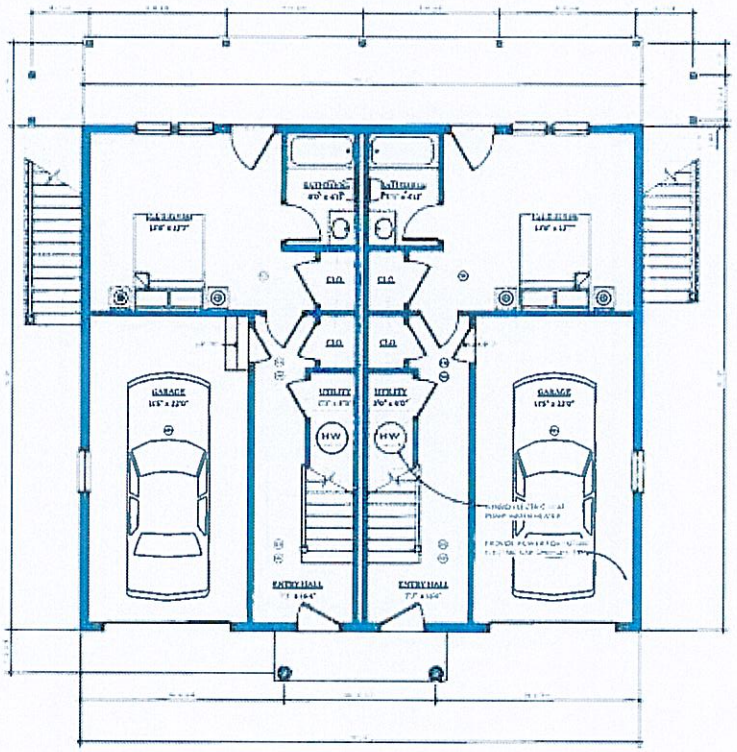
STORMWATER DETAILS

DRAWING NO. 11 OF 11

SURVEY BY: WCD
DRAFTED BY: GTS
CHECKED BY: WAS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 22, 2020

REVISIONS
NO. DESCRIPTION DATE

PROJ. #4316
DRAWING: 4316_MAIN.dwg



1 FIRST FLOOR PLAN
Scale: 1/4" = 1'-0"

NOTE
FLOOR PLANS SHOWN MAY BE APPROPRIATE OR REVERSED DEPENDING ON UNIT LOCATION ON SITE

FIRST FLOOR SQ. FT. (EXCL. GARAGE)	445.60 FT
SECOND FLOOR SQ. FT.	739 SQ. FT.
THIRD FLOOR SQ. FT.	663 SQ. FT.
TOTAL SQUARE FOOTAGE **	1848 SQ. FT.

**AREA TAKEN TO EXTERIOR SHEATHING

0 1 10 16 FT

SCOTT BROWN ARCHITECTS
48 MARKET STREET
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WWW.SCOTTBROWNARCHITECT.COM

MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

1ST FLOOR PLAN
DUPLEX BUILDING

A1.1

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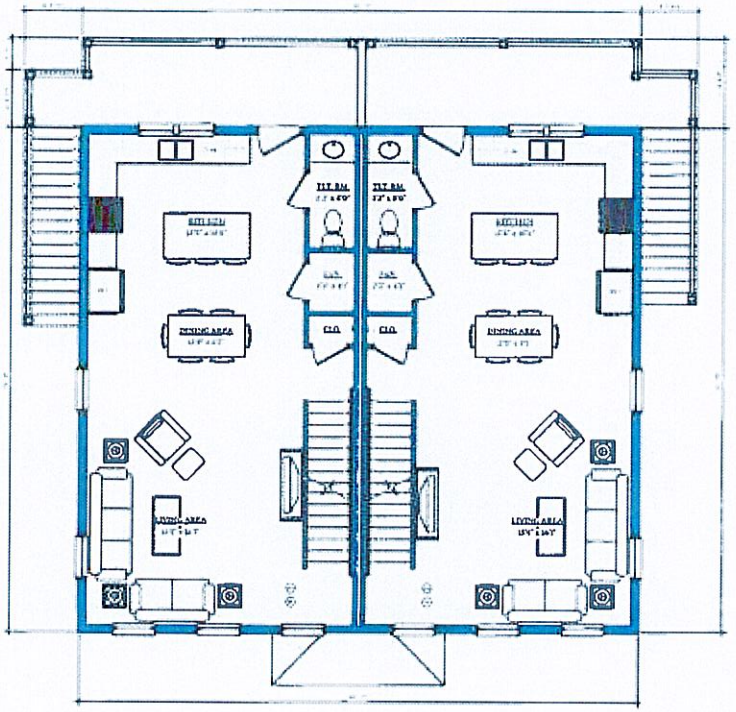

1 SECOND FLOOR PLAN
Scale 1/4" = 1'-0"

FLOOR PLANS SHOWN MAY BE MIRRORED DEPENDING ON UNIT LOCATION ON SITE

0 5 10 15 FT

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MULTI-FAMILY DEVELOPMENT

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REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

2ND FLOOR PLAN
DUPLEX BUILDING

A1.2

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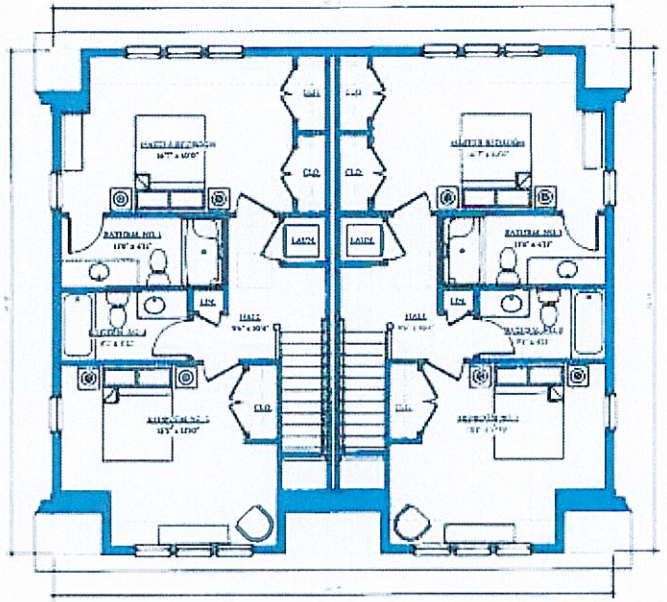

1 THIRD FLOOR PLAN
Scale 1/4" = 1'-0"

FLOOR PLANS SHOWN MAY BE MIRRORED DEPENDING ON UNIT LOCATION ON SITE

0 5 10 15 FT

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MULTI-FAMILY DEVELOPMENT

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REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

3RD FLOOR PLAN
DUPLEX BUILDING

A1.3

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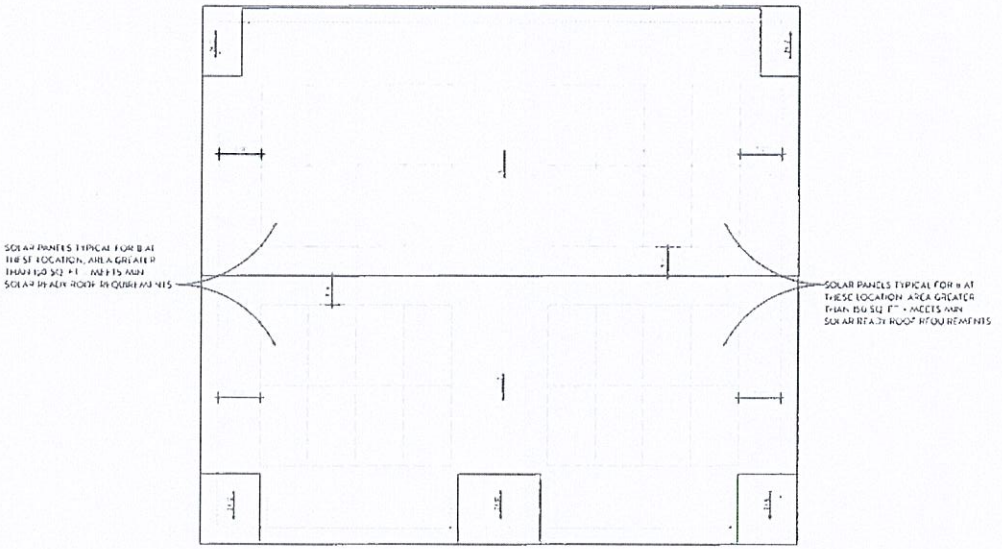

1 ROOF PLAN
Scale 1/4" = 1'-0"

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48 MARKET STREET
NEWBURYPORT, MA 01950
T 978.461.1533
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale AS NOTED

ROOF PLAN DUPLEX BUILDING

A1.4

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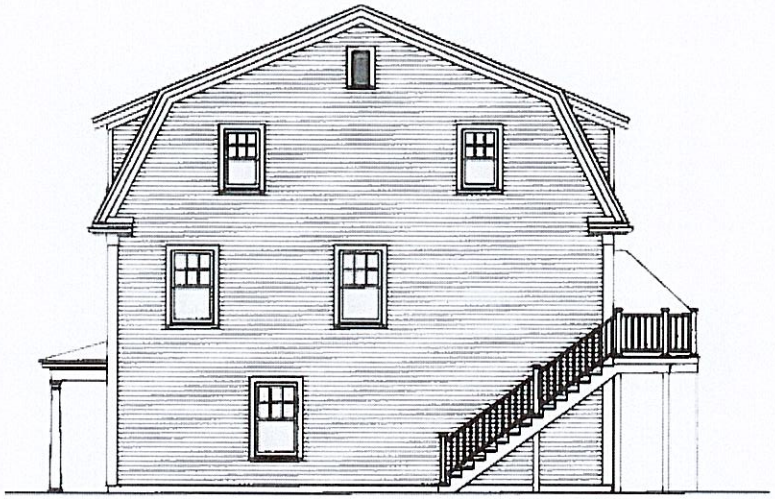

2 RIGHT SIDE ELEVATION
1/4" = 1'-0"

1 FRONT ELEVATION
1/4" = 1'-0"

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MULTI-FAMILY DEVELOPMENT

LOCATED AT

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REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

ELEVATIONS DUPLEX BUILDING

A2.1

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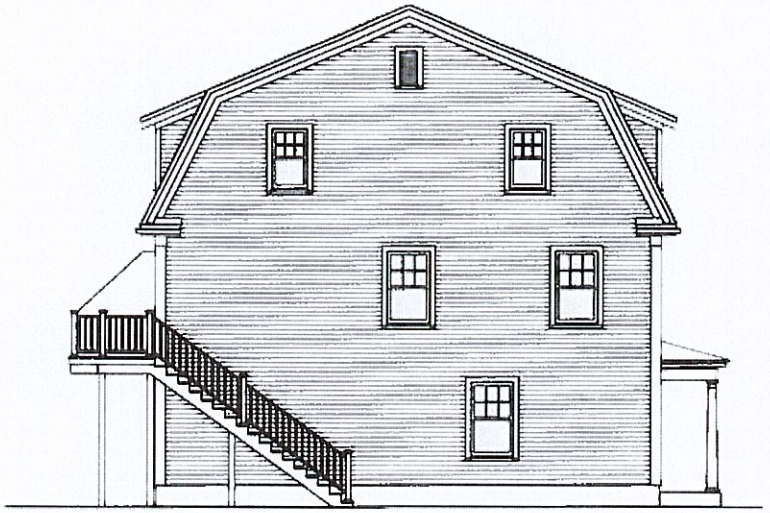

2 LEFT SIDE ELEVATION
1/4" = 1'-0"

1 REAR ELEVATION
1/4" = 1'-0"

0 5 10 FT

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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X X	3-21-26

Scale AS NOTED

ELEVATIONS DUPLEX BUILDING

A2.2

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1 STREET ELEVATIONS
3/16" = 1'-0"

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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

STREET ELEVATIONS

A2.3

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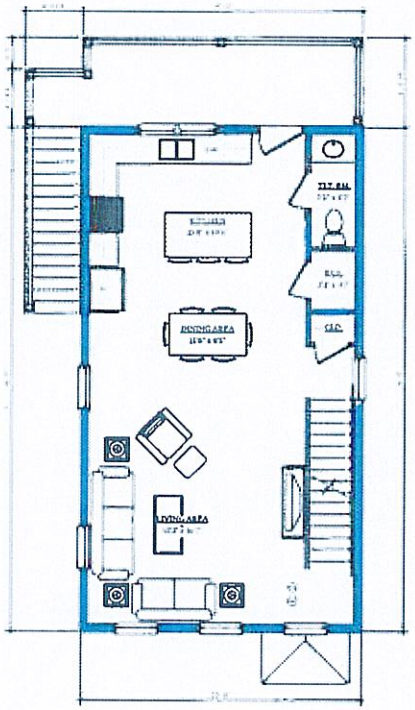
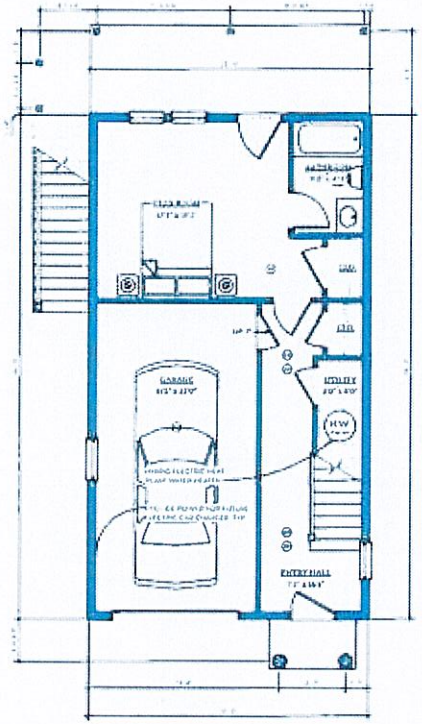


1 SECOND FLOOR PLAN
Scale 1/4" = 1'-0"



FIRST FLOOR PLAN
Scale 1/4" = 1'-0"

NOTE:
FLOOR PLANS SHOWN MAY BE MIRRORED DEPENDING ON UNIT LOCATION ON SITE

FIRST FLOOR SQ FT (EXCL. GARAGE)	441 SQ FT
SECOND FLOOR SQ FT	720 SQ FT
THIRD FLOOR SQ FT	690 SQ FT
TOTAL SQUARE FOOTAGE **	1,415 SQ FT

**AREA TAKEN TO EXTERIOR SHEATHING

0 5 10 20 FT

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ARCHITECTS

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NEWBURYPORT, MA 01950
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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

1ST & 2ND FLOOR PLAN SINGLE BUILDING

A1.1B

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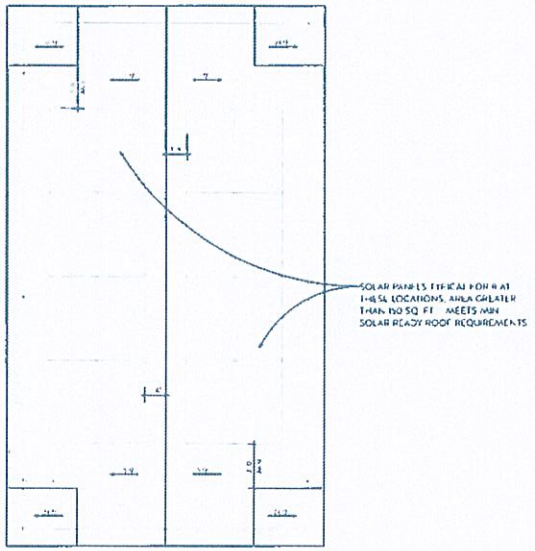
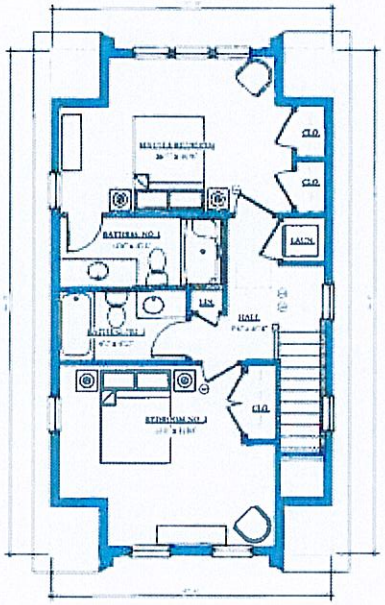


1 ROOF PLAN
Scale: 1/4" = 1'-0"



1 THIRD FLOOR PLAN
Scale: 1/4" = 1'-0"

NOTE
FLOOR PLANS SHOWN MAY BE MIRRORED DEPENDING ON LOT LOCATION ON SITE

0 1 16 48 FT

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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No.	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

3RD FLOOR & ROOF PLAN SINGLE BUILDING

A1.2B

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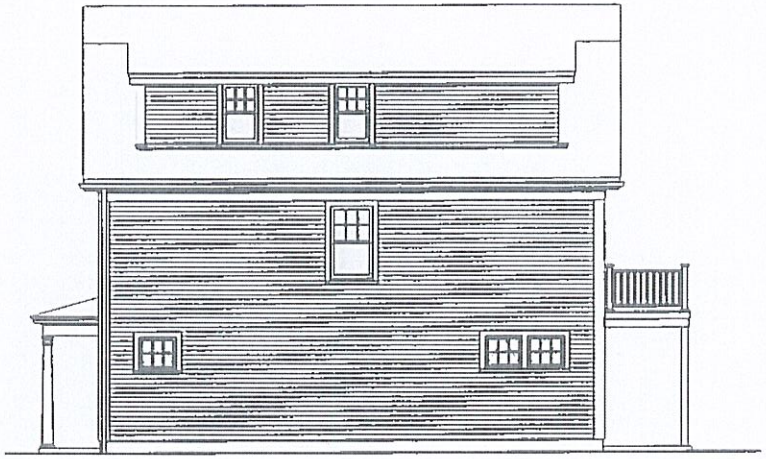
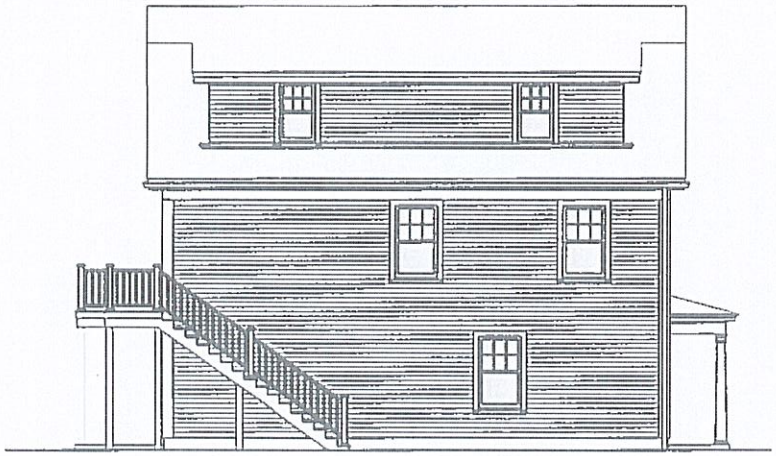
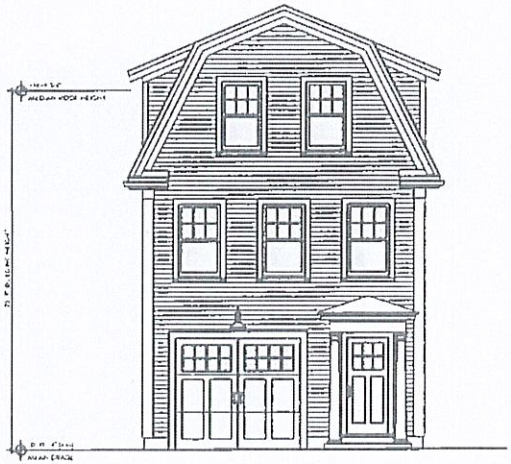
4 REAR ELEVATION
1/4" = 1'-0"



3 RIGHT SIDE ELEVATION
1/4" = 1'-0"



2 LEFT SIDE ELEVATION
1/4" = 1'-0"



1 FRONT ELEVATION
1/4" = 1'-0"

0 1 10 FT

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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES		
No	Date	Notes

Project #	Project Manager	Date
2026-13	K.K.	3-23-26

Scale: AS NOTED

ELEVATIONS SINGLE BUILDING

A2.1B

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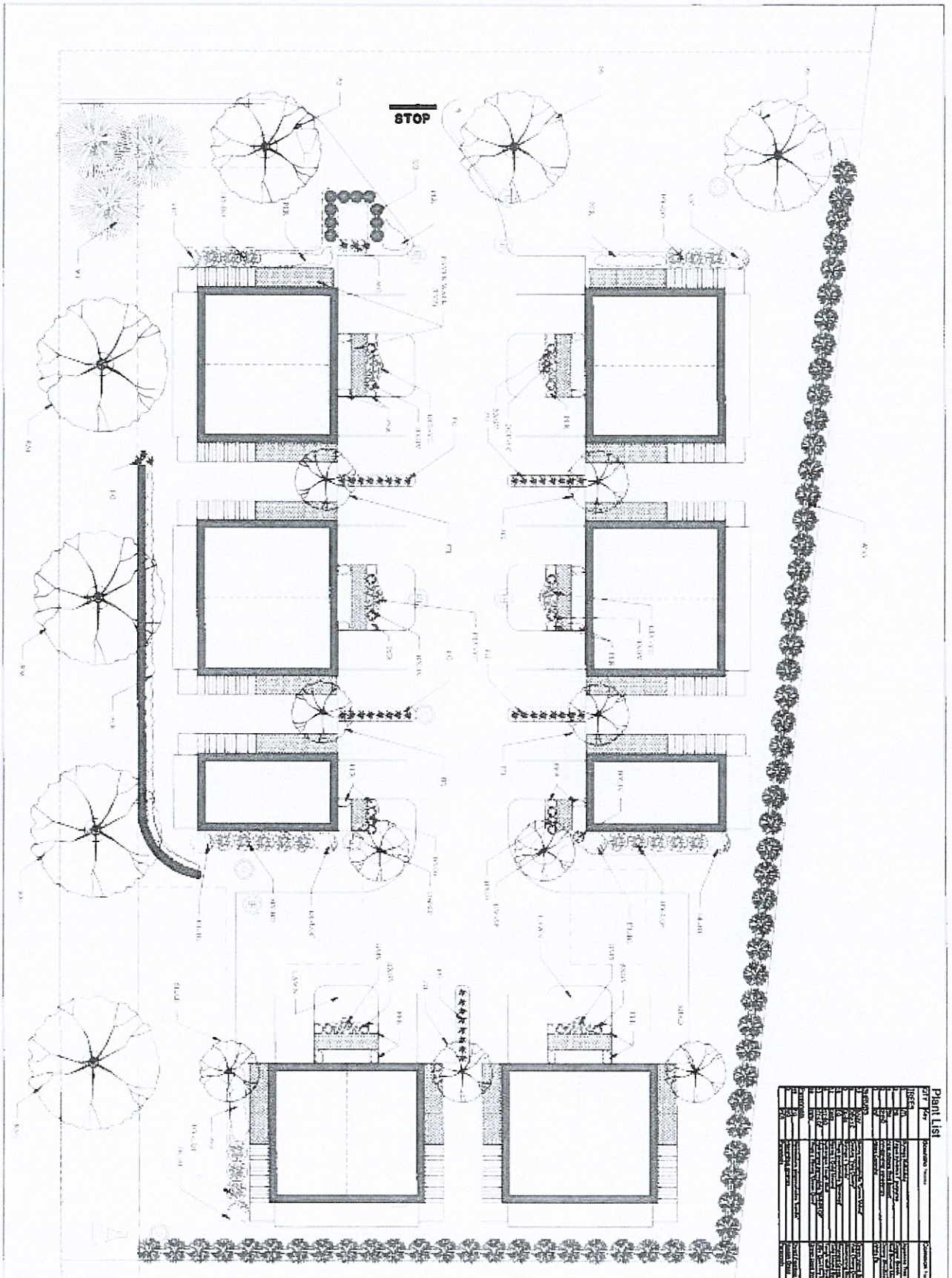


Plant List

L-100

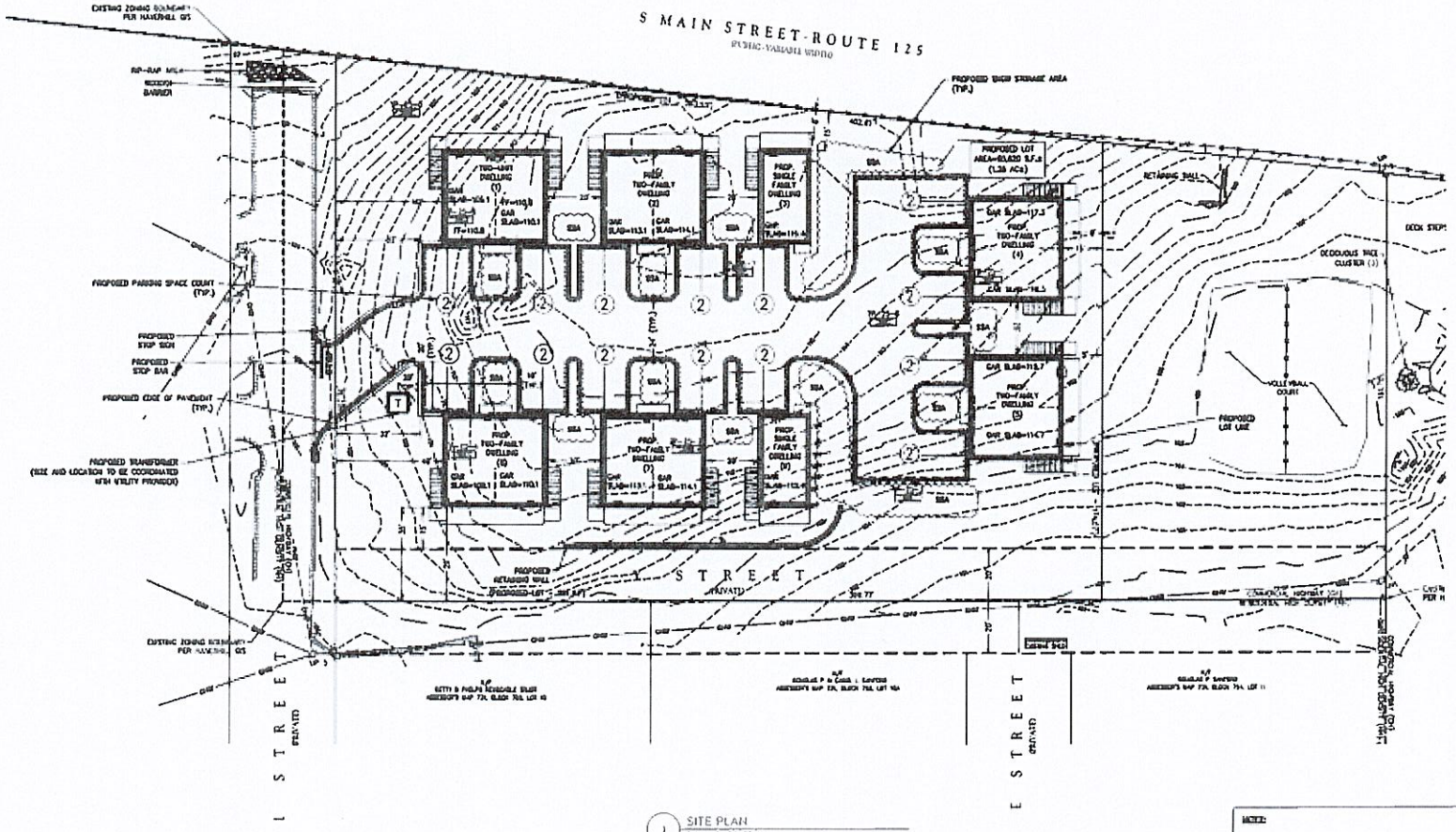
LANDSCAPE PLAN

I Street

4 Nonno Drive West Newbury MA 01985

Corliss

DRAWING LIST					
SHEET NUMBER	SHEET NAME	DATE	REVISION	REVISION DATE	ISSUED TO
A0.0	SITE PLAN	3-23-26			
A1.1	FIRST FLOOR PLAN DUPLEX BUILDING	3-23-26			
A1.2	SECOND FLOOR PLAN DUPLEX BUILDING	3-23-26			
A1.3	ROOF PLAN DUPLEX BUILDING	3-23-26			
A2.1	ELEVATIONS DUPLEX BUILDING	3-23-26			
A2.2	ELEVATIONS DUPLEX BUILDING	3-23-26			
A3.0	FIRST, SECOND FLOOR PLAN SINGLE BUILDING	3-23-26			
A3.1	ATTIC FLOOR & ROOF PLAN SINGLE BUILDING	3-23-26			
A3.2	ELEVATIONS SINGLE BUILDING	3-23-26			
A4.1	STREET ELEVATIONS	3-23-26			



1 SITE PLAN
Scale: 1" = 20'-0"

NOTES:
SITE PLAN IS FOR REFERENCE ONLY BASED UPON INFORMATION AS PROVIDED IN THE SITE DEVELOPMENT PLANS DATED [illegible] AS PREPARED BY THE MORIN - AMERON GROUP INC.

0 10 20 40 80 FT

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MULTI-FAMILY DEVELOPMENT

LOCATED AT

931 BOSTON ROAD HAVERHILL, MA 01835

REVISION & REISSUE NOTES

No	Date	Notes

Project #	Project Manager	Date
2026-13	X.X.	3-23-26

Scale: AS NOTED

SITE PLAN

A0.0

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STORMWATER REPORT

FOR THE

MULTI-FAMILY RESIDENTIAL DEVELOPMENT

LOCATED AT

931 BOSTON ROAD

HAVERHILL MASSACHUSETTS

April 28, 2026

SUBMITTED TO:

CITY OF HAVERHILL
CITY COUNCIL
HAVERHILL CITY HALL
4 SUMMER STREET, ROOM 204
HAVERHILL, MA 01830

APPLICANT:

PENTUCKET NORTH DEVELOPMENT LLC
C/O RONALD J. MAILLOUX SR.
55 CHASE STREET
METHUEN, MA 01844

PREPARED BY:

THE MORIN-CAMERON GROUP, INC.
66 ELM STREET
DANVERS, MA 01923

DRAINAGE REPORT NARRATIVE

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- Figure 3: SCS Soils Map
- Figure 4: FEMA Flood Map
- Figure 5: Pre-Development Watershed Plan
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- APPENDIX A MassDEP Stormwater Management Report Checklist
- APPENDIX B Existing Conditions Hydrologic Analysis Report
- APPENDIX C Proposed Conditions Hydrologic Analysis Report
- APPENDIX D Construction Phase Best Management Practices Plan
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- APPENDIX F Illicit Discharge Compliance Statement
- APPENDIX G Stormwater Management Calculations
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DRAINAGE REPORT
931 Boston Road Multi-Family Site Development

I. Executive Summary

Pentucket North Development LLC, c/o Ronald J. Mailloux Sr., the applicant, proposes to develop a portion of land located at 931 Boston Road in Haverhill, Massachusetts (the "site"). The project includes constructing six two-unit residential buildings and two one-unit residential buildings totaling 14 residential units between the eight buildings with surface parking at each building, landscaping improvements, stormwater management systems and new utility infrastructure. The subject parcel is shown on the City of Haverhill Assessor's Map 754, Block 2, Lot 21 which is currently situated in the Commercial Highway (CH) Zoning District. The applicant is applying to convert the zoning to a Planned Development District.

The project will require Rezoning Approval through the Haverhill City Council to allow for approximately 55,620 square feet (1.28 Acres) of 931 Boston Road to be converted from Commercial Highway Zoning District to Planned Development Zoning District. As part of the project permitting, the proponent must demonstrate compliance with applicable stormwater best management practices and regulations. The following drainage report contains a description of existing and proposed site conditions, stormwater management design methodology and results summaries and other supplemental information in support of the stormwater best management system design.

II. Existing Site Description

The existing site consists of a total land area of approximately 10.75 acres and is currently developed as Cedardale Health and Fitness with one main large interconnected commercial building that houses the gym and indoor tennis, several smaller supporting buildings, outdoor tennis and pickleball courts, swimming pools and associated asphalt roadways, and utility infrastructure. The subject portion of land located at the corner of I Street and Y Street (an undeveloped "paper street") is primarily undeveloped woodlands with some lawn areas neighboring the existing volleyball court to the North and nearest Cedardale Health and Fitness.

Grades on the undeveloped portion of the site range from 1%-20% with the elevation at the proposed driveway being 105' and the highest point on site being 120'. The site has a defined high point near the Western center of the development with defined watershed breaks creating three design points [I Street (Westbound) -DP1, I Street (Eastbound) – DP2, and Y Street (Northern end towards the Cedardale Health and Fitness site)].

Soils on site are primarily (92%) Charlton-Rock Outcrop-Hollis Complex (711C), Hydrologic Soil Group (HSG) A/D and the remaining area (8%) located along the Western property line are Unorthentis, Smoothed, HSG A. See Figure 3: SCS Soils Map for an illustration of the soil types. In-situ soil testing was conducted by The Morin-Cameron Group, Inc. in November 2025 to verify soil textures and determine estimated seasonal high groundwater elevations. The entire site is shown to be located in a Zone X: area of minimal flood hazard above 100-year flood level as illustrated on the FEMA Federal Insurance Rate Map (FIRM) #25009C0088G, with an effective date of July 8, 2025 (See Figure 4: FEMA Flood Map).

III. Proposed Site Description

The applicant proposes to construct six two-unit residential buildings and two one-unit residential buildings totaling 14 residential units between the eight buildings with surface parking at each building, landscaping improvements, stormwater management systems and new utility infrastructure. Each unit has a 20' x 36' footprint (720 square feet).

The proposed project includes a single curb cut located on I street where there is currently an existing area of gravel fenced off that has been used for parking. The two proposed two-unit residential buildings closest to the front property line have a front setback of 40 feet. The proposed entrance driveway is not perpendicular to the roadway due to the existing topography of the site being steep. The proposed angled driveway entrance helps to lengthen the entrance enough to allow for the roadway to be at a higher elevation, closer to the existing grade, than would be possible if designed perpendicular to I street. Once the driveway straightens out there are two two-unit buildings and one one-unit building on each side of the driveway as you enter the site with the end of the driveway bringing you to the remaining two two-unit buildings. Each building has 2 surface parking spaces and one garage space associated with each unit and closest to their respective entrances. The driveway has been designed to allow for the Haverhill Fire Department ladder truck to be able to easily enter the site and make a three-point turn at the end of the driveway to turn around and exit the site. There is a proposed fire hydrant at the end of the driveway between building 3/4 and an existing fire hydrant location approximately 70 feet west of the proposed driveway entrance on I Street.

Infrastructure associated with the development of the site will include the removal of the minor existing water irrigation utilities and installation of a new water main to service all proposed buildings, new electrical services, new sewer services and construction of stormwater management infrastructure. The proposed utility pole relocation, transformer and services will be coordinated with the electric service provider.

The proposed stormwater management system for the project will consist of various Best Management Practices ("BMP's") in both mitigating and renovating stormwater runoff. The entire stormwater system was designed in accordance with the City of Haverhill's Stormwater Management Regulations (Chapter 219) and the Massachusetts Stormwater Management Handbook ("Handbook"), which the City of Haverhill references in its regulations. The measures to be implemented at the site include six stone infiltration bed systems and two water quality units. Refer to the Grading & Drainage Plan and associated details for more information. The existing watershed characteristics, flow paths and drainage patterns were matched to the extent practicable in the proposed condition to demonstrate that there are no adverse impacts to adjacent properties or resource areas (i.e. design points).

IV. Stormwater Management

A. Existing Watershed Characteristics

Stormwater runoff exits the site in the existing condition at three (3) distinct locations. The location where stormwater runoff leaves the site boundary is called the design point ("DP"). DP1 is I Street (Westbound). DP2 is I Street (Eastbound). DP3 is the Northeast property corner of the site near Y street. The design points and the tributary watersheds (or subcatchments) are illustrated on Figure 5: Existing Site Development Watershed Plan. The table below lists the total area associated with each subcatchment area.

Summary of Existing Subcatchments

Existing Drainage Area (E)	Total Area (SF)	% Impervious	Composite Curve Number
E-1	14,004	0%	32
E-2	8,274	0%	34
E-3	51,518	0%	36
Total	**73,796 (1.69 acres)**	**0%**	35

Description of Existing Subcatchments

The subcatchments analyzed in the existing condition can be described as follows:

- **Subcatchment E-1:** The Southwestern portion of the proposed lot that includes primarily undeveloped woodland and some lawn areas at the top of the slope. The Design point of this subcatchment is I Street (Westbound).
- **Subcatchment E-2:** The Southeastern portion of the proposed lot that includes primarily undeveloped woodland and small lawn area at the top of the slope. The Design point of this subcatchment is I Street (Eastbound).
- **Subcatchment E-3:** The Northern portion of the proposed lot that includes primarily undeveloped lawn area and woodland area. The Design point of this subcatchment is Y Street (Northern end closest to Cedardale Health and Fitness).

B. Proposed Watershed Characteristics

The proposed development of the site will maintain the design points identified in the existing watershed analysis. In order to understand and analyze the proposed development, smaller subcatchments were delineated to analyze stormwater impacts on a more detailed scale. The table below provides the total drainage area and the percentage that will be impervious in the post-development condition. The design points and the tributary watersheds (or subcatchments) are illustrated on Figure 6: Proposed Site Development Watershed Plan. The table below lists the total area associated with each subcatchment area.

Summary of Proposed Subcatchments

Proposed Drainage Area	Total Area (SF)	% Impervious	Composite Curve Number
P-1	5,775	80.57%	87
P-2	8,985	6.84%	43
P-3	5,037	12.63%	46
P-4	11,423	68.38%	79
P-5	32,496	0.00%	39
PS-R1 TO PS-R8	10,080	100.00%	98
TOTALS	**73,796 (1.69 acres)**	**39.18%**	**58**

Description of Proposed Subcatchments

- **Subcatchment P-1:** Includes the lower parking area, driveway area and associated landscaping areas in front of Buildings 1 & 8 and roughly half of Buildings 2 & 7. This area is captured and directed to Stone Infiltration Bed System #1 (P1).

- **Subcatchment P-2:** Includes the Western area of driveway that isn't captured by catch basins 1 & 2, lawn areas behind Buildings 1/2/3 and the lawn areas surrounding the Stone Infiltration Beds 1 & 2 (P1 & P2). This area flows directly offsite to Design Point 1.
- **Subcatchment P-3:** Includes the Eastern area of driveway that isn't captured by catch basins 1 & 2, lawn area behind Buildings 8 and the lawn area surrounding the Stone Infiltration Beds 3 (P3). This area flows directly offsite to Design Point 2.
- **Subcatchment P-4:** Includes the upper parking, driveway and landscaping areas associated with Buildings 3/4/5/6 and roughly half of Buildings 2/7. This area is captured and directed to the Stone Infiltration Bed System #6 (P6). This area eventually outfalls to Design Point 3.
- **Subcatchment P-5:** Includes the remaining lawn areas that are not captured behind Buildings 4/5/6/7. This area flows directly offsite to Design Point 3.
- **Subcatchment PS-R1:** Only roof area of Building 1, which is captured and directed to Stone Infiltration Beds #2 (P2). This area eventually outfalls to Design Point 1.
- **Subcatchment PS-R2:** Only roof area of Building 2, which is captured and directed to Stone Infiltration Bed #3 (P3). This area eventually outfalls to Design Point 2.
- **Subcatchment PS-R3:** Only roof area of Building 3, which is captured and directed to Stone Infiltration Bed #4 (P4). This area eventually outfalls to Design Point 3.
- **Subcatchment PS-R4:** Only roof area of Building 4, which is captured and directed to Stone Infiltration Bed #4 (P4). This area eventually outfalls to Design Point 3.
- **Subcatchment PS-R5:** Only roof area of Building 5, which is captured and directed to Stone Infiltration Bed #5 (P5). This area eventually outfalls to Design Point 3.
- **Subcatchment PS-R6:** Only roof area of Building 6, which is captured and directed to Stone Infiltration Bed #5 (P5). This area eventually outfalls to Design Point 3.
- **Subcatchment PS-R7:** Only roof area of Building 7, which is captured and directed to Stone Infiltration Bed #3 (P3). This area eventually outfalls to Design Point 2.
- **Subcatchment PS-R8:** Only roof area of Building 8, which is captured and directed to Stone Infiltration Bed #3 (P3). This area eventually outfalls to Design Point 2.

C. Hydrologic Analysis:

The purpose of the stormwater analysis is to demonstrate that the proposed development will not adversely impact the land or surrounding land. The industry standard for stormwater management design in Massachusetts is governed by the Massachusetts Stormwater Management Handbook ("Handbook") published by the Mass Department of Environmental Protection, January 2008. The City of Haverhill Stormwater Management Ordinance defers to the Handbook for analysis of the 2, 10 and 100-year storm events.

The Handbook lists 10 standards covering both mitigation and renovation of stormwater runoff. A full discussion on compliance with the standards can be found at the end of this report. However, the following section will summarize the projects compliance with the mitigation standards 1 and 2 of the Handbook relating to reducing peak rates of runoff and creating no adverse down gradient impacts.

In order to demonstrate that there will be no downstream impacts as a result of the proposed project, a stormwater analysis was performed using the U.S. Soil Conservation Service (S.C.S) method of analysis contained in Technical Release #20 (TR-20) published by the U.S. Conservation Service, along with the extreme precipitation values published by the Northeast Regional Climate Center. The software application HydroCAD was used to analyze the existing

and proposed development watershed conditions. This application is widely used in the civil engineering industry and is an accepted means of performing a TR-20 analysis. It is a computer aided design program for analyzing the hydrology and hydraulics of storm water runoff. It utilizes the latest techniques of both fields to accurately predict the consequences of any given storm event. This analysis allows the engineer to verify that a given drainage system is adequate for the area under consideration and further allows the engineer to predict where flooding or erosion are most likely to occur. This model was used to analyze the storm drainage system designed for the development to demonstrate that the drainage system is in compliance with the City's Stormwater Management Standards.

The HydroCAD analysis was performed by examining the three design points that were previously referenced. The storm events used were taken from NRCS2-Rain Event Lookup table for Haverhill, MA available online (based on NOAA Atlas 14 Volume 10 - Point Precipitation Frequency Estimates then the upper confidence interval multiplied by 90%.) The following is a listing of the total existing and proposed development rates of stormwater runoff for the proposed development for the 2, 10 and 100-year rainfall events:

Haverhill 24-hour rainfall data

STORM EVENT (HAVERHILL, MA)	
Years	*Depth/24 hrs*
2	3.17
10	5.02
100	7.96

DP1 Peak Discharge Rates (CFS)				
Storm Event		Existing Conditions	Proposed Conditions	Change in Peak
2-yr	Outflow	0.0	0.0	NO CHANGE
10-yr	Outflow	0.0	0.0	NO CHANGE
100-yr	Outflow	0.0	0.5	+0.5

DP2 Peak Discharge Rates (CFS)				
Storm Event		Existing Conditions	Proposed Conditions	Change in Peak
2-yr	Outflow	0.0	0.0	NO CHANGE
10-yr	Outflow	0.0	0.0	NO CHANGE
100-yr	Outflow	0.1	0.2	+0.1

DP3 Peak Discharge Rates (CFS)				
Storm Event		Existing Conditions	Proposed Conditions	Change in Peak
2-yr	Outflow	0.0	0.0	NO CHANGE
10-yr	Outflow	0.0	0.0	NO CHANGE
100-yr	Outflow	0.5	0.8	+0.3

DP1 Volume Discharge (CF)				
Storm Event		Existing Conditions	Proposed Conditions	Change in Volume
2-yr	Outflow	0	15	+15
10-yr	Outflow	31	269	+238
100-yr	Outflow	644	2,119	+1,475

DP2 Volume Discharge (CF)				
Storm Event		Existing Conditions	Proposed Conditions	Change in Volume
2-yr	Outflow	0	23	+23
10-yr	Outflow	43	208	+165
100-yr	Outflow	488	762	+274

DP3 Peak Discharge Rates (CFS)				
Storm Event		Existing Conditions	Proposed Conditions	Change in Peak
2-yr	Outflow	0.0	0.0	NO CHANGE
10-yr	Outflow	478	553	+75
100-yr	Outflow	3,755	3,561	-194

Based on the analysis of the 2 and 10-year storm events, our proposed design maintains the peak discharge rates directed to Design Point 1, 2 & 3.

For Design Point 1 our proposed design increases the rate for the 100-year storm event by 0.5 CFS (From 0.0 CFS to 0.5 CFS), while increasing the volume by 1,475 CF (from 644 CF to 2,119 CF). For Design Point 2 our proposed design increases the rate for the 100-year storm event by 0.1 CFS (From 0.1 CFS to 0.2 CFS), while increasing the volume by 274 CF (from 488 CF to 762 CF). For Design Point 3 our proposed design increases the rate for the 100-year storm event by 0.3 CFS (From 0.5 CFS to 0.8 CFS), but decreases the volume by 194 CF (from 3,755 CF to 3,561 CF).

For stormwater associated with Design Point 1, the water exits the SouthWest property corner and follows the natural topography of the woodland along the Eastern right-of-way of Route 125. From Mass GIS topography you can see that the stormwater will find itself in a depression nearby Route 125 that eventually makes it way to an apparent wetland measuring 12,227 SF based on

MA GIS. The wetland is hydrologically connected under Route 125 to a 235,692 SF wetland. The proposed additional volume increase of 1,475 CF over the first smaller wetland when converted to an equivalent depth increase is 1.45 inches (1,475 CF/12,227 SF= 0.121 ft). Since the two wetlands are hydrologically connected an isolated analysis of the smaller wetland alone overestimates localized impacts as water levels will equilibrate between the two hydrologically connected wetlands. The proposed additional volume increase of 1,475 CF over the larger wetland when converted to an equivalent depth increase is 0.07 inches (1,475 CF/235,692 SF= 0.006 ft). Ultimately, this increase qualifies as de minimus given the calculated depth increase of the larger wetland being only 0.07 inches, which poses no material risk to the wetland system's capacity, functionality, or integrity during the 100-year storm.

For stormwater associated with Design Point 2, the water exits the SouthEast property corner and follows the natural topography of the right-of way (R.O.W.) on I street. The 274 CF increase represents a minor incremental volume, equivalent to approximately the capacity of a large hot tub or about 2,050 gallons. In the context of a 100-year storm event measuring 7.96" of rainfall over a 24-hour period, this is a small fraction of the total runoff generated by even a modest upstream area on I street. There are approximately 500 linear feet of R.O.W. on I street from the site to the intersection of Oxford Avenue. Assuming a right-of-way width of 20 feet, there is approximately 10,000 SF of area in the R.O.W. that this stormwater would have to infiltrate. Assuming no infiltration, this stormwater increase of 274 CF when converted to an equivalent depth increase is 0.33 inches (274 CF/10,000 SF= 0.0274 ft). This is a minimal rise, well below typical ponding thresholds for streets and no additional flood hazards are introduced by this increase as the minor volume increase will dissipate rapidly without causing downstream impacts.

For stormwater associated with Design Point 3, there is a decrease in total stormwater volume of 194 CF during the 100-year storm, while the peak flow rate increases by 0.3 CFS. A stormwater volume decrease during a 100-year storm, despite any peak rate increase, prevents downstream flooding by reducing flood duration and total hydrograph volume, avoiding capacity exceedances, therefore there is no additional flood hazard present at Design Point 3.

D. Review of Stormwater Management Standards

The proposed development project is comprised of only new development. The drainage system has been designed to attenuate peak rates of stormwater for all storm events up to and including the 100-year event. Measures will also be implemented to provide the required total suspended solids (TSS) removal, to ensure the stormwater runoff is renovated prior to discharge.

1. No stormwater conveyance system discharges untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. The project includes a variety of BMPs to provide treatment of runoff prior to discharge.
   The proposed development meets this standard.
2. The stormwater management system has been designed such that proposed peak runoff rates and volumes do not exceed existing rates or volumes for the 2-year and 10-year 24-hour storm events and the 100-year storm event has been evaluated to ensure no off-site flooding issues.
   The proposed development reduced runoff rates for the 2-year and 10-year for all three Design Points. The increase in volume for the 100-year storm for Design Points 1 & 2 has been evaluated above to show there are no off-site flooding issues anticipated.
3. Loss of annual recharge to groundwater has been eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance.
   The proposed development meets this standard. (See Stormwater Management Calculations Section)
4. The proposed stormwater management system has been designed to remove a minimum of 90% of the average annual post-construction load of Total Suspended Solids (TSS). The best management practices treatment train utilizes water quality units and six underground stone infiltration bed systems to achieve TSS removal.
   The proposed development meets this standard. (See Stormwater Management Calculations Section)
5. Land Uses with Higher Potential Pollutant Load.
   This standard does not apply.
6. Discharges to critical areas.
   This standard does not apply.
7. Redevelopment Projects: the project consists of a mix of new development and redevelopment.
   This standard does not apply.
8. A Construction Phase Operation and Maintenance Plan in included herewith. A Stormwater Pollution Prevention Plan following the EPA guidelines under the National Pollutant Discharge Elimination System will be prepared prior to construction.
   The proposed development meets this standard.
9. A long-term operation and maintenance plan: A long-term O&M has been prepared to provide guidance for current and future owners to inspect and maintain the stormwater management systems in perpetuity. A copy of this O&M plan is included herein.

The proposed development meets this standard.

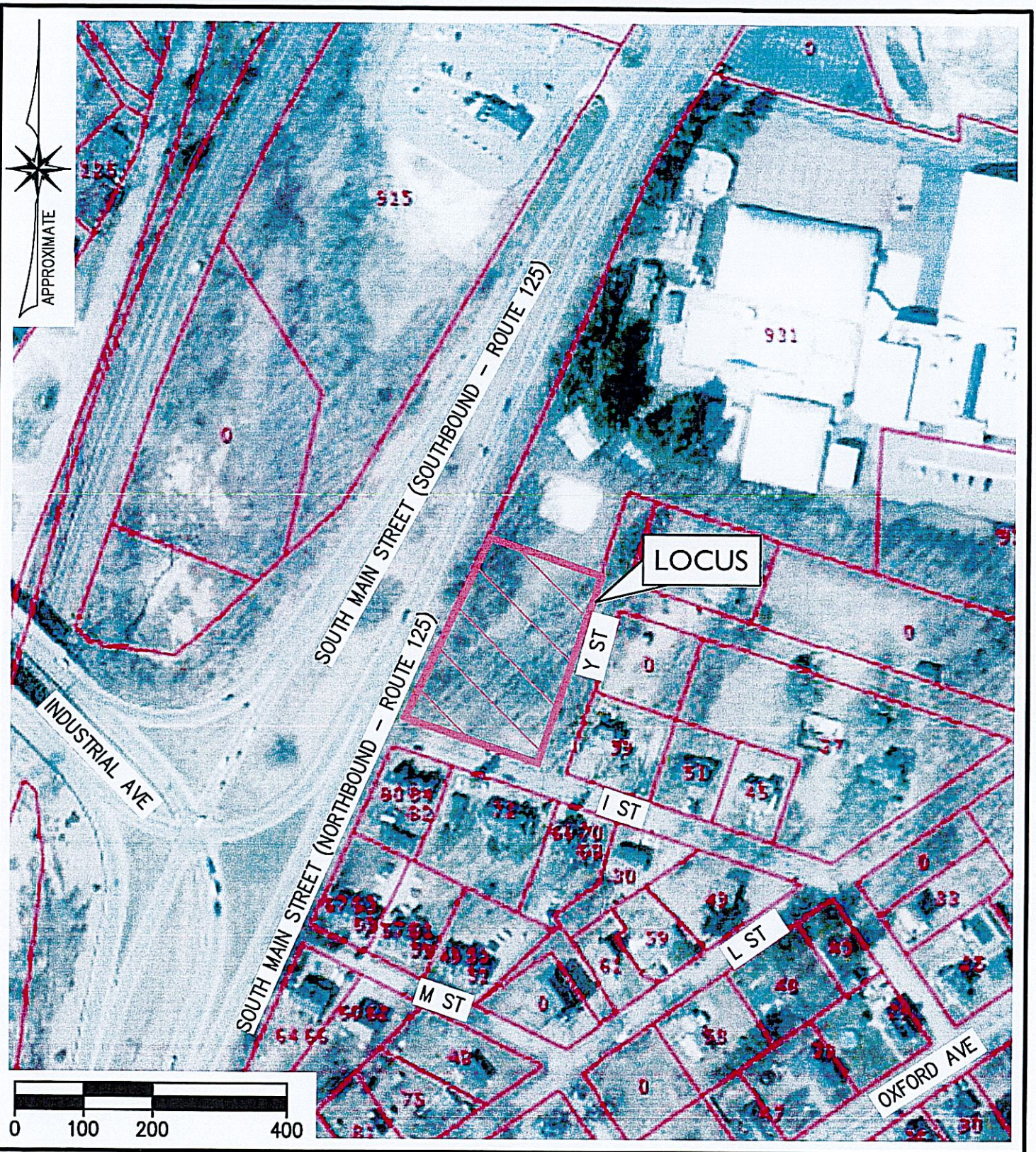
10. Illicit discharges: To the best of our knowledge and belief there are no illicit discharges to the stormwater management system on this site. A certification is included herein.
    The proposed development meets this standard.

V. Conclusion

The project at 931 Boston Road, as proposed, is in compliance with the MassDEP Stormwater Management Handbook and the Haverhill Stormwater Management Regulation, which reference the MA Stormwater Standards.

For questions regarding this Drainage Report, please contact The Morin-Cameron Group, Inc. between the hours of 8:30am to 4:30pm at (978) 777-8586.

FIGURES



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66 ELM STREET, DANVERS, MASSACHUSETTS 01923
P: 978-777-8586, W: WWW.MORINCAMERON.COM

ORTHO MAP

AT

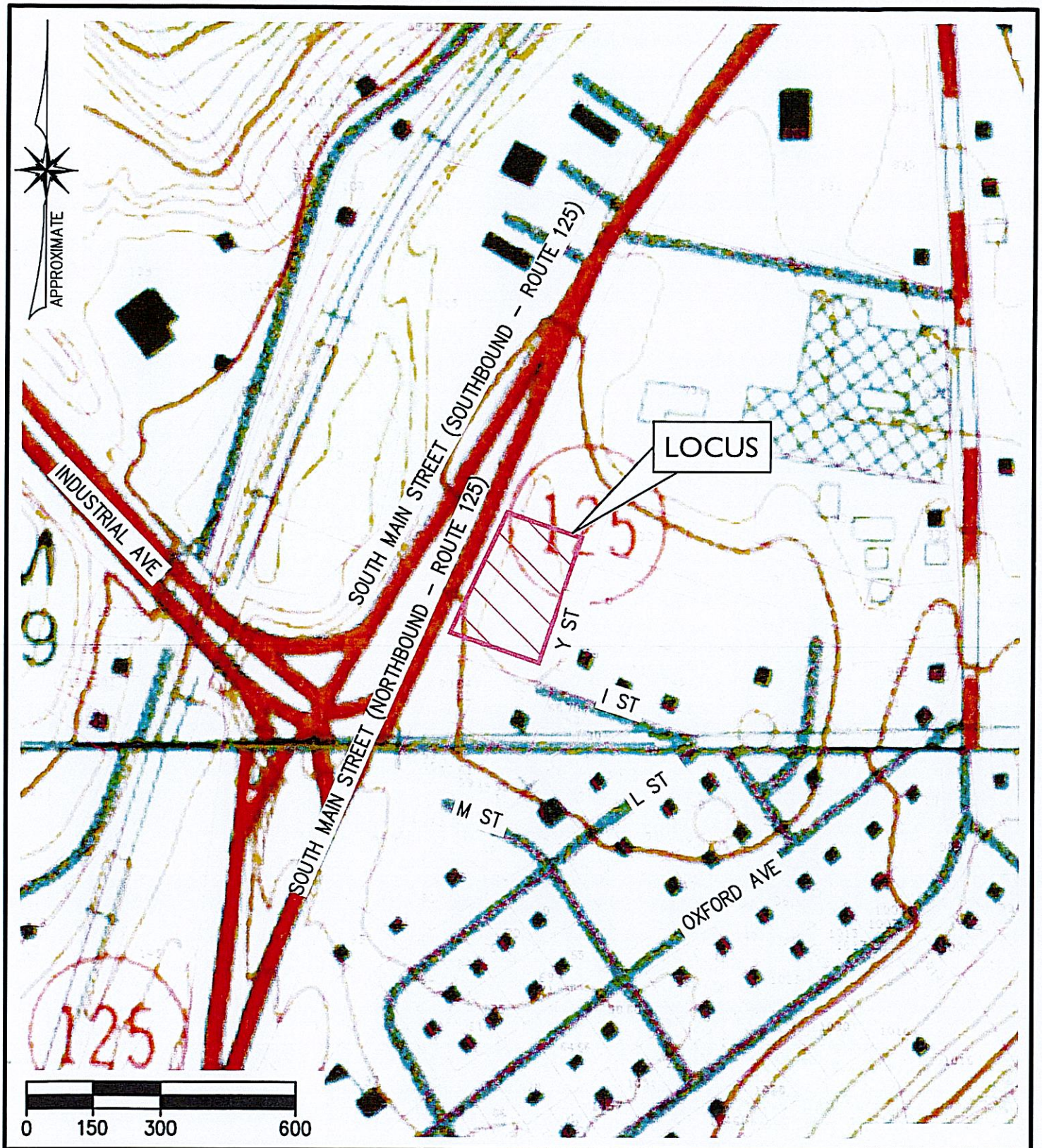
931 BOSTON ROAD
HAVERHILL, MASSACHUSETTS

DATE: FEBRUARY 13, 2026

SCALE: 1" = 200'

FIGURE 1: ORTHO MAP

PROJ. 4316



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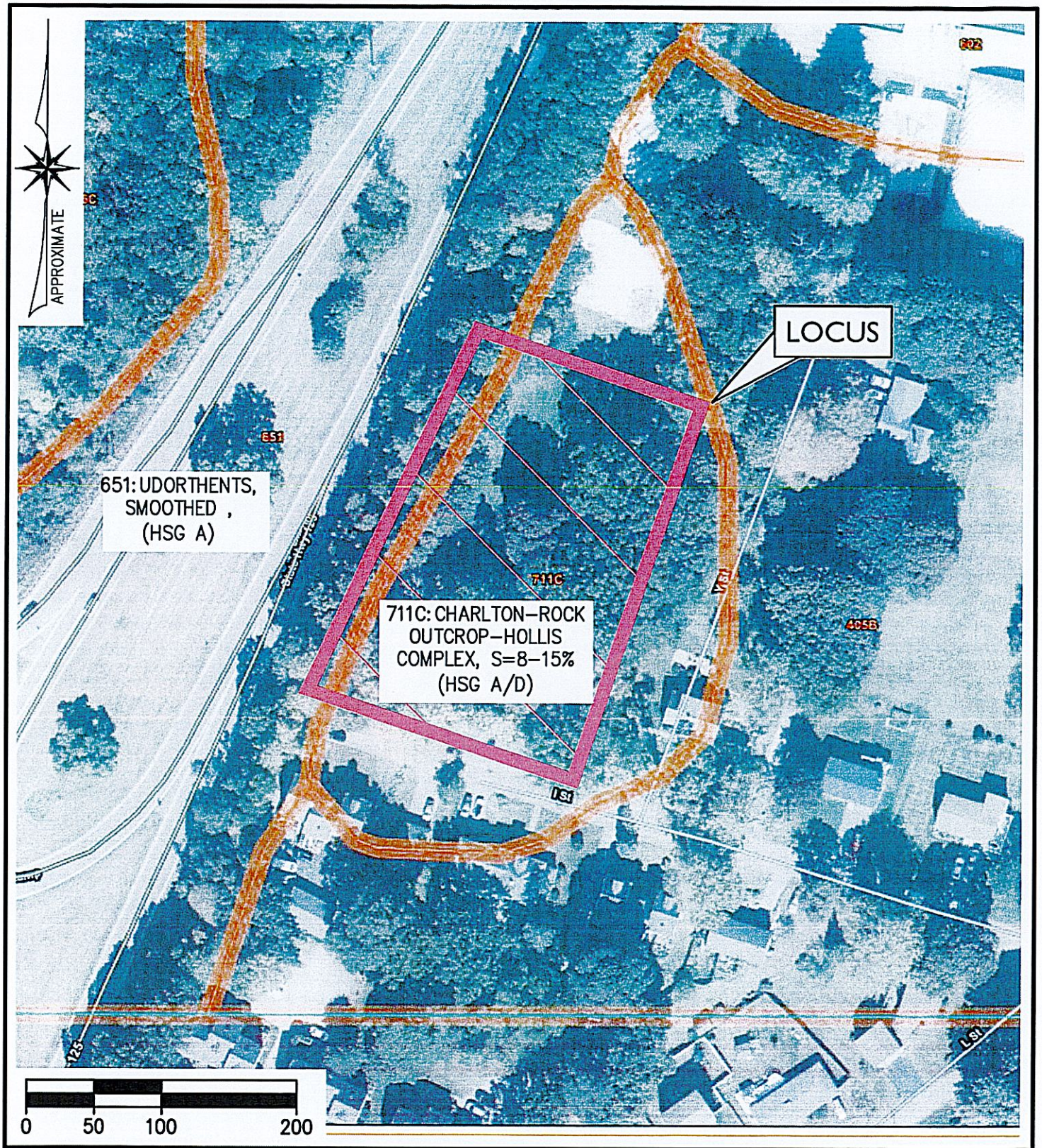
USGS LOCUS MAP

AT

931 BOSTON ROAD
HAVERHILL, MASSACHUSETTS

DATE: FEBRUARY 13, 2026 | SCALE: 1" = 300' | FIGURE 2: USGS LOCUS MAP

PROJ. 4316



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SCS SOIL MAP

AT

931 BOSTON ROAD
HAVERHILL, MASSACHUSETTS

DATE: FEBRUARY 13, 2026

SCALE: 1" = 100'

FIGURE 3: SCS SOILS MAP

PROJ. 4316

APPENDIX A:

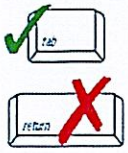
MASSDEP STORMWATER MANAGEMENT REPORT CHECKLIST

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

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

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

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

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

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

B. Stormwater Checklist and Certification

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

Checklist for Stormwater Report

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

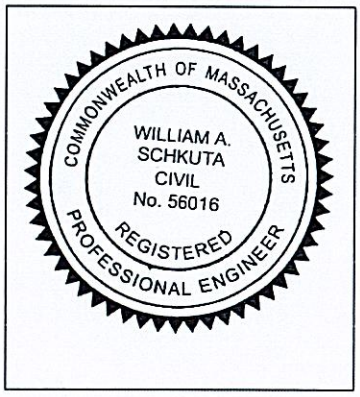
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date 4/20/2026

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist (continued)

Checklist for Stormwater Report

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

- ☒ No disturbance to any Wetland Resource Areas
- ☒ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☒ Other (describe): Stone Infiltration Bed Systems (6)

Standard 1: No New Untreated Discharges

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

Checklist (continued)

Checklist for Stormwater Report

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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

Checklist (continued)

Checklist for Stormwater Report

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

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

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist (continued)

Checklist for Stormwater Report

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☒ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist (continued)

Checklist for Stormwater Report

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

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

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

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist (continued)

Checklist for Stormwater Report

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

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

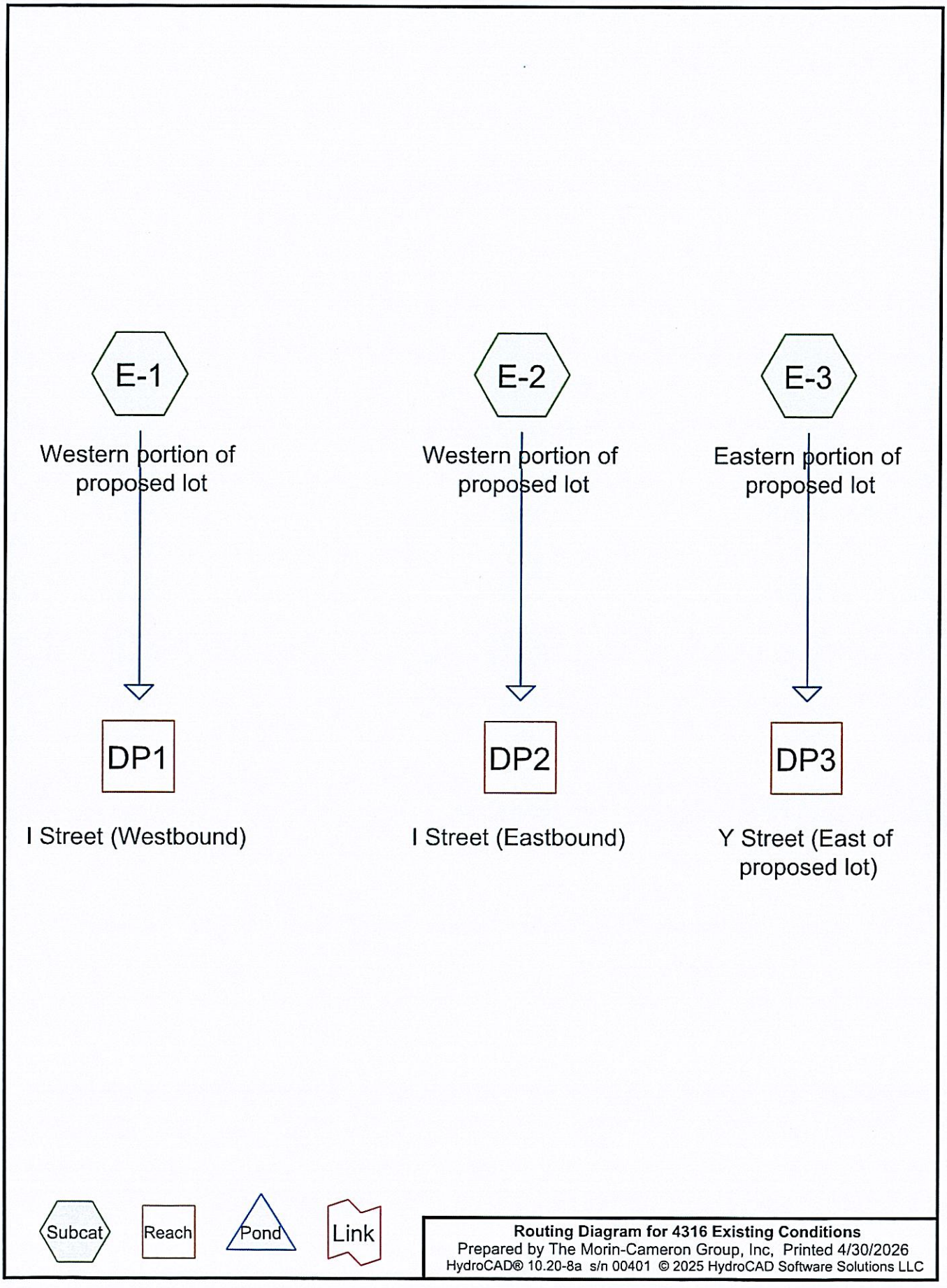
☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX B:

EXISTING CONDITIONS

HYDROLOGIC ANALYSIS REPORT



Routing Diagram for 4316 Existing Conditions
Prepared by The Morin-Cameron Group, Inc, Printed 4/30/2026
HydroCAD® 10.20-8a s/n 00401 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NOAA10 24-hr	D	Default	24.00	1	3.17	2
2	10-Year	NOAA10 24-hr	D	Default	24.00	1	5.02	2
3	100-Year	NOAA10 24-hr	D	Default	24.00	1	7.96	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
36,279	39	>75% Grass cover, Good, HSG A (E-1, E-2, E-3)
691	96	Gravel surface, HSG A (E-1, E-2)
36,826	30	Woods, Good, HSG A (E-1, E-2, E-3)
73,796	**35**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
36,279	0	0	0	0	36,279	>75% Grass cover, Good
691	0	0	0	0	691	Gravel surface
36,826	0	0	0	0	36,826	Woods, Good
73,796	**0**	**0**	**0**	**0**	**73,796**	**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE-1: Western portion of Runoff Area=14,004 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=180' Tc=6.4 min CN=32 Runoff=0.0 cfs 0 cf

SubcatchmentE-2: Western portion of Runoff Area=8,274 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=34 Runoff=0.0 cfs 0 cf

SubcatchmentE-3: Eastern portion of Runoff Area=51,518 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=208' Tc=9.5 min CN=36 Runoff=0.0 cfs 0 cf

Reach DP1: I Street (Westbound) Inflow=0.0 cfs 0 cf
Outflow=0.0 cfs 0 cf

Reach DP2: I Street (Eastbound) Inflow=0.0 cfs 0 cf
Outflow=0.0 cfs 0 cf

Reach DP3: Y Street (East of proposed lot) Inflow=0.0 cfs 0 cf
Outflow=0.0 cfs 0 cf

Total Runoff Area = 73,796 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
100.00% Pervious = 73,796 sf 0.00% Impervious = 0 sf

Summary for Subcatchment E-1: Western portion of proposed lot

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP1 : I Street (Westbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
12,377	30	Woods, Good, HSG A
171	96	Gravel surface, HSG A
1,456	39	>75% Grass cover, Good, HSG A
14,004	32	Weighted Average
14,004		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0180	0.14		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.10"
0.4	130	0.1270	5.74		**Shallow Concentrated Flow, Woodland** Unpaved Kv= 16.1 fps
6.4	180	Total			

Summary for Subcatchment E-2: Western portion of proposed lot

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP2 : I Street (Eastbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
7,667	30	Woods, Good, HSG A
520	96	Gravel surface, HSG A
87	39	>75% Grass cover, Good, HSG A
8,274	34	Weighted Average
8,274		100.00% Pervious Area

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

Summary for Subcatchment E-3: Eastern portion of proposed lot

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP3 : Y Street (East of proposed lot)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
16,782	30	Woods, Good, HSG A
34,736	39	>75% Grass cover, Good, HSG A
51,518	36	Weighted Average
51,518		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	23	0.0430	0.08		**Sheet Flow, Sheet- Woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.0	27	0.0370	0.11		**Sheet Flow, Sheet - Lawn** Grass: Dense n= 0.240 P2= 3.10"
0.5	158	0.1010	5.12		**Shallow Concentrated Flow, Lawn** Unpaved Kv= 16.1 fps
9.5	208	Total			

Summary for Reach DP1: I Street (Westbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,004 sf, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2: I Street (Eastbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8,274 sf, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: Y Street (East of proposed lot)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	51,518 sf,	0.00% Impervious,	Inflow Depth =	0.00"	for 2-Year event
Inflow =	0.0 cfs @	0.00 hrs, Volume=	0 cf		
Outflow =	0.0 cfs @	0.00 hrs, Volume=	0 cf, Atten= 0%, Lag= 0.0 min		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE-1: Western portion of Runoff Area=14,004 sf 0.00% Impervious Runoff Depth=0.03"
Flow Length=180' Tc=6.4 min CN=32 Runoff=0.0 cfs 31 cf

SubcatchmentE-2: Western portion of Runoff Area=8,274 sf 0.00% Impervious Runoff Depth=0.06"
Tc=6.0 min CN=34 Runoff=0.0 cfs 43 cf

SubcatchmentE-3: Eastern portion of Runoff Area=51,518 sf 0.00% Impervious Runoff Depth=0.11"
Flow Length=208' Tc=9.5 min CN=36 Runoff=0.0 cfs 478 cf

Reach DP1: I Street (Westbound) Inflow=0.0 cfs 31 cf
Outflow=0.0 cfs 31 cf

Reach DP2: I Street (Eastbound) Inflow=0.0 cfs 43 cf
Outflow=0.0 cfs 43 cf

Reach DP3: Y Street (East of proposed lot) Inflow=0.0 cfs 478 cf
Outflow=0.0 cfs 478 cf

Total Runoff Area = 73,796 sf Runoff Volume = 553 cf Average Runoff Depth = 0.09"
100.00% Pervious = 73,796 sf 0.00% Impervious = 0 sf

Summary for Subcatchment E-1: Western portion of proposed lot

Runoff = 0.0 cfs @ 21.85 hrs, Volume= 31 cf, Depth= 0.03"
Routed to Reach DP1 : I Street (Westbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
12,377	30	Woods, Good, HSG A
171	96	Gravel surface, HSG A
1,456	39	>75% Grass cover, Good, HSG A
14,004	32	Weighted Average
14,004		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0180	0.14		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.10"
0.4	130	0.1270	5.74		**Shallow Concentrated Flow, Woodland** Unpaved Kv= 16.1 fps
6.4	180	Total			

Summary for Subcatchment E-2: Western portion of proposed lot

Runoff = 0.0 cfs @ 20.25 hrs, Volume= 43 cf, Depth= 0.06"
Routed to Reach DP2 : I Street (Eastbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
7,667	30	Woods, Good, HSG A
520	96	Gravel surface, HSG A
87	39	>75% Grass cover, Good, HSG A
8,274	34	Weighted Average
8,274		100.00% Pervious Area

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

Summary for Subcatchment E-3: Eastern portion of proposed lot

Runoff = 0.0 cfs @ 19.26 hrs, Volume= 478 cf, Depth= 0.11"
Routed to Reach DP3 : Y Street (East of proposed lot)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
16,782	30	Woods, Good, HSG A
34,736	39	>75% Grass cover, Good, HSG A
51,518	36	Weighted Average
51,518		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	23	0.0430	0.08		**Sheet Flow, Sheet- Woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.0	27	0.0370	0.11		**Sheet Flow, Sheet - Lawn** Grass: Dense n= 0.240 P2= 3.10"
0.5	158	0.1010	5.12		**Shallow Concentrated Flow, Lawn** Unpaved Kv= 16.1 fps
9.5	208	Total			

Summary for Reach DP1: I Street (Westbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,004 sf, 0.00% Impervious, Inflow Depth = 0.03" for 10-Year event
Inflow = 0.0 cfs @ 21.85 hrs, Volume= 31 cf
Outflow = 0.0 cfs @ 21.85 hrs, Volume= 31 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2: I Street (Eastbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8,274 sf, 0.00% Impervious, Inflow Depth = 0.06" for 10-Year event
Inflow = 0.0 cfs @ 20.25 hrs, Volume= 43 cf
Outflow = 0.0 cfs @ 20.25 hrs, Volume= 43 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: Y Street (East of proposed lot)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 51,518 sf, 0.00% Impervious, Inflow Depth = 0.11" for 10-Year event
Inflow = 0.0 cfs @ 19.26 hrs, Volume= 478 cf
Outflow = 0.0 cfs @ 19.26 hrs, Volume= 478 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Western portion of Runoff Area=14,004 sf 0.00% Impervious Runoff Depth=0.55"
Flow Length=180' Tc=6.4 min CN=32 Runoff=0.0 cfs 644 cf

Subcatchment E-2: Western portion of Runoff Area=8,274 sf 0.00% Impervious Runoff Depth=0.71"
Tc=6.0 min CN=34 Runoff=0.1 cfs 488 cf

Subcatchment E-3: Eastern portion of Runoff Area=51,518 sf 0.00% Impervious Runoff Depth=0.87"
Flow Length=208' Tc=9.5 min CN=36 Runoff=0.5 cfs 3,755 cf

Reach DP1: I Street (Westbound) Inflow=0.0 cfs 644 cf
Outflow=0.0 cfs 644 cf

Reach DP2: I Street (Eastbound) Inflow=0.1 cfs 488 cf
Outflow=0.1 cfs 488 cf

Reach DP3: Y Street (East of proposed lot) Inflow=0.5 cfs 3,755 cf
Outflow=0.5 cfs 3,755 cf

Total Runoff Area = 73,796 sf Runoff Volume = 4,886 cf Average Runoff Depth = 0.79"
100.00% Pervious = 73,796 sf 0.00% Impervious = 0 sf

Summary for Subcatchment E-1: Western portion of proposed lot

Runoff = 0.0 cfs @ 12.25 hrs, Volume= 644 cf, Depth= 0.55"
Routed to Reach DP1 : I Street (Westbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
12,377	30	Woods, Good, HSG A
171	96	Gravel surface, HSG A
1,456	39	>75% Grass cover, Good, HSG A
14,004	32	Weighted Average
14,004		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0180	0.14		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.10"
0.4	130	0.1270	5.74		**Shallow Concentrated Flow, Woodland** Unpaved Kv= 16.1 fps
6.4	180	Total			

Summary for Subcatchment E-2: Western portion of proposed lot

Runoff = 0.1 cfs @ 12.16 hrs, Volume= 488 cf, Depth= 0.71"
Routed to Reach DP2 : I Street (Eastbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
7,667	30	Woods, Good, HSG A
520	96	Gravel surface, HSG A
87	39	>75% Grass cover, Good, HSG A
8,274	34	Weighted Average
8,274		100.00% Pervious Area

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

Summary for Subcatchment E-3: Eastern portion of proposed lot

Runoff = 0.5 cfs @ 12.20 hrs, Volume= 3,755 cf, Depth= 0.87"
Routed to Reach DP3 : Y Street (East of proposed lot)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
16,782	30	Woods, Good, HSG A
34,736	39	>75% Grass cover, Good, HSG A
51,518	36	Weighted Average
51,518		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	23	0.0430	0.08		**Sheet Flow, Sheet- Woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.0	27	0.0370	0.11		**Sheet Flow, Sheet - Lawn** Grass: Dense n= 0.240 P2= 3.10"
0.5	158	0.1010	5.12		**Shallow Concentrated Flow, Lawn** Unpaved Kv= 16.1 fps
9.5	208	Total			

Summary for Reach DP1: I Street (Westbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,004 sf, 0.00% Impervious, Inflow Depth = 0.55" for 100-Year event
Inflow = 0.0 cfs @ 12.25 hrs, Volume= 644 cf
Outflow = 0.0 cfs @ 12.25 hrs, Volume= 644 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP2: I Street (Eastbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8,274 sf, 0.00% Impervious, Inflow Depth = 0.71" for 100-Year event
Inflow = 0.1 cfs @ 12.16 hrs, Volume= 488 cf
Outflow = 0.1 cfs @ 12.16 hrs, Volume= 488 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: Y Street (East of proposed lot)

[40] Hint: Not Described (Outflow=Inflow)

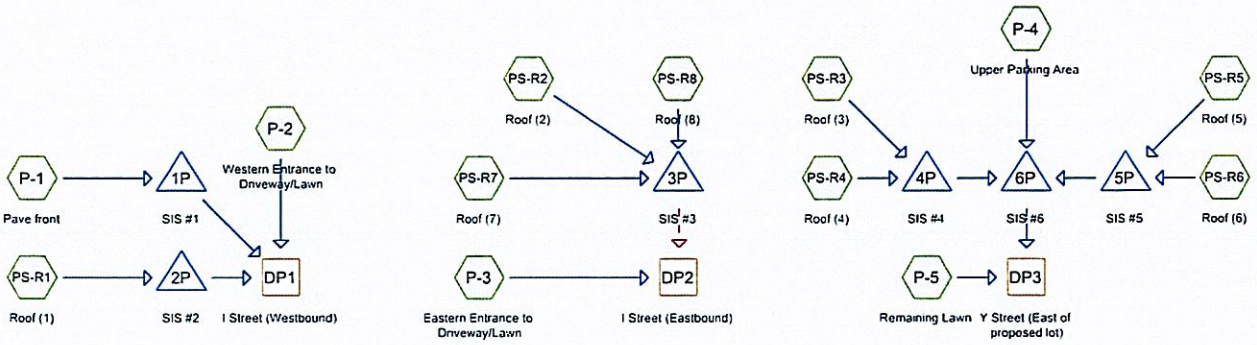
Inflow Area = 51,518 sf, 0.00% Impervious, Inflow Depth = 0.87" for 100-Year event
Inflow = 0.5 cfs @ 12.20 hrs, Volume= 3,755 cf
Outflow = 0.5 cfs @ 12.20 hrs, Volume= 3,755 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

APPENDIX C:

PROPOSED CONDITIONS

HYDROLOGIC ANALYSIS REPORT



Subcat Reach Pond Link

Routing Diagram for 4316 Proposed Conditions
Prepared by The Morin-Cameron Group, Inc, Printed 4/29/2026
HydroCAD® 10.20-8a s/n 00401 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NOAA10 24-hr	D	Default	24.00	1	3.17	2
2	10-Year	NOAA10 24-hr	D	Default	24.00	1	5.02	2
3	100-Year	NOAA10 24-hr	D	Default	24.00	1	7.96	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
50,008	39	>75% Grass cover, Good, HSG A (P-1, P-2, P-3, P-4, P-5)
13,708	98	Paved parking, HSG A (P-1, P-2, P-3, P-4)
10,080	98	Roofs, HSG A (PS-R1, PS-R2, PS-R3, PS-R4, PS-R5, PS-R6, PS-R7, PS-R8)
73,796	**58**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
50,008	0	0	0	0	50,008	>75% Grass cover, Good
13,708	0	0	0	0	13,708	Paved parking
10,080	0	0	0	0	10,080	Roofs
73,796	**0**	**0**	**0**	**0**	**73,796**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1: Pave front	Runoff Area=5,775 sf 80.45% Impervious Runoff Depth=1.81" Tc=6.0 min CN=86 Runoff=0.3 cfs 871 cf
SubcatchmentP-2: Western Entrance to	Runoff Area=8,985 sf 6.84% Impervious Runoff Depth=0.02" Tc=6.0 min CN=43 Runoff=0.0 cfs 15 cf
SubcatchmentP-3: Eastern Entrance to	Runoff Area=5,037 sf 12.63% Impervious Runoff Depth=0.05" Tc=6.0 min CN=46 Runoff=0.0 cfs 23 cf
SubcatchmentP-4: Upper Parking Area	Runoff Area=11,423 sf 68.38% Impervious Runoff Depth=1.31" Tc=6.0 min CN=79 Runoff=0.4 cfs 1,251 cf
SubcatchmentP-5: Remaining Lawn	Runoff Area=32,496 sf 0.00% Impervious Runoff Depth=0.00" Tc=6.0 min CN=39 Runoff=0.0 cfs 0 cf
SubcatchmentPS-R1: Roof (1)	Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=98 Runoff=0.1 cfs 353 cf
SubcatchmentPS-R2: Roof (2)	Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=98 Runoff=0.1 cfs 353 cf
SubcatchmentPS-R3: Roof (3)	Runoff Area=720 sf 100.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=98 Runoff=0.1 cfs 176 cf
SubcatchmentPS-R4: Roof (4)	Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=98 Runoff=0.1 cfs 353 cf
SubcatchmentPS-R5: Roof (5)	Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=98 Runoff=0.1 cfs 353 cf
SubcatchmentPS-R6: Roof (6)	Runoff Area=720 sf 100.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=98 Runoff=0.1 cfs 176 cf
SubcatchmentPS-R7: Roof (7)	Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=98 Runoff=0.1 cfs 353 cf
SubcatchmentPS-R8: Roof (8)	Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=98 Runoff=0.1 cfs 353 cf
Reach DP1: I Street (Westbound)	Inflow=0.0 cfs 15 cf Outflow=0.0 cfs 15 cf
Reach DP2: I Street (Eastbound)	Inflow=0.0 cfs 23 cf Outflow=0.0 cfs 23 cf
Reach DP3: Y Street (East of proposed lot)	Inflow=0.0 cfs 0 cf Outflow=0.0 cfs 0 cf

Pond 1P: SIS #1 Peak Elev=102.70' Storage=265 cf Inflow=0.3 cfs 871 cf
Discarded=0.0 cfs 871 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 871 cf

Pond 2P: SIS #2 Peak Elev=100.48' Storage=109 cf Inflow=0.1 cfs 353 cf
Discarded=0.0 cfs 353 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 353 cf

Pond 3P: SIS #3 Peak Elev=105.28' Storage=297 cf Inflow=0.3 cfs 1,058 cf
Discarded=0.0 cfs 1,058 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 1,058 cf

Pond 4P: SIS #4 Peak Elev=112.92' Storage=149 cf Inflow=0.2 cfs 529 cf
Discarded=0.0 cfs 529 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 529 cf

Pond 5P: SIS #5 Peak Elev=108.45' Storage=149 cf Inflow=0.2 cfs 529 cf
Discarded=0.0 cfs 529 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 529 cf

Pond 6P: SIS #6 Peak Elev=101.88' Storage=302 cf Inflow=0.4 cfs 1,251 cf
Discarded=0.0 cfs 1,251 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 1,251 cf

Total Runoff Area = 73,796 sf Runoff Volume = 4,627 cf Average Runoff Depth = 0.75"
67.77% Pervious = 50,008 sf 32.23% Impervious = 23,788 sf

Summary for Subcatchment P-1: Pave front

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 871 cf, Depth= 1.81"
Routed to Pond 1P : SIS #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
4,646	98	Paved parking, HSG A
1,129	39	>75% Grass cover, Good, HSG A
5,775	86	Weighted Average
1,129		19.55% Pervious Area
4,646		80.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment P-2: Western Entrance to Driveway/Lawn

Runoff = 0.0 cfs @ 21.85 hrs, Volume= 15 cf, Depth= 0.02"
Routed to Reach DP1 : I Street (Westbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
8,370	39	>75% Grass cover, Good, HSG A
615	98	Paved parking, HSG A
8,985	43	Weighted Average
8,370		93.16% Pervious Area
615		6.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment P-3: Eastern Entrance to Driveway/Lawn

Runoff = 0.0 cfs @ 19.94 hrs, Volume= 23 cf, Depth= 0.05"
Routed to Reach DP2 : I Street (Eastbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
4,401	39	>75% Grass cover, Good, HSG A
636	98	Paved parking, HSG A
5,037	46	Weighted Average
4,401		87.37% Pervious Area
636		12.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment P-4: Upper Parking Area

Runoff = 0.4 cfs @ 12.13 hrs, Volume= 1,251 cf, Depth= 1.31"
Routed to Pond 6P : SIS #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
7,811	98	Paved parking, HSG A
3,612	39	>75% Grass cover, Good, HSG A
11,423	79	Weighted Average
3,612		31.62% Pervious Area
7,811		68.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment P-5: Remaining Lawn

Runoff = 0.0 cfs @ 24.02 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach DP3 : Y Street (East of proposed lot)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
32,496	39	>75% Grass cover, Good, HSG A
32,496		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R1: Roof (1)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 353 cf, Depth= 2.94"
Routed to Pond 2P : SIS #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R2: Roof (2)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 353 cf, Depth= 2.94"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R3: Roof (3)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 176 cf, Depth= 2.94"
Routed to Pond 4P : SIS #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
720	98	Roofs, HSG A
720		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R4: Roof (4)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 353 cf, Depth= 2.94"
Routed to Pond 4P : SIS #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R5: Roof (5)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 353 cf, Depth= 2.94"
Routed to Pond 5P : SIS #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R6: Roof (6)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 176 cf, Depth= 2.94"
Routed to Pond 5P : SIS #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
720	98	Roofs, HSG A
720		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R7: Roof (7)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 353 cf, Depth= 2.94"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R8: Roof (8)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 353 cf, Depth= 2.94"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-Year Rainfall=3.17"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Reach DP1: I Street (Westbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,200 sf, 41.36% Impervious, Inflow Depth = 0.01" for 2-Year event
Inflow = 0.0 cfs @ 21.85 hrs, Volume= 15 cf
Outflow = 0.0 cfs @ 21.85 hrs, Volume= 15 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Reach DP2: I Street (Eastbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,037 sf, 12.63% Impervious, Inflow Depth = 0.05" for 2-Year event
Inflow = 0.0 cfs @ 19.94 hrs, Volume= 23 cf
Outflow = 0.0 cfs @ 19.94 hrs, Volume= 23 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Reach DP3: Y Street (East of proposed lot)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 48,239 sf, 25.15% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.0 cfs @ 24.02 hrs, Volume= 0 cf
Outflow = 0.0 cfs @ 24.02 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Pond 1P: SIS #1

Inflow Area = 5,775 sf, 80.45% Impervious, Inflow Depth = 1.81" for 2-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 871 cf
Outflow = 0.0 cfs @ 12.04 hrs, Volume= 871 cf, Atten= 93%, Lag= 0.0 min
Discarded = 0.0 cfs @ 12.04 hrs, Volume= 871 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach DP1 : I Street (Westbound)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 102.70' @ 13.36 hrs Surf.Area= 950 sf Storage= 265 cf

Plug-Flow detention time= 90.6 min calculated for 870 cf (100% of inflow)
Center-of-Mass det. time= 90.6 min (940.3 - 849.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.00'	897 cf	**20.46'W x 46.42'L x 2.71'H Field A** 2,573 cf Overall - 330 cf Embedded = 2,243 cf x 40.0% Voids
#2A	103.00'	255 cf	**ADS N-12 12"** x 14 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 14 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	102.50'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder** Impervious
		1,155 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	103.00'	**12.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 103.00' / 100.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	104.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	104.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.0 cfs @ 12.04 hrs HW=102.16' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=102.00' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.0 cfs)
  ├**3=Orifice/Grate** (Controls 0.0 cfs)
  └**4=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Summary for Pond 2P: SIS #2

Inflow Area = 1,440 sf,100.00% Impervious, Inflow Depth = 2.94" for 2-Year event
Inflow = 0.1 cfs @ 12.13 hrs, Volume= 353 cf
Outflow = 0.0 cfs @ 11.91 hrs, Volume= 353 cf, Atten= 94%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.91 hrs, Volume= 353 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach DP1 : I Street (Westbound)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 100.48' @ 13.47 hrs Surf.Area= 277 sf Storage= 109 cf

Plug-Flow detention time= 115.4 min calculated for 352 cf (100% of inflow)
Center-of-Mass det. time= 115.4 min (876.4 - 761.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	99.50'	259 cf	**11.34'W x 24.42'L x 2.71'H Field A** 750 cf Overall - 103 cf Embedded = 646 cf x 40.0% Voids
#2A	100.50'	80 cf	**ADS N-12 12"** x 4 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 4 Chambers in 4 Rows 9.34' Header x 0.81 sf x 2 = 15.1 cf Inside
#3	100.00'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder**Impervious
		341 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	101.67'	**4.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 101.67' / 101.67' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Discarded OutFlow Max=0.0 cfs @ 11.91 hrs HW=99.66' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=99.50' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.0 cfs)

Summary for Pond 3P: SIS #3

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=210)

Inflow Area =	4,320 sf,100.00% Impervious,	Inflow Depth =	2.94"	for 2-Year event
Inflow =	0.3 cfs @ 12.13 hrs,	Volume=	1,058 cf	
Outflow =	0.0 cfs @ 11.78 hrs,	Volume=	1,058 cf, Atten= 93%, Lag= 0.0 min	
Discarded =	0.0 cfs @ 11.78 hrs,	Volume=	1,058 cf	
Primary =	0.0 cfs @ 0.00 hrs,	Volume=	0 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 105.28' @ 13.24 hrs Surf.Area= 950 sf Storage= 297 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 83.9 min (844.9 - 761.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	104.50'	897 cf	**20.46'W x 46.42'L x 2.71'H Field A** 2,573 cf Overall - 330 cf Embedded = 2,243 cf x 40.0% Voids
#2A	105.50'	255 cf	**ADS N-12 12"** x 14 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 14 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	105.50'	1 cf	**0.50'D x 4.00'H Vertical Cone/Cylinder** Impervious
		1,153 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	104.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	106.50'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 11.78 hrs HW=104.55' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=104.50' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond 4P: SIS #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=206)

Inflow Area =	2,160 sf,100.00% Impervious,	Inflow Depth =	2.94"	for 2-Year event
Inflow =	0.2 cfs @ 12.13 hrs,	Volume=	529 cf	
Outflow =	0.0 cfs @ 11.01 hrs,	Volume=	529 cf, Atten= 93%, Lag= 0.0 min	
Discarded =	0.0 cfs @ 11.01 hrs,	Volume=	529 cf	
Primary =	0.0 cfs @ 0.00 hrs,	Volume=	0 cf	

Routed to Pond 6P : SIS #6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 112.92' @ 13.24 hrs Surf.Area= 475 sf Storage= 149 cf

Plug-Flow detention time= 84.1 min calculated for 529 cf (100% of inflow)
Center-of-Mass det. time= 83.9 min (844.9 - 761.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.14'	442 cf	**19.46'W x 24.42'L x 2.71'H Field A** 1,287 cf Overall - 183 cf Embedded = 1,104 cf x 40.0% Voids
#2A	113.14'	142 cf	**ADS N-12 12"** x 7 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 7 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	111.50'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder**Impervious
		586 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.14'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	116.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 11.01 hrs HW=112.14' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=111.50' TW=101.50' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond 5P: SIS #5

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=204)

Inflow Area = 2,160 sf,100.00% Impervious, Inflow Depth = 2.94" for 2-Year event
Inflow = 0.2 cfs @ 12.13 hrs, Volume= 529 cf
Outflow = 0.0 cfs @ 11.01 hrs, Volume= 529 cf, Atten= 93%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.01 hrs, Volume= 529 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 6P : SIS #6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 108.45' @ 13.24 hrs Surf.Area= 475 sf Storage= 149 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 83.8 min (844.7 - 761.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	107.67'	442 cf	**19.46'W x 24.42'L x 2.71'H Field A** 1,287 cf Overall - 183 cf Embedded = 1,104 cf x 40.0% Voids
#2A	108.67'	142 cf	**ADS N-12 12"** x 7 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 7 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	107.57'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder** Impervious
		586 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.67'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	115.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 11.01 hrs HW=107.67' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=107.57' TW=101.50' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond 6P: SIS #6

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=381)

Inflow Area =	15,743 sf,	77.06% Impervious,	Inflow Depth = 0.95"	for 2-Year event
Inflow =	0.4 cfs @	12.13 hrs, Volume=	1,251 cf	
Outflow =	0.0 cfs @	11.98 hrs, Volume=	1,251 cf, Atten= 89%, Lag= 0.0 min	
Discarded =	0.0 cfs @	11.98 hrs, Volume=	1,251 cf	
Primary =	0.0 cfs @	0.00 hrs, Volume=	0 cf	

Routed to Reach DP3 : Y Street (East of proposed lot)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 101.88' @ 12.70 hrs Surf.Area= 1,988 sf Storage= 302 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 41.8 min (923.7 - 881.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	101.50'	1,870 cf	**23.00'W x 86.42'L x 2.71'H Field A** 5,385 cf Overall - 710 cf Embedded = 4,675 cf x 40.0% Voids
#2A	102.50'	549 cf	**ADS N-12 12"** x 32 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 32 Chambers in 8 Rows 19.00' Header x 0.81 sf x 2 = 30.8 cf Inside
		2,419 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	102.50'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 102.50' / 102.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	104.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.0 cfs @ 11.98 hrs HW=101.53' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=101.50' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.0 cfs)
↑—**3=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1: Pave front Runoff Area=5,775 sf 80.45% Impervious Runoff Depth=3.49"
Tc=6.0 min CN=86 Runoff=0.6 cfs 1,677 cf

SubcatchmentP-2: Western Entrance to Runoff Area=8,985 sf 6.84% Impervious Runoff Depth=0.36"
Tc=6.0 min CN=43 Runoff=0.0 cfs 269 cf

SubcatchmentP-3: Eastern Entrance to Runoff Area=5,037 sf 12.63% Impervious Runoff Depth=0.50"
Tc=6.0 min CN=46 Runoff=0.0 cfs 208 cf

SubcatchmentP-4: Upper Parking Area Runoff Area=11,423 sf 68.38% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=79 Runoff=0.9 cfs 2,683 cf

SubcatchmentP-5: Remaining Lawn Runoff Area=32,496 sf 0.00% Impervious Runoff Depth=0.20"
Tc=6.0 min CN=39 Runoff=0.0 cfs 553 cf

SubcatchmentPS-R1: Roof (1) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=98 Runoff=0.2 cfs 574 cf

SubcatchmentPS-R2: Roof (2) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=98 Runoff=0.2 cfs 574 cf

SubcatchmentPS-R3: Roof (3) Runoff Area=720 sf 100.00% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=98 Runoff=0.1 cfs 287 cf

SubcatchmentPS-R4: Roof (4) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=98 Runoff=0.2 cfs 574 cf

SubcatchmentPS-R5: Roof (5) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=98 Runoff=0.2 cfs 574 cf

SubcatchmentPS-R6: Roof (6) Runoff Area=720 sf 100.00% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=98 Runoff=0.1 cfs 287 cf

SubcatchmentPS-R7: Roof (7) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=98 Runoff=0.2 cfs 574 cf

SubcatchmentPS-R8: Roof (8) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=98 Runoff=0.2 cfs 574 cf

Reach DP1: I Street (Westbound) Inflow=0.0 cfs 269 cf
Outflow=0.0 cfs 269 cf

Reach DP2: I Street (Eastbound) Inflow=0.0 cfs 208 cf
Outflow=0.0 cfs 208 cf

Reach DP3: Y Street (East of proposed lot) Inflow=0.0 cfs 553 cf
Outflow=0.0 cfs 553 cf

Pond 1P: SIS #1 Peak Elev=103.65' Storage=698 cf Inflow=0.6 cfs 1,677 cf
Discarded=0.0 cfs 1,677 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 1,677 cf

Pond 2P: SIS #2 Peak Elev=101.25' Storage=222 cf Inflow=0.2 cfs 574 cf
Discarded=0.0 cfs 574 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 574 cf

Pond 3P: SIS #3 Peak Elev=106.00' Storage=611 cf Inflow=0.5 cfs 1,722 cf
Discarded=0.0 cfs 1,722 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 1,722 cf

Pond 4P: SIS #4 Peak Elev=113.63' Storage=306 cf Inflow=0.3 cfs 861 cf
Discarded=0.0 cfs 861 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 861 cf

Pond 5P: SIS #5 Peak Elev=109.16' Storage=306 cf Inflow=0.3 cfs 861 cf
Discarded=0.0 cfs 861 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 861 cf

Pond 6P: SIS #6 Peak Elev=102.73' Storage=982 cf Inflow=0.9 cfs 2,683 cf
Discarded=0.0 cfs 2,684 cf Primary=0.0 cfs 0 cf Outflow=0.0 cfs 2,684 cf

Total Runoff Area = 73,796 sf Runoff Volume = 9,408 cf Average Runoff Depth = 1.53"
67.77% Pervious = 50,008 sf 32.23% Impervious = 23,788 sf

Summary for Subcatchment P-1: Pave front

Runoff = 0.6 cfs @ 12.13 hrs, Volume= 1,677 cf, Depth= 3.49"
Routed to Pond 1P : SIS #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
4,646	98	Paved parking, HSG A
1,129	39	>75% Grass cover, Good, HSG A
5,775	86	Weighted Average
1,129		19.55% Pervious Area
4,646		80.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment P-2: Western Entrance to Driveway/Lawn

Runoff = 0.0 cfs @ 12.18 hrs, Volume= 269 cf, Depth= 0.36"
Routed to Reach DP1 : I Street (Westbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
8,370	39	>75% Grass cover, Good, HSG A
615	98	Paved parking, HSG A
8,985	43	Weighted Average
8,370		93.16% Pervious Area
615		6.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment P-3: Eastern Entrance to Driveway/Lawn

Runoff = 0.0 cfs @ 12.16 hrs, Volume= 208 cf, Depth= 0.50"
Routed to Reach DP2 : I Street (Eastbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
4,401	39	>75% Grass cover, Good, HSG A
636	98	Paved parking, HSG A
5,037	46	Weighted Average
4,401		87.37% Pervious Area
636		12.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment P-4: Upper Parking Area

Runoff = 0.9 cfs @ 12.13 hrs, Volume= 2,683 cf, Depth= 2.82"
Routed to Pond 6P : SIS #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
7,811	98	Paved parking, HSG A
3,612	39	>75% Grass cover, Good, HSG A
11,423	79	Weighted Average
3,612		31.62% Pervious Area
7,811		68.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment P-5: Remaining Lawn

Runoff = 0.0 cfs @ 15.02 hrs, Volume= 553 cf, Depth= 0.20"
Routed to Reach DP3 : Y Street (East of proposed lot)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
32,496	39	>75% Grass cover, Good, HSG A
32,496		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R1: Roof (1)

Runoff = 0.2 cfs @ 12.13 hrs, Volume= 574 cf, Depth= 4.78"
Routed to Pond 2P : SIS #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R2: Roof (2)

Runoff = 0.2 cfs @ 12.13 hrs, Volume= 574 cf, Depth= 4.78"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R3: Roof (3)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 287 cf, Depth= 4.78"
Routed to Pond 4P : SIS #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
720	98	Roofs, HSG A
720		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R4: Roof (4)

Runoff = 0.2 cfs @ 12.13 hrs, Volume= 574 cf, Depth= 4.78"
Routed to Pond 4P : SIS #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R5: Roof (5)

Runoff = 0.2 cfs @ 12.13 hrs, Volume= 574 cf, Depth= 4.78"
Routed to Pond 5P : SIS #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R6: Roof (6)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 287 cf, Depth= 4.78"
Routed to Pond 5P : SIS #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
720	98	Roofs, HSG A
720		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R7: Roof (7)

Runoff = 0.2 cfs @ 12.13 hrs, Volume= 574 cf, Depth= 4.78"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Subcatchment PS-R8: Roof (8)

Runoff = 0.2 cfs @ 12.13 hrs, Volume= 574 cf, Depth= 4.78"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-Year Rainfall=5.02"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min Tc=6min

Summary for Reach DP1: I Street (Westbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,200 sf, 41.36% Impervious, Inflow Depth = 0.20" for 10-Year event
Inflow = 0.0 cfs @ 12.18 hrs, Volume= 269 cf
Outflow = 0.0 cfs @ 12.18 hrs, Volume= 269 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Reach DP2: I Street (Eastbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,037 sf, 12.63% Impervious, Inflow Depth = 0.50" for 10-Year event
Inflow = 0.0 cfs @ 12.16 hrs, Volume= 208 cf
Outflow = 0.0 cfs @ 12.16 hrs, Volume= 208 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Reach DP3: Y Street (East of proposed lot)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 48,239 sf, 25.15% Impervious, Inflow Depth = 0.14" for 10-Year event
Inflow = 0.0 cfs @ 15.02 hrs, Volume= 553 cf
Outflow = 0.0 cfs @ 15.02 hrs, Volume= 553 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Pond 1P: SIS #1

Inflow Area = 5,775 sf, 80.45% Impervious, Inflow Depth = 3.49" for 10-Year event
Inflow = 0.6 cfs @ 12.13 hrs, Volume= 1,677 cf
Outflow = 0.0 cfs @ 11.71 hrs, Volume= 1,677 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.71 hrs, Volume= 1,677 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach DP1 : I Street (Westbound)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 103.65' @ 15.08 hrs Surf.Area= 950 sf Storage= 698 cf

Plug-Flow detention time= 297.9 min calculated for 1,677 cf (100% of inflow)
Center-of-Mass det. time= 297.9 min (1,121.7 - 823.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.00'	897 cf	**20.46'W x 46.42'L x 2.71'H Field A** 2,573 cf Overall - 330 cf Embedded = 2,243 cf x 40.0% Voids
#2A	103.00'	255 cf	**ADS N-12 12"** x 14 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 14 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	102.50'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder** Impervious
		1,155 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	103.00'	**12.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 103.00' / 100.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	104.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	104.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.0 cfs @ 11.71 hrs HW=102.16' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=102.00' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Controls 0.0 cfs)
↑**3=Orifice/Grate** (Controls 0.0 cfs)
↑**4=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Summary for Pond 2P: SIS #2

Inflow Area = 1,440 sf,100.00% Impervious, Inflow Depth = 4.78" for 10-Year event
Inflow = 0.2 cfs @ 12.13 hrs, Volume= 574 cf
Outflow = 0.0 cfs @ 11.30 hrs, Volume= 574 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.30 hrs, Volume= 574 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach DP1 : I Street (Westbound)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 101.25' @ 15.06 hrs Surf.Area= 277 sf Storage= 222 cf

Plug-Flow detention time= 279.8 min calculated for 574 cf (100% of inflow)
Center-of-Mass det. time= 279.9 min (1,030.4 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	99.50'	259 cf	**11.34'W x 24.42'L x 2.71'H Field A** 750 cf Overall - 103 cf Embedded = 646 cf x 40.0% Voids
#2A	100.50'	80 cf	**ADS N-12 12"** x 4 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 4 Chambers in 4 Rows 9.34' Header x 0.81 sf x 2 = 15.1 cf Inside
#3	100.00'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder**Impervious
		341 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	101.67'	**4.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 101.67' / 101.67' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Discarded OutFlow Max=0.0 cfs @ 11.30 hrs HW=99.66' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=99.50' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Controls 0.0 cfs)

Summary for Pond 3P: SIS #3

Inflow Area = 4,320 sf,100.00% Impervious, Inflow Depth = 4.78" for 10-Year event
Inflow = 0.5 cfs @ 12.13 hrs, Volume= 1,722 cf
Outflow = 0.0 cfs @ 11.09 hrs, Volume= 1,722 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.09 hrs, Volume= 1,722 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 106.00' @ 14.08 hrs Surf.Area= 950 sf Storage= 611 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 216.4 min (966.9 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	104.50'	897 cf	**20.46'W x 46.42'L x 2.71'H Field A** 2,573 cf Overall - 330 cf Embedded = 2,243 cf x 40.0% Voids
#2A	105.50'	255 cf	**ADS N-12 12"** x 14 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 14 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	105.50'	1 cf	**0.50'D x 4.00'H Vertical Cone/Cylinder** Impervious
		1,153 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	104.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	106.50'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 11.09 hrs HW=104.55' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=104.50' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond 4P: SIS #4

Inflow Area = 2,160 sf,100.00% Impervious, Inflow Depth = 4.78" for 10-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 861 cf
Outflow = 0.0 cfs @ 10.31 hrs, Volume= 861 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.0 cfs @ 10.31 hrs, Volume= 861 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 6P : SIS #6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 113.63' @ 14.07 hrs Surf.Area= 475 sf Storage= 306 cf

Plug-Flow detention time= 216.2 min calculated for 861 cf (100% of inflow)

Center-of-Mass det. time= 216.2 min (966.7 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.14'	442 cf	**19.46'W x 24.42'L x 2.71'H Field A** 1,287 cf Overall - 183 cf Embedded = 1,104 cf x 40.0% Voids
#2A	113.14'	142 cf	**ADS N-12 12"** x 7 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 7 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	111.50'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder** Impervious
		586 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.14'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	116.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 10.31 hrs HW=112.14' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=111.50' TW=101.50' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond 5P: SIS #5

Inflow Area = 2,160 sf,100.00% Impervious, Inflow Depth = 4.78" for 10-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 861 cf
Outflow = 0.0 cfs @ 10.31 hrs, Volume= 861 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.0 cfs @ 10.31 hrs, Volume= 861 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 6P : SIS #6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 109.16' @ 14.07 hrs Surf.Area= 475 sf Storage= 306 cf

Plug-Flow detention time= 216.0 min calculated for 861 cf (100% of inflow)
Center-of-Mass det. time= 216.0 min (966.6 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	107.67'	442 cf	**19.46'W x 24.42'L x 2.71'H Field A** 1,287 cf Overall - 183 cf Embedded = 1,104 cf x 40.0% Voids
#2A	108.67'	142 cf	**ADS N-12 12"** x 7 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 7 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	107.57'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder** Impervious
		586 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.67'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	115.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 10.31 hrs HW=107.67' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=107.57' TW=101.50' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond 6P: SIS #6

Inflow Area = 15,743 sf, 77.06% Impervious, Inflow Depth = 2.05" for 10-Year event
Inflow = 0.9 cfs @ 12.13 hrs, Volume= 2,683 cf
Outflow = 0.0 cfs @ 11.64 hrs, Volume= 2,684 cf, Atten= 95%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.64 hrs, Volume= 2,684 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach DP3 : Y Street (East of proposed lot)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 102.73' @ 14.23 hrs Surf.Area= 1,988 sf Storage= 982 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 201.5 min (1,053.1 - 851.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	101.50'	1,870 cf	**23.00'W x 86.42'L x 2.71'H Field A** 5,385 cf Overall - 710 cf Embedded = 4,675 cf x 40.0% Voids
#2A	102.50'	549 cf	**ADS N-12 12"** x 32 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 32 Chambers in 8 Rows 19.00' Header x 0.81 sf x 2 = 30.8 cf Inside
		2,419 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	102.50'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 102.50' / 102.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	104.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.0 cfs @ 11.64 hrs HW=101.53' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=101.50' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.0 cfs)
↑—**3=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1: Pave front Runoff Area=5,775 sf 80.45% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=86 Runoff=1.0 cfs 3,028 cf

SubcatchmentP-2: Western Entrance to Runoff Area=8,985 sf 6.84% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=43 Runoff=0.3 cfs 1,137 cf

SubcatchmentP-3: Eastern Entrance to Runoff Area=5,037 sf 12.63% Impervious Runoff Depth=1.82"
Tc=6.0 min CN=46 Runoff=0.2 cfs 762 cf

SubcatchmentP-4: Upper Parking Area Runoff Area=11,423 sf 68.38% Impervious Runoff Depth=5.47"
Tc=6.0 min CN=79 Runoff=1.7 cfs 5,208 cf

SubcatchmentP-5: Remaining Lawn Runoff Area=32,496 sf 0.00% Impervious Runoff Depth=1.14"
Tc=6.0 min CN=39 Runoff=0.8 cfs 3,088 cf

SubcatchmentPS-R1: Roof (1) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=7.72"
Tc=6.0 min CN=98 Runoff=0.3 cfs 926 cf

SubcatchmentPS-R2: Roof (2) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=7.72"
Tc=6.0 min CN=98 Runoff=0.3 cfs 926 cf

SubcatchmentPS-R3: Roof (3) Runoff Area=720 sf 100.00% Impervious Runoff Depth=7.72"
Tc=6.0 min CN=98 Runoff=0.1 cfs 463 cf

SubcatchmentPS-R4: Roof (4) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=7.72"
Tc=6.0 min CN=98 Runoff=0.3 cfs 926 cf

SubcatchmentPS-R5: Roof (5) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=7.72"
Tc=6.0 min CN=98 Runoff=0.3 cfs 926 cf

SubcatchmentPS-R6: Roof (6) Runoff Area=720 sf 100.00% Impervious Runoff Depth=7.72"
Tc=6.0 min CN=98 Runoff=0.1 cfs 463 cf

SubcatchmentPS-R7: Roof (7) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=7.72"
Tc=6.0 min CN=98 Runoff=0.3 cfs 926 cf

SubcatchmentPS-R8: Roof (8) Runoff Area=1,440 sf 100.00% Impervious Runoff Depth=7.72"
Tc=6.0 min CN=98 Runoff=0.3 cfs 926 cf

Reach DP1: I Street (Westbound) Inflow=0.3 cfs 2,063 cf
Outflow=0.3 cfs 2,063 cf

Reach DP2: I Street (Eastbound) Inflow=0.2 cfs 762 cf
Outflow=0.2 cfs 762 cf

Reach DP3: Y Street (East of proposed lot) Inflow=0.8 cfs 3,561 cf
Outflow=0.8 cfs 3,561 cf

Pond 1P: SIS #1 Peak Elev=104.50' Storage=1,074 cf Inflow=1.0 cfs 3,028 cf
Discarded=0.0 cfs 2,278 cf Primary=0.1 cfs 751 cf Outflow=0.2 cfs 3,028 cf

Pond 2P: SIS #2 Peak Elev=101.94' Storage=309 cf Inflow=0.3 cfs 926 cf
Discarded=0.0 cfs 751 cf Primary=0.1 cfs 176 cf Outflow=0.1 cfs 926 cf

Pond 3P: SIS #3 Peak Elev=106.62' Storage=934 cf Inflow=0.8 cfs 2,779 cf
Discarded=0.0 cfs 2,405 cf Primary=0.1 cfs 374 cf Outflow=0.2 cfs 2,779 cf

Pond 4P: SIS #4 Peak Elev=116.05' Storage=584 cf Inflow=0.4 cfs 1,390 cf
Discarded=0.0 cfs 1,344 cf Primary=0.0 cfs 46 cf Outflow=0.0 cfs 1,390 cf

Pond 5P: SIS #5 Peak Elev=115.04' Storage=585 cf Inflow=0.4 cfs 1,390 cf
Discarded=0.0 cfs 1,345 cf Primary=0.0 cfs 45 cf Outflow=0.0 cfs 1,390 cf

Pond 6P: SIS #6 Peak Elev=104.04' Storage=2,285 cf Inflow=1.7 cfs 5,299 cf
Discarded=0.0 cfs 4,826 cf Primary=0.1 cfs 473 cf Outflow=0.1 cfs 5,299 cf

Total Runoff Area = 73,796 sf Runoff Volume = 19,708 cf Average Runoff Depth = 3.20"
67.77% Pervious = 50,008 sf 32.23% Impervious = 23,788 sf

Summary for Subcatchment P-1: Pave front

Runoff = 1.0 cfs @ 12.13 hrs, Volume= 3,028 cf, Depth= 6.29"
Routed to Pond 1P : SIS #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
4,646	98	Paved parking, HSG A
1,129	39	>75% Grass cover, Good, HSG A
5,775	86	Weighted Average
1,129		19.55% Pervious Area
4,646		80.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment P-2: Western Entrance to Driveway/Lawn

Runoff = 0.3 cfs @ 12.14 hrs, Volume= 1,137 cf, Depth= 1.52"
Routed to Reach DP1 : I Street (Westbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
8,370	39	>75% Grass cover, Good, HSG A
615	98	Paved parking, HSG A
8,985	43	Weighted Average
8,370		93.16% Pervious Area
615		6.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment P-3: Eastern Entrance to Driveway/Lawn

Runoff = 0.2 cfs @ 12.14 hrs, Volume= 762 cf, Depth= 1.82"
Routed to Reach DP2 : I Street (Eastbound)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
4,401	39	>75% Grass cover, Good, HSG A
636	98	Paved parking, HSG A
5,037	46	Weighted Average
4,401		87.37% Pervious Area
636		12.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment P-4: Upper Parking Area

Runoff = 1.7 cfs @ 12.13 hrs, Volume= 5,208 cf, Depth= 5.47"
Routed to Pond 6P : SIS #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
7,811	98	Paved parking, HSG A
3,612	39	>75% Grass cover, Good, HSG A
11,423	79	Weighted Average
3,612		31.62% Pervious Area
7,811		68.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment P-5: Remaining Lawn

Runoff = 0.8 cfs @ 12.15 hrs, Volume= 3,088 cf, Depth= 1.14"
Routed to Reach DP3 : Y Street (East of proposed lot)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
32,496	39	>75% Grass cover, Good, HSG A
32,496		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R1: Roof (1)

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 926 cf, Depth= 7.72"
Routed to Pond 2P : SIS #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R2: Roof (2)

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 926 cf, Depth= 7.72"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R3: Roof (3)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 463 cf, Depth= 7.72"
Routed to Pond 4P : SIS #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
720	98	Roofs, HSG A
720		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R4: Roof (4)

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 926 cf, Depth= 7.72"
Routed to Pond 4P : SIS #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R5: Roof (5)

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 926 cf, Depth= 7.72"
Routed to Pond 5P : SIS #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R6: Roof (6)

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 463 cf, Depth= 7.72"
Routed to Pond 5P : SIS #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
720	98	Roofs, HSG A
720		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R7: Roof (7)

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 926 cf, Depth= 7.72"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Subcatchment PS-R8: Roof (8)

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 926 cf, Depth= 7.72"
Routed to Pond 3P : SIS #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-Year Rainfall=7.96"

Area (sf)	CN	Description
1,440	98	Roofs, HSG A
1,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=6min**

Summary for Reach DP1: I Street (Westbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,200 sf, 41.36% Impervious, Inflow Depth = 1.53" for 100-Year event
Inflow = 0.3 cfs @ 12.24 hrs, Volume= 2,063 cf
Outflow = 0.3 cfs @ 12.24 hrs, Volume= 2,063 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Reach DP2: I Street (Eastbound)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,037 sf, 12.63% Impervious, Inflow Depth = 1.82" for 100-Year event
Inflow = 0.2 cfs @ 12.14 hrs, Volume= 762 cf
Outflow = 0.2 cfs @ 12.14 hrs, Volume= 762 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Reach DP3: Y Street (East of proposed lot)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 48,239 sf, 25.15% Impervious, Inflow Depth = 0.89" for 100-Year event
Inflow = 0.8 cfs @ 12.15 hrs, Volume= 3,561 cf
Outflow = 0.8 cfs @ 12.15 hrs, Volume= 3,561 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Summary for Pond 1P: SIS #1

Inflow Area = 5,775 sf, 80.45% Impervious, Inflow Depth = 6.29" for 100-Year event
Inflow = 1.0 cfs @ 12.13 hrs, Volume= 3,028 cf
Outflow = 0.2 cfs @ 12.39 hrs, Volume= 3,028 cf, Atten= 83%, Lag= 15.6 min
Discarded = 0.0 cfs @ 10.48 hrs, Volume= 2,278 cf
Primary = 0.1 cfs @ 12.39 hrs, Volume= 751 cf
Routed to Reach DP1 : I Street (Westbound)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 104.50' @ 12.39 hrs Surf.Area= 950 sf Storage= 1,074 cf

Plug-Flow detention time= 303.4 min calculated for 3,028 cf (100% of inflow)
Center-of-Mass det. time= 303.5 min (1,105.0 - 801.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.00'	897 cf	**20.46'W x 46.42'L x 2.71'H Field A** 2,573 cf Overall - 330 cf Embedded = 2,243 cf x 40.0% Voids
#2A	103.00'	255 cf	**ADS N-12 12"** x 14 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 14 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	102.50'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder** Impervious
		1,155 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	103.00'	**12.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 103.00' / 100.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	104.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	104.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.0 cfs @ 10.48 hrs HW=102.16' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.1 cfs @ 12.39 hrs HW=104.50' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Passes 0.1 cfs of 3.0 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.1 cfs @ 2.96 fps)
  └**4=Broad-Crested Rectangular Weir** (Weir Controls 0.0 cfs @ 0.14 fps)

Summary for Pond 2P: SIS #2

Inflow Area = 1,440 sf,100.00% Impervious, Inflow Depth = 7.72" for 100-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 926 cf
Outflow = 0.1 cfs @ 12.28 hrs, Volume= 926 cf, Atten= 70%, Lag= 8.8 min
Discarded = 0.0 cfs @ 9.54 hrs, Volume= 751 cf
Primary = 0.1 cfs @ 12.28 hrs, Volume= 176 cf
Routed to Reach DP1 : I Street (Westbound)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 101.94' @ 12.28 hrs Surf.Area= 277 sf Storage= 309 cf

Plug-Flow detention time= 311.2 min calculated for 926 cf (100% of inflow)
Center-of-Mass det. time= 311.3 min (1,054.1 - 742.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	99.50'	259 cf	**11.34'W x 24.42'L x 2.71'H Field A** 750 cf Overall - 103 cf Embedded = 646 cf x 40.0% Voids
#2A	100.50'	80 cf	**ADS N-12 12"** x 4 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 4 Chambers in 4 Rows 9.34' Header x 0.81 sf x 2 = 15.1 cf Inside
#3	100.00'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder** Impervious
		341 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	101.67'	**4.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 101.67' / 101.67' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Discarded OutFlow Max=0.0 cfs @ 9.54 hrs HW=99.66' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.1 cfs @ 12.28 hrs HW=101.94' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Barrel Controls 0.1 cfs @ 1.34 fps)

Summary for Pond 3P: SIS #3

Inflow Area = 4,320 sf,100.00% Impervious, Inflow Depth = 7.72" for 100-Year event
Inflow = 0.8 cfs @ 12.13 hrs, Volume= 2,779 cf
Outflow = 0.2 cfs @ 12.35 hrs, Volume= 2,779 cf, Atten= 80%, Lag= 13.4 min
Discarded = 0.0 cfs @ 9.45 hrs, Volume= 2,405 cf
Primary = 0.1 cfs @ 12.35 hrs, Volume= 374 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 106.62' @ 12.35 hrs Surf.Area= 950 sf Storage= 934 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 297.6 min (1,040.4 - 742.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	104.50'	897 cf	**20.46'W x 46.42'L x 2.71'H Field A** 2,573 cf Overall - 330 cf Embedded = 2,243 cf x 40.0% Voids
#2A	105.50'	255 cf	**ADS N-12 12"** x 14 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 14 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	105.50'	1 cf	**0.50'D x 4.00'H Vertical Cone/Cylinder** Impervious
		1,153 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	104.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	106.50'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 9.45 hrs HW=104.55' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.1 cfs @ 12.35 hrs HW=106.62' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 1.19 fps)

Summary for Pond 4P: SIS #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=56)

Inflow Area = 2,160 sf,100.00% Impervious, Inflow Depth = 7.72" for 100-Year event
Inflow = 0.4 cfs @ 12.13 hrs, Volume= 1,390 cf
Outflow = 0.0 cfs @ 13.42 hrs, Volume= 1,390 cf, Atten= 90%, Lag= 77.5 min
Discarded = 0.0 cfs @ 7.74 hrs, Volume= 1,344 cf
Primary = 0.0 cfs @ 13.42 hrs, Volume= 46 cf
Routed to Pond 6P : SIS #6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 116.05' @ 13.42 hrs Surf.Area= 475 sf Storage= 584 cf

Plug-Flow detention time= 430.3 min calculated for 1,389 cf (100% of inflow)
Center-of-Mass det. time= 430.3 min (1,173.1 - 742.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.14'	442 cf	**19.46'W x 24.42'L x 2.71'H Field A** 1,287 cf Overall - 183 cf Embedded = 1,104 cf x 40.0% Voids
#2A	113.14'	142 cf	**ADS N-12 12"** x 7 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 7 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	111.50'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder**Impervious
		586 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.14'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	116.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 7.74 hrs HW=112.14' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 13.42 hrs HW=116.05' TW=104.03' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 0.78 fps)

Summary for Pond 5P: SIS #5

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=45)

Inflow Area = 2,160 sf,100.00% Impervious, Inflow Depth = 7.72" for 100-Year event
Inflow = 0.4 cfs @ 12.13 hrs, Volume= 1,390 cf
Outflow = 0.0 cfs @ 13.43 hrs, Volume= 1,390 cf, Atten= 93%, Lag= 78.1 min
Discarded = 0.0 cfs @ 7.75 hrs, Volume= 1,345 cf
Primary = 0.0 cfs @ 13.43 hrs, Volume= 45 cf
Routed to Pond 6P : SIS #6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 115.04' @ 13.43 hrs Surf.Area= 475 sf Storage= 585 cf

Plug-Flow detention time= 430.8 min calculated for 1,389 cf (100% of inflow)
Center-of-Mass det. time= 431.0 min (1,173.8 - 742.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	107.67'	442 cf	**19.46'W x 24.42'L x 2.71'H Field A** 1,287 cf Overall - 183 cf Embedded = 1,104 cf x 40.0% Voids
#2A	108.67'	142 cf	**ADS N-12 12"** x 7 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 7 Chambers in 7 Rows 17.46' Header x 0.81 sf x 2 = 28.3 cf Inside
#3	107.57'	3 cf	**0.50'D x 15.00'H Vertical Cone/Cylinder** Impervious
		586 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	107.67'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	115.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 7.75 hrs HW=107.67' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 13.43 hrs HW=115.04' TW=104.04' (Dynamic Tailwater)
↑**2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 0.70 fps)

Summary for Pond 6P: SIS #6

Inflow Area = 15,743 sf, 77.06% Impervious, Inflow Depth = 4.04" for 100-Year event
Inflow = 1.7 cfs @ 12.13 hrs, Volume= 5,299 cf
Outflow = 0.1 cfs @ 13.53 hrs, Volume= 5,299 cf, Atten= 92%, Lag= 83.9 min
Discarded = 0.0 cfs @ 10.56 hrs, Volume= 4,826 cf
Primary = 0.1 cfs @ 13.53 hrs, Volume= 473 cf
Routed to Reach DP3 : Y Street (East of proposed lot)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 104.04' @ 13.53 hrs Surf.Area= 1,988 sf Storage= 2,285 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 438.9 min (1,264.8 - 825.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	101.50'	1,870 cf	**23.00'W x 86.42'L x 2.71'H Field A** 5,385 cf Overall - 710 cf Embedded = 4,675 cf x 40.0% Voids
#2A	102.50'	549 cf	**ADS N-12 12"** x 32 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 32 Chambers in 8 Rows 19.00' Header x 0.81 sf x 2 = 30.8 cf Inside
		2,419 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	102.50'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 102.50' / 102.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	104.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.0 cfs @ 10.56 hrs HW=101.53' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.1 cfs @ 13.53 hrs HW=104.04' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 0.1 cfs of 3.0 cfs potential flow)
↑**3=Broad-Crested Rectangular Weir** (Weir Controls 0.1 cfs @ 0.56 fps)

APPENDIX D:

CONSTRUCTION PHASE

BEST MANAGEMENT PRACTICES PLAN

Construction Phase Best Management Practices (BMP's)

Erosion and Sedimentation will be controlled at the site by utilizing structural practices, stabilization practices, and dust control. These practices correspond with the site development plans entitled "Site Development Plans In Haverhill, Massachusetts, 931 Boston Road" prepared by The Morin-Cameron Group, Inc. dated April 28, 2026 as revised and approved by the Haverhill City Council, hereinafter referred to as the Site Plans.

Responsible Party Contact Information:

Stormwater Management System Owner:	Pentucket North Development LLC c/o Ronald J. Mailloux Sr. 55 Chase Street Methuen, MA 01844 P: (978) 808-0722
General Contractor:	TBD
Site Contractor:	TBD

Town Contact Information:

Haverhill Public Works:	Haverhill Public Works Department 500 Primrose Street Haverhill, MA 01830 P: (978) 374-2360
Haverhill City Council:	Haverhill City Council Haverhill City Hall 4 Summer Street, Room 204 Haverhill, MA 01830 P: (978) 374-2328
Site Design Engineer Information:	The Morin-Cameron Group, Inc. 66 Elm St Danvers, MA 01923 Phone: (978) 777-8586

Structural Practices:

1) **Silt Fence** – Siltation fence shall be installed in accordance with the approved plans where high rates of stormwater runoff are anticipated.
   a) Installation Schedule: Prior to Start of land disturbance.

   b) Maintenance and Inspection: The site supervisor shall inspect the silt fence at least once per week and shall repair any damaged or affected areas of the fence at the time they are noted.

2) **Mulch Sock** – Mulch sock shall be installed in accordance with the approved plans where high rates of stormwater runoff are anticipated.
   c) Installation Schedule: Prior to Start of land disturbance.

   d) Maintenance and Inspection: The site supervisor shall inspect the mulch sock at least once per week and shall repair any damaged or affected areas of the sock at the time they are noted.

3) **Hay-Bales/Silt Fence** – Hay-bales and siltation fence shall be installed in accordance with the approved plans where high rates of stormwater runoff are anticipated.
   e) Installation Schedule: Prior to Start of land disturbance.

   f) Maintenance and Inspection: The site supervisor shall inspect the silt fence at least once per week and shall repair any damaged or affected areas of the fence at the time they are noted.

4) **Inlet Protection** – Inlet Protection will be utilized around the catch basin grates in the street layout along the frontage of the property. The inlet protection will allow the storm drain inlets to be used before final stabilization. This structural practice will allow early use of the drainage system. Siltsack or equivalent will be utilized for the inlet protection. Siltsack is manufactured by ACF Environmental. The telephone number is 800-448-3636. Regular flow siltsack will be utilized, and if it does not allow enough storm water flow, hi-flow siltsack will be utilized.

Silt Sack (or equivalent) Inlet Protection Inspection/Maintenance Requirements *

a) The silt sack trapping device and the catch basin should be inspected after every rain storm and repairs made as necessary.

b) Sediment should be removed from the silt sack after the sediment has reached a maximum depth of one-half the depth of the trap.

c) Sediment should be disposed of in a suitable area and protected from erosion by either structural or vegetative means. Sediment material removed shall be disposed of in accordance with all applicable local, state, and federal regulations.

d) The silt sack must be replaced if it is ripped or torn in any way.

e) Temporary traps should be removed and the area repaired as soon as the contributing drainage area to the inlet has been completely stabilized.

5) **Sediment Track-Out:** Stabilized Construction Exit: Prior to the commencement of site work, crushed stone anti-tracking pads will be installed at the entrance to the site. This will prevent trucks from tracking material onto the road from the construction site. If, at any point during the project, the tracking pad becomes ineffective due to accumulation of soil, the crushed stone shall be replaced. Details for construction of the stabilized entrance can be found in the Erosion Control Details sheet that is part of the comprehensive permit plan set associated with the project. The site supervisor will inspect the tracking pads weekly to ensure that they are properly limiting the tracking of soil onto the road. If tracking onto the roadway is noted, it shall be removed immediately via a mechanical street sweeper.

Stabilization Practices:

Stabilization measures shall be implemented as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased, with the following exceptions.

- Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

- Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 21 days) then stabilization measures do not have to be initiated on that portion of the site by the 14th day after construction activity temporarily ceased.

1) **Temporary Seeding** – Temporary seeding will allow a short-term vegetative cover on disturbed site areas that may be in danger of erosion. Temporary seeding will be done at stock piles and disturbed portions of the site where construction activity will temporarily cease for at least 21 days. The temporary seeding will stabilize cleared and unvegetated areas that will not be brought into final grade for several weeks or months.

Temporary Seeding Planting Procedures *

a) Planting should preferably be done between April 1st and June 30th, and September 1st through September 31st. If planting is done in the months of July and August, irrigation may be required. If planting is done between October 1st and March 31st, mulching should be applied immediately after planting. If seeding is done during the summer months, irrigation of some sort will probably be necessary.

b) Before seeding, install structural practice controls. Utilize Amoco supergro or equivalent.

c) Select the appropriate seed species for temporary cover from the following table.

Species	Seeding Rate (lbs./1,000 sq.)	Seeding Rate (lbs./acre)	Recommended Seeding Dates	Seed Cover required
Annual Ryegrass	1	40	April 1st to June 1st August 15th to Sept. 15th	¼ inch
Foxtail Millet	0.7	30	May 1st to June 30th	½ to ¾ inch
Oats	2	80	April 1st to July 1st August 15th to Sept. 15th	1 to 1-½ inch
Winter Rye	3	120	August 15th to Oct. 15th	1 to 1-½ inch

Apply the seed uniformly by hydroseeding, broadcasting, or by hand.

d) Use effective mulch, such as clean grain straw; tacked and/or tied with netting to protect seedbed and encourage plant growth.

Temporary Seeding Inspection/Maintenance *

a) Inspect within 6 weeks of planting to see if stands are adequate. Check for damage within 24 hours of the end to a heavy rainfall, defined as a 2-year storm event (i.e., 3.2 inches of rainfall within a twenty-four-hour period). Stands should be uniform and dense. Reseed and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary.

b) Seeds should be supplied with adequate moisture. Furnish water as needed, especially in abnormally hot or dry weather. Water application rates should be controlled to prevent runoff.

2) **Geotextiles** - Geotextiles such as jute netting will be used in combination with other practices such as mulching to stabilize slopes. The following geotextile materials or equivalent are to be utilized for structural and nonstructural controls as shown in the following table.

Practice	Manufacturer	Product	Remarks
Sediment Fence	Amoco	Woven polypropylene 1198 or equivalent	0.425 mm opening
Construction Entrance	Amoco	Woven polypropylene 2002 or equivalent	0.300 mm opening
Outlet Protection	Amoco	Nonwoven polypropylene 4551 or equivalent	0.150 mm opening
Erosion Control (slope stability)	Amoco	Supergro or equivalent	Erosion control revegetation mix, open polypropylene fiber on degradable

			polypropylene net scrim

Amoco may be reached at (800) 445-7732

Geotextile Installation

a) Netting and matting require firm, continuous contact between the materials and the soil. If there is no contact, the material will not hold the soil and erosion will occur underneath the material.

Geotextile Inspection/Maintenance *

a) In the field, regular inspections should be made to check for cracks, tears, or breaches in the fabric. The appropriate repairs should be made.

3) **Mulching and Netting** – Mulching will provide immediate protection to exposed soils during the period of short construction delays, or over winter months through the application of plant residues, or other suitable materials, to exposed soil areas. In areas, which have been seeded either for temporary or permanent cover, mulching should immediately follow seeding. On steep slopes, mulch must be supplemented with netting. The preferred mulching material is straw.

Mulch (Hay or Straw) Materials and Installation

a) Straw has been found to be one of the most effective organic mulch materials. The specifications for straw are described below, but other material may be appropriate. The straw should be air-dried; free of undesirable seeds & coarse materials. The application rate per 1,000 sq. is 90-100 lbs. (2-3 bales) and the application rate per acre is 2 tons (100-120 bales). The application should cover about 90% of the surface. The use of straw mulch is appropriate where mulch is maintained for more than three months. Straw mulch is subject to wind blowing unless anchored, is the most commonly used mulching material, and has the best microenvironment for germinating seeds.

Mulch Maintenance *

a) Inspect after rainstorms to check for movement of mulch or erosion. If washout, breakage, or erosion occurs, repair surface, reseed, remulch, and install new netting.

b) Straw or grass mulches that blow or wash away should be repaired promptly.

c) If plastic netting is used to anchor mulch, care should be taken during initial mowing to keep the mower height high. Otherwise, the netting can wrap up on the mower blade shafts. After a period of time, the netting degrades and becomes less of a problem.

d) Continue inspections until vegetation is well established.

4) **Land Grading** – Grading on fill slopes, cut slopes, and stockpile areas will be done with full siltation controls in place.

Land Grading Design/Installation Requirements

a) Areas to be graded should be cleared and grubbed of all timber, logs, brush, rubbish, and vegetated matter that will interfere with the grading operation. Topsoil should be stripped and stockpiled for use on critical disturbed areas for establishment of vegetation. Cut slopes to be topsoiled should be thoroughly scarified to a minimum depth of 3-inches prior to placement of topsoil.

b) Fill materials should be generally free of brush, rubbish, rocks, and stumps. Frozen materials or soft and easily compressible materials should not be used in fills intended to support buildings, parking lots, roads, conduits, or other structures.

c) Earth fill intended to support structural measures should be compacted to a minimum of 90 percent of Standard Proctor Test density with proper moisture control, or as otherwise specified by the engineer responsible for the design. Compaction of other fills should be to the density required to control sloughing, erosion or excessive moisture content. Maximum thickness of fill layers prior to compaction should not exceed 9 inches.

d) The uppermost one foot of fill slopes should be compacted to at least 85 percent of the maximum unit weight (based on the modified AASHTO compaction test). This is usually accomplished by running heavy equipment over the fill.

e) Fill should consist of material from borrow areas and excess cut will be stockpiled in areas shown on the Site Plans. All disturbed areas should be free draining, left with a neat and finished appearance, and should be protected from erosion.

Land Grading Stabilization Inspection/Maintenance *

a) All slopes should be checked periodically to see that vegetation is in good condition. Any rills or damage from erosion and animal burrowing should be repaired immediately to avoid further damage.

b) If seeps develop on the slopes, the area should be evaluated to determine if the seep will cause an unstable condition. Subsurface drains or a gravel mulch may be required to solve seep problems. However, no seeps are anticipated.

c) Areas requiring revegetation should be repaired immediately. Control undesirable vegetation such as weeds and woody growth to avoid bank stability problems in the future.

5) **Topsoiling *** – Topsoiling will help establish vegetation on all disturbed areas throughout the site during the seeding process. The soil texture of the topsoil to be used will be a sandy loam to a silt loam texture with 15% to 20% organic content.

Topsoiling Placement

a) Topsoil should not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or when conditions exist that may otherwise be detrimental to proper grading or proposed seeding.

b) Do not place topsoil on slopes steeper than 2.5:1, as it will tend to erode.

c) If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. The best method is to actually work the topsoil into the layer below for a depth of at least 6 inches.

6) **Permanent Seeding** – Permanent Seeding should be done immediately after the final design grades are achieved. Native species of plants should be used to establish perennial vegetative cover on disturbed areas. The revegetation should be done early enough in the fall so that a good cover is established before cold weather comes and growth stops until the spring. A good cover is defined as vegetation covering 75 percent or more of the ground surface.

Permanent Seeding Seedbed Preparation

a) In infertile or coarse-textured subsoil, it is best to stockpile topsoil and re-spread it over the finished slope at a minimum 2 to 6-inch depth and roll it to provide a firm seedbed. The topsoil must have a sandy loam to silt loam texture with 15% to 20% organic content. If construction fill operations have left soil exposed with a loose, rough, or irregular surface, smooth with blade and roll.

b) Loosen the soil to a depth of 3-5 inches with suitable agricultural or construction equipment.

c) Areas not to receive topsoil shall be treated to firm the seedbed after incorporation of the lime and fertilizer so that it is depressed no more than ½ - 1 inch when stepped on with a shoe. Areas to receive topsoil shall not be firmed until after topsoiling and lime and fertilizer is applied and incorporated, at which time it shall be treated to firm the seedbed as described above.

Permanent Seeding Grass Selection/Application

a) Select an appropriate cool or warm season grass based on site conditions and seeding date. Apply the seed uniformly by hydro-seeding, broadcasting, or by hand. Uniform seed distribution is essential. On steep slopes, hydroseeding may be the most effective seeding method. Surface roughening is particularly important when preparing slopes for hydroseeding.

b) Lime and fertilize. Organic fertilizer shall be utilized in areas within the 100-foot buffer zone to a wetland resource area.

c) Mulch the seedings with straw applied at the rate of ½ tons per acre. Anchor the mulch with erosion control netting or fabric on sloping areas. Amoco supergro or equivalent should be utilized.

Permanent Seeding Inspection/Maintenance *

a) Frequently inspect seeded areas for failure and make necessary repairs and reseed immediately. Conduct or follow-up survey after one year and replace failed plants where necessary.

b) If vegetative cover is inadequate to prevent rill erosion, overseed and fertilize in accordance with soil test results.

c) If a stand has less than 40% cover, reevaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results. If the season prevents resowing, mulch or jute netting is an effective temporary cover.

d) Seeded areas should be fertilized during the second growing season. Lime and fertilize thereafter at periodic intervals, as needed. Organic fertilizer shall be utilized in areas within the 100-foot buffer zone to a wetland resource area.

Dust Control:

Dust control will be utilized throughout the entire construction process of the site. For example, keeping disturbed surfaces moist during windy periods will be an effective control measure, especially for construction access roads. The use of dust control will prevent the movement of soil to offsite areas. However, care must be taken to not create runoff from excessive use of water to control dust. The following are methods of Dust Control that may be used on-site:

- Vegetative Cover – The most practical method for disturbed areas not subject to traffic.
- Calcium Chloride – Calcium chloride may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage.
- Sprinkling – The site may be sprinkled until the surface is wet. Sprinkling will be effective for dust control on haul roads and other traffic routes.
- Stone – Stone will be used to stabilize construction roads; will also be effective for dust control.

The general contractor shall employ an on-site water vehicle for the control of dust as necessary.

Non-Stormwater Discharges:

The construction de-watering and all non-stormwater discharges will be directed into a sediment dirt bag (or equivalent inlet protection) or a sediment basin. Sediment

material removed shall be disposed of in accordance with all applicable local, state, and federal regulations.

The developer and site general contractor will comply with the E.P.A.'s Final General Permit for Construction De-watering Discharges, (N.P.D.E.S., Section 402 and 40 C.F.R. 122.26(b) (14) (x).

Inspection/Maintenance:

Operator personnel must inspect the construction site at least once every 14 calendar days and within 24 hours of a storm event of 1/4-inch or greater. The applicant shall be responsible to secure the services of a design professional or similar professional (inspector) on an on-going basis throughout all phases of the project. Refer to the Inspection/Maintenance Requirements presented earlier in the "Structural and Stabilization Practices." The inspector should review the erosion and sediment controls with respect to the following:

- Whether or not the measure was installed/performed correctly.
- Whether or not there has been damage to the measure since it was installed or performed.
- What should be done to correct any problems with the measure.

The inspector should complete a Stormwater Management Construction Phase BMP Inspection Schedule and Evaluation Checklist for documenting the findings and should request the required maintenance or repair for the pollution prevention measures when the inspector finds that it is necessary for the measure to be effective. The inspector should notify the appropriate person to make the changes and submit copies of the form to the Haverhill Department of Public Works.

It is essential that the inspector document the inspection of the pollution prevention measures. These records will be used to request maintenance and repair and to prove that the inspection and maintenance were performed. The forms list each of the measures to be inspected on the site, the inspector's name, the date of the inspection, the condition of the measure/area inspected, maintenance or repair performed and any changes which should be made to the Operation and Maintenance Plan to control or eliminate unforeseen pollution of storm water.

APPENDIX E:

LONG TERM BEST MANAGEMENT PRACTICES O&M PLAN

Long Term Stormwater Best Management Practices
Operation and Maintenance Plan
for
931 Boston Road
Haverhill, Massachusetts
April 28, 2026

The following operation and maintenance plan has been provided to satisfy the requirements of Standard 9 of the Mass DEP Stormwater Management Handbook associated with development of the site and associated infrastructure. The success of the Stormwater Management Plan depends on the proper implementation, operation and maintenance of several management components. The following procedures shall be implemented to ensure success of the Stormwater Management Plan:

1. The contractor shall comply with the details of construction of the site as shown on the approved plans.
2. Subsurface stone infiltration systems and water quality units shall be inspected and maintained as indicated below.
3. Effective erosion control measurers during and after construction shall be maintained until a stable turf is established on all altered areas.

Basic Information

Stormwater Management System Owner:	Pentucket North Development LLC c/o Ronald J. Mailloux Sr. 55 Chase Street Methuen, MA 01844 P: (978) 808-0722
Haverhill Public Works:	Haverhill Public Works Department 500 Primrose Street Haverhill, MA 01830 P: (978) 374-2360
Haverhill City Council:	Haverhill City Council Haverhill City Hall 4 Summer Street, Room 204 Haverhill, MA 01830 P: (978) 374-2328
Site Design Engineer Information:	The Morin-Cameron Group, Inc. 66 Elm Street Danvers, MA 01923 Phone: (978) 777-8586

Erosion and Sedimentation Controls during Construction:

The site and drainage construction contractor shall be responsible for maintaining the stormwater system during construction. Routine maintenance of all items shall be performed to ensure adequate runoff and pollution control during construction.

A proposed silt fence will be placed downgradient of the work area prior to the commencement of any clearing, grubbing, and earth removal or construction activity. The integrity of the erosion control barrier will be maintained by periodic inspection and replacement as necessary. The erosion control barrier will remain in place until the first course of pavement has been placed and all side slopes have been loamed and seeded and vegetation has been established. A silt sack will also be placed over the new catch basins once constructed.

Operations and maintenance plans for the Stormwater Management construction phase and long term operation of the system have been attached to this report.

General Conditions

1. The developer shall be responsible for scheduling regular inspections and maintenance of the stormwater BMP's. The BMP maintenance shall be conducted as detailed in the following long-term pollution prevention plan and illustrated on the approved design plans:
   "Site Development Plans In Haverhill, Massachusetts, 931 Boston Road" prepared by The Morin-Cameron Group, Inc. dated April 28, 2026 as revised and approved by the Haverhill City Council.
2. All Stormwater BMP's shall be operated and maintained in accordance with the design plans and the following Long-Term Pollution Prevention Plan.
3. The owner shall:
   a. Maintain an Operation and Maintenance Log for the last three years. The Log shall include all BMP inspections, repairs, replacement activities and disposal activities (disposal material and disposal location shall be included in the Log);
   b. Make the log available to the Haverhill Department of Public Works and City Council upon request;
   c. Allow members and agents of the Haverhill Department of Public Works and City Council to enter the premises and ensure that the Owner has complied with the Operation and Maintenance Plan requirements for each BMP.
4. A recommended inspection and maintenance schedule is outlined below based on statewide averages. This inspection and maintenance schedule shall be adhered to at a minimum for the first year of service of all BMP's referenced in this document. At the commencement of the first year of service, a more accurate inspection/maintenance schedule shall be determined based on the level of service for this site.

Long-Term Pollution Prevention Plan (LTPPP)

Vegetated Areas:
Immediately after construction, monitoring of the erosion control systems shall occur until establishment of natural vegetation. Afterwards, vegetated areas shall be maintained as such. Vegetation shall be replaced as necessary to ensure proper stabilization of the site.

Cost: Included with annual landscaping budget. Consult with local landscape contractors.

Paved Areas:
Sweepers shall sweep paved areas periodically during dry weather to remove excess sediments and to reduce the amount of sediments that the drainage system shall have to remove from the runoff. The sweeping shall be conducted primarily between March 15th and November 15th. Special attention should be made to sweeping paved surfaces in March and April before spring rains wash residual sand into the drainage system.

Cost: $100 - $150 per sweeping

Salt used for de-icing on the driveway during winter months shall be limited as much as possible as this will reduce the need for removal and treatment. Sand containing the minimum amount of calcium chloride (or approved equivalent) needed for handling may be applied as part of the routine winter maintenance activities.

Proprietary Water Quality Units (CASCADE CS-3):
The Cascade CS-3 water quality pretreatment units shall be inspected monthly during a routine SWPPP inspection. The unit shall be cleaned per manufacturer instructions included in the approved OMP.

Rip-Rap Outfalls:
The rip-rap outfalls shall be checked for debris accumulation during regular SWPPP inspections. Trash, leaves, branches, etc. shall be removed from outfall. Silt, sand and sediment, if significant accumulation occurs, shall be removed as required by means of mechanical excavation. Material removed shall be disposed of in accordance with all applicable local, state, and federal regulations. The outfall shall be kept free of woody vegetation and removal of woody vegetation shall be conducted between October 15th and April 15th. Any slope erosion within the outfall shall be stabilized and repaired immediately and additional rip-rap added as required.

Deep Sump Hooded Catch Basins:
The catch basin grates shall be checked quarterly and following heavy rainfalls to verify that the inlet openings are not clogged by debris. Debris shall be removed from the grates and disposed of properly. Deep sump catch basins shall be inspected four times per year and cleaned as needed when accumulated sediments exceeds 2' from the bottom of the sump (approximately 1/2 of the sump capacity). Catch basins shall be inspected annually to check oil build-up and outlet obstructions. Material shall be removed from catch basins and disposed of in accordance with all applicable regulations

Cost: Estimated $50 - $100 per cleaning per catch basin as needed. The Owner shall consult local vacuum cleaning contractors for detailed cost estimates.

Public Safety Concerns: Catch basins shall not be left open and unattended at any time during inspection, cleaning or otherwise. Broken or missing grates or frames shall be replaced immediately. At no time shall any person enter the basin structure unless measures have been taken to ensure safe access in accordance with OSHA enclosed space regulations.

Subsurface Stone Infiltration Systems:
The subsurface stone infiltration system shall be monitored annually to ensure that it is draining properly. The outlet structure shall be checked for debris accumulation twice per year, in the spring and fall. In the case that water remains in the infiltration system for greater than three (3) days after a storm event, an inspection is warranted and necessary maintenance or repairs should be addressed as necessary.

Additional inspections should be scheduled during the first few months to make sure that the system is functioning as intended. Trash, leaves, branches, etc. shall be removed from facility. Silt, sand and sediment, if significant accumulation occurs, shall be removed annually. Material removed from the system shall be disposed of in accordance with all applicable local, state, and federal regulations. In the case that water remains in the infiltration facilities for greater than three (3) days after a storm event, an inspection is warranted and necessary maintenance or repairs should be addressed as necessary. The inspections shall be conducted by qualified personnel.

Cost: $500-$2,500 per cleaning depending on the volume of material/liquids that need to be removed.

Public Safety Concerns: The manhole covers shall not be left open and unattended at any time during inspection, cleaning or otherwise. Broken covers or frames shall be replaced immediately. At no time shall any person enter the subsurface structure unless measures have been taken to ensure safe access in accordance with OSHA enclosed space regulations.

Overall Site Grading and Stormwater Management:
After construction, and during the initial vegetation establishment period, the site should be inspected after every rainfall. Mowing, litter removal, and spot vegetation repair should be performed on a regular basis.

Debris & Litter:
All debris and litter shall be removed from the driveway/parking area as necessary to prevent migration into the drainage system.

Pesticides, Herbicides, and Fertilizers:
Pesticides and herbicides shall be used sparingly. Fertilizers shall be restricted to the use of organic, slow release nitrogen fertilizers only. All fertilizers, herbicides, pesticides, sand and salt for deicing and the like shall be stored in dry area that is protected from weather.

Cost: Included in the routine landscaping maintenance schedule. The Owner shall consult local landscaping contractors for details.

Public Safety Concerns: Chemicals shall be stored in a secure area to prevent children from obtaining access to them. Any major spills shall be reported to municipal officials.

Snow Storage:
Snow storage shall be managed by the General Contractor. Care should be taken to avoid pushing snow into sensitive areas, blocking stormwater runoff or blocking pedestrian or emergency vehicle access to and through the construction site.

Prevention of Illicit Discharges:
Illicit discharges to the stormwater management system are not allowed. Illicit discharges are discharges that are not comprised entirely of stormwater. Pursuant to Mass DEP Stormwater Standards the following activities or facilities are not considered illicit discharges: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air

conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, DE chlorinated water from swimming pools, water used for street washing and water used to clean residential building without detergents.

To prevent illicit discharges to the stormwater management system the following policies should be implemented:

1. Provisions For Storing Materials And Waste Products Inside Or Under Cover
2. Vehicle Maintenance And Washing Controls
3. Requirements for Routine Inspections of the Stormwater Management System (i.e.: Infiltration basin, water quality units & subsurface stone infiltration systems.)
4. Spill Prevention and Response Plans.

APPENDIX F:

ILLICIT DISCHARGE

COMPLIANCE STATEMENT

Illicit Discharge Compliance Statement

I, William A. Schkuta, P.E., hereby notify the Haverhill Planning Board that I have not witnessed, nor am aware of any existing illicit discharges at the site known as 931 Boston Road in Haverhill, Massachusetts. I also hereby certify that the development of said property as illustrated on the final plans entitled "Site Development Plans In Haverhill, Massachusetts, 931 Boston Road" prepared by The Morin-Cameron Group, Inc. dated April 28, 2026 and as revised and approved by the Haverhill Planning Board and maintenance thereof in accordance with the "Construction Phase Best Management Practices" and "Long-Term Stormwater Best Management Practices Operation and Maintenance Plan" prepared by The Morin-Cameron Group, Inc dated April 28, 2026 and as revised and approved by the Haverhill City Council will not create any new illicit discharges. There is no warranty implied regarding future illicit discharges that may occur as a result of improper construction or maintenance of the stormwater management system or unforeseen accidents.

Name: William A. Schkuta, P.E.

Company: The Morin-Cameron Group, Inc.

Title: Owner's Representative

Signature:

Date: 4/28/2026

APPENDIX G:

STORMWATER MANAGEMENT

CALCULATIONS

April 28, 2026

Stormwater Management Calculations

STANDARD 3: Recharge To Groundwater: Static Method

1. Calculate Impervious Area *(From HydroCAD Model)*
   - Existing Impervious Area (HSG A Soil) = 0 SF
   - Proposed Impervious Area (HSG A Soil) = 23,788 SF
   - Increase in Impervious area = 23,788 – 0 = 23,788 SF

2. Determine Rainfall Depth to be Recharged
   (MassDEP Stormwater Management Handbook: Table 2.3.2)

Hydrologic Soil Group	Recharge Rainfall Depth
A	0.60"

3. Calculate Recharge Volume (Rv)
   Soil HSG A '*Rv*' = [(0.60" x 23,788 SF) / 12 SF-In] = 1,190 CF

   Total '*Rv*' = 1,190 CF

4. Calculate Provided Recharge
   Proposed recharge provided in infiltration basins

HCAD System ID	Bottom of Infiltration	Lowest System Outlet	Total Recharge Volume Provided (CF)
1P	102.00	104.00	**883**
2P	99.50	101.67	**260**
3P	104.50	106.50	**883**
4P	112.14	116.00	**584**
5P	107.67	115.00	**584**
6P	101.50	104.00	**2,253**
TOTAL			**5,447**

Required Recharge Volume Summary

Total Volume Provided Below Outlets = 5,447 CF
Total Volume Required = 1,190 CF
5,447 CF provided > 1,190 CF required

- Capture Area Adjustment
  Schedule of Areas Tributary to Recharge Systems

HCAD System ID	Tributary Impervious Area
PS-R1 through PS-R8	10,080 SF
P-1	4,646 SF
P-4	7,811 SF
Total:	**22,537 SF**

Total Impervious Area (entire site) = 23,788 SF

Capture Area Adjustment = 23,788 SF / 22,537 SF = 1.06
Required Recharge Volume ***'Rv'*** = 1.06 x Rv = 1.06 x 1,190 CF = **1,262 CF**

Verify Drawdown, Maximum 72-Hours: Static Method

HCAD System ID	Recharge Volume (CF)	Bottom Surface Area (SF)	Infiltration Rate Inches/Hour	Drawdown Time Rv / (K x A) (Hours)	Description
1P	883	950	1.02	11.0	Stone Infiltration System
2P	260	277	1.02	11.1	Stone Infiltration System
3P	883	950	1.02	11.0	Stone Infiltration System
4P	584	475	1.02	14.5	Stone Infiltration System
5P	584	475	1.02	14.5	Stone Infiltration System
6P	2,253	1,988	1.02	13.4	Stone Infiltration System

*****Design Complies with Recharge Volume Standard*****

STANDARD 4: Water Quality Volume

1. Calculate Impervious Area *(From HydroCAD Model)*
   - Total proposed post-construction impervious area = 23,788 SF

2. Retaining the volume of runoff equivalent to, or greater than 1.0 inch multiplied by the total post-construction impervious area
(See Haverhill Stormwater Management: Chapter 219-9.C.(b))
3. Calculate Recharge Volume (Rv)
   'Rv' = [(1.0" x 23,788 SF) / 12 SF-In] = 1,983 CF

Total *'Rv'* = 1,983 CF

4. Calculate Provided Recharge
   Proposed recharge provided in infiltration basins

HCAD System ID	Bottom of Infiltration	Lowest System Outlet	Total Recharge Volume Provided (CF)
1P	102.00	104.00	**883**
2P	99.50	101.67	**260**
3P	104.50	106.50	**883**
4P	112.14	116.00	**584**
5P	107.67	115.00	**584**
6P	101.50	104.00	**2,253**
TOTAL			**5,447**

Required Recharge Volume Summary

Total Volume Provided Below Outlets = 5,447 CF
Total Volume Required = 1,983 CF

5,447 CF provided > 1,983 CF required [OK]

*** This fulfills the average annual pollutant requirements in Chapter 219-9B of the Haverhill Stormwater Management Regulation due to the proposed stormwater systems ability to retain the volume of runoff greater than 1.0 inch multiplied by the total post construction impervious surface area on the proposed new development site (per *Haverhill Stormwater Management: Chapter 219-9.C.(b)*)***

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Danvers, MA 01923
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Standard 4: Total Suspended Solids Calculation for Subsurface Infiltration System (2P)

Name: 931 Boston Road
cation: 931 Boston Road
Haverhill, MA
County: Essex County
Applicant: Cedardale, Inc

Proj. No.: 4316
Date: 4/28/2026
Revised:
Computed by: Dan Sievers, P.E.
Checked by: William Schkuta, P.E.

Pretreatment= 80% (greater than 44% - OK)

TSS Removal Calculation Worksheet

B BMP	C TSS Removal Rate	D Starting TSS Load (*F)	E Amount Removed (C*D)	F Remaining Load (D-E)
Proprietary Treatment Practice	0.80	1.00	0.80	0.20
Subsurface Infiltration Structure	0.80	0.20	0.16	0.04
	0.00	0.04	0.00	0.04
	0.00	0.04	0.00	0.04
	0.00	0.04	0.00	0.04

Total TSS Removal = 96%

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

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

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Danvers, MA 01923
p | 978.777.8586

Standard 4: Total Suspended Solids Calculation for Subsurface Infiltration System (6P)

Name: 931 Boston Road
cation: 931 Boston Road
Haverhill, MA
County: Essex County
Applicant: Cedardale, Inc

Proj. No.: 4316
Date: 4/28/2026
Revised:
Computed by: Dan Sievers, P.E.
Checked by: William Schkuta, P.E.

Pretreatment= 80% (greater than 44% - OK)

TSS Removal Calculation Worksheet

B BMP	C TSS Removal Rate	D Starting TSS Load (*F)	E Amount Removed (C*D)	F Remaining Load (D-E)
Proprietary Treatment Practice	0.80	1.00	0.80	0.20
Subsurface Infiltration Structure	0.80	0.20	0.16	0.04
	0.00	0.04	0.00	0.04
	0.00	0.04	0.00	0.04
	0.00	0.04	0.00	0.04

Total TSS Removal = 96%

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

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Project:	**931 Boston Road**
Location:	**Haverhill, MA**
Prepared For:	**The Morin-Cameron Group**

CONTECH ENGINEERED SOLUTIONS

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1 of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 3 or 4. Figure 4 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 3 or Table in Figure 4. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$Q = (qu)\ (A)\ (P)$$

where
:

Q = flow rate associated with first 1 of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
P = water quality volume in watershed inches (1 in this case)
WQV = impervious area (sq ft) * rainfall depth (P)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	P (in)	WQv (cu ft) (Total)	qu (csm/in.)	Q (cfs)
Basin 1	0.06	0.0000984	6.0	0.100	1.00	228.7	774.00	0.08
Basin 2	0.22	0.0003422	6.0	0.100	1.00	794.7	774.00	0.26

The WQf sizing calculation selects the minimum size CDS/Cascade/StormCeptor model capable of operating at the computed WQf peak flowrate prior to bypassing. It assumes free discharge of the WQf through the unit and ignores the routing effect of any upstream storm drain piping. As with all hydrodynamic separators, there will be some impact to the Hydraulic Gradient of the corresponding drainage system, and evaluation of this impact should be considered in the design.

CONTECH ENGINEERED SOLUTIONS

CASCADE separator™

CASCADE ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

931 BOSTON ROAD
HAVERHILL, MA

Area	**0.06 ac**	Unit Site Designation	**Basin 1**
Weighted C	**0.90**		
t_c	**6 min**		
Cascade Model	**CS-3**	Cascade Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Treated Flowrate (cfs)	Hydraulic Loading Rate (gpm/ft2)	Incremental Removal (%)
0.02	10.2%	10.2%	0.00	0.07	10.2
0.04	9.6%	19.8%	0.00	0.14	9.6
0.06	9.4%	29.3%	0.00	0.22	9.4
0.08	7.7%	37.0%	0.00	0.29	7.7
0.10	8.6%	45.6%	0.01	0.36	8.6
0.12	6.3%	51.9%	0.01	0.43	6.3
0.14	4.7%	56.5%	0.01	0.50	4.7
0.16	4.6%	61.2%	0.01	0.58	4.6
0.18	3.5%	64.7%	0.01	0.65	3.5
0.20	4.3%	69.1%	0.01	0.72	4.3
0.25	8.0%	77.1%	0.01	0.90	8.0
0.30	5.6%	82.7%	0.02	1.08	5.6
0.35	4.4%	87.0%	0.02	1.26	4.4
0.40	2.5%	89.5%	0.02	1.44	2.5
0.45	2.5%	92.1%	0.03	1.62	2.5
0.50	1.4%	93.5%	0.03	1.80	1.4
0.75	5.0%	98.5%	0.04	2.70	5.0
1.00	1.0%	99.5%	0.06	3.60	1.0
1.50	0.0%	99.5%	0.09	5.40	0.0
2.00	0.0%	99.5%	0.11	7.20	0.0
3.00	0.5%	100.0%	0.17	10.80	0.5
					100.0
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**93.5%**

1 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CASCADE separator™

CASCADE ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

931 BOSTON ROAD
HAVERHILL, MA

Area	0.22 ac	Unit Site Designation	Basin 2
Weighted C	0.90		
t_c	6 min		
Cascade Model	CS-3	Cascade Treatment Capacity	1.0 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Treated Flowrate (cfs)	Hydraulic Loading Rate (gpm/ft2)	Incremental Removal (%)
0.02	10.2%	10.2%	0.00	0.25	10.2
0.04	9.6%	19.8%	0.01	0.50	9.6
0.06	9.4%	29.3%	0.01	0.75	9.4
0.08	7.7%	37.0%	0.02	1.00	7.7
0.10	8.6%	45.6%	0.02	1.25	8.6
0.12	6.3%	51.9%	0.02	1.50	6.3
0.14	4.7%	56.5%	0.03	1.75	4.7
0.16	4.6%	61.2%	0.03	2.00	4.6
0.18	3.5%	64.7%	0.04	2.25	3.5
0.20	4.3%	69.1%	0.04	2.50	4.3
0.25	8.0%	77.1%	0.05	3.13	8.0
0.30	5.6%	82.7%	0.06	3.75	5.6
0.35	4.4%	87.0%	0.07	4.38	4.4
0.40	2.5%	89.5%	0.08	5.01	2.5
0.45	2.5%	92.1%	0.09	5.63	2.5
0.50	1.4%	93.5%	0.10	6.26	1.4
0.75	5.0%	98.5%	0.15	9.39	5.0
1.00	1.0%	99.5%	0.20	12.52	1.0
1.50	0.0%	99.5%	0.30	18.77	0.0
2.00	0.0%	99.5%	0.39	25.03	0.0
3.00	0.5%	100.0%	0.59	37.55	0.4
					99.9
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**93.4%**

1 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

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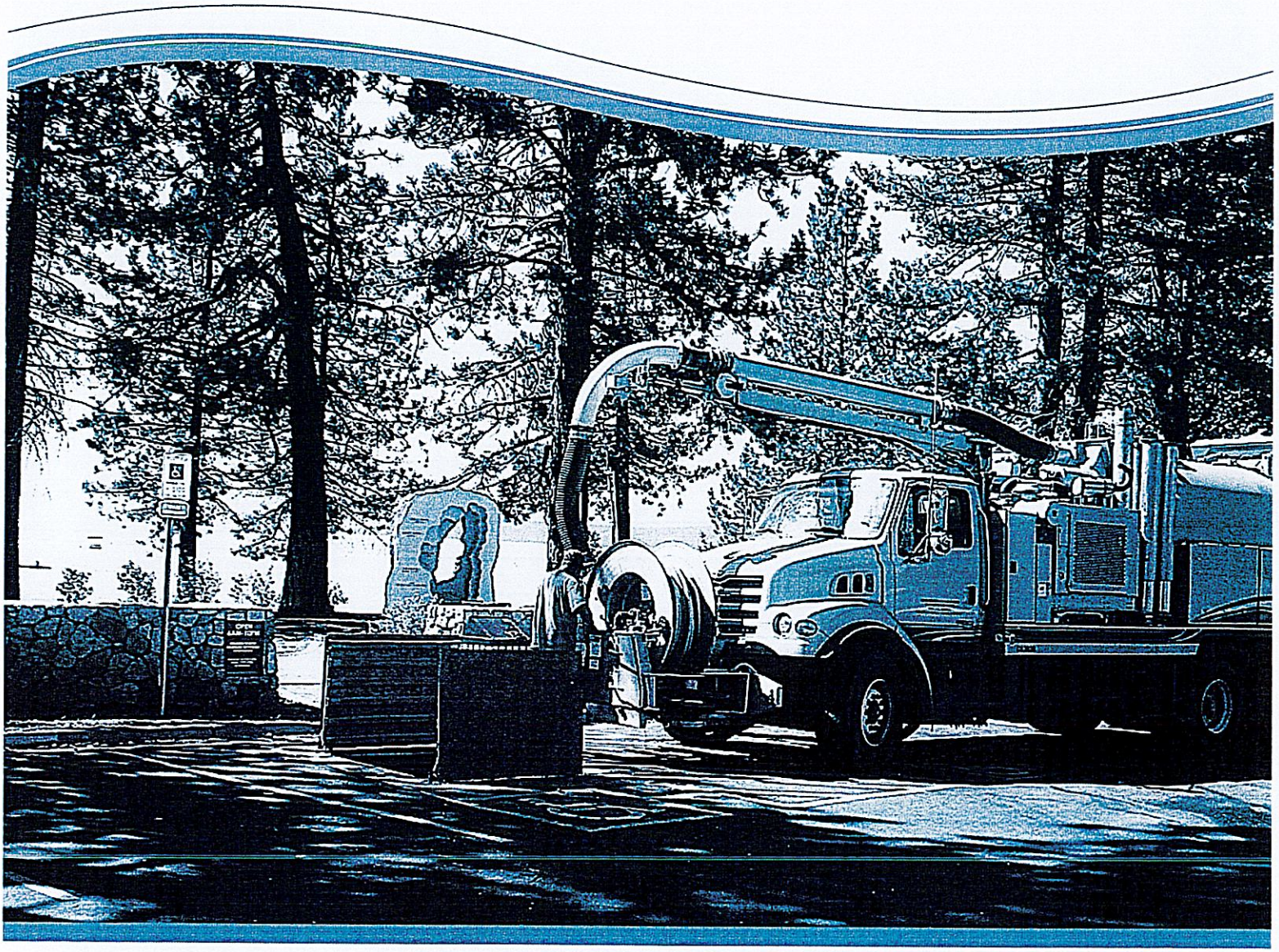
ENGINEERED SOLUTIONS

Cascade Separator® Inspection and Maintenance Guide



CASCADE
separator®

Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

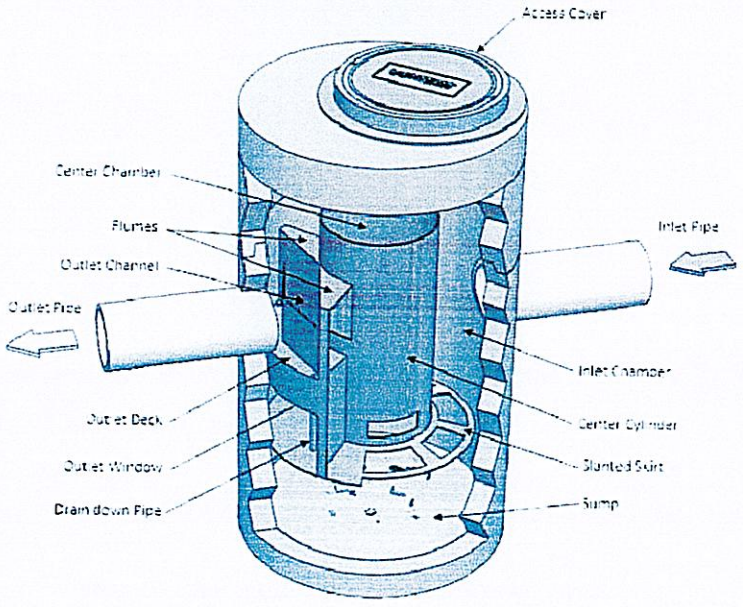
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

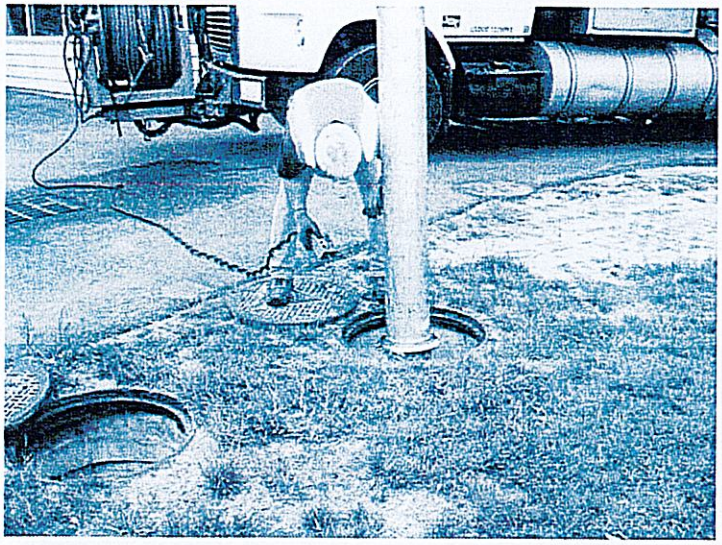
Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



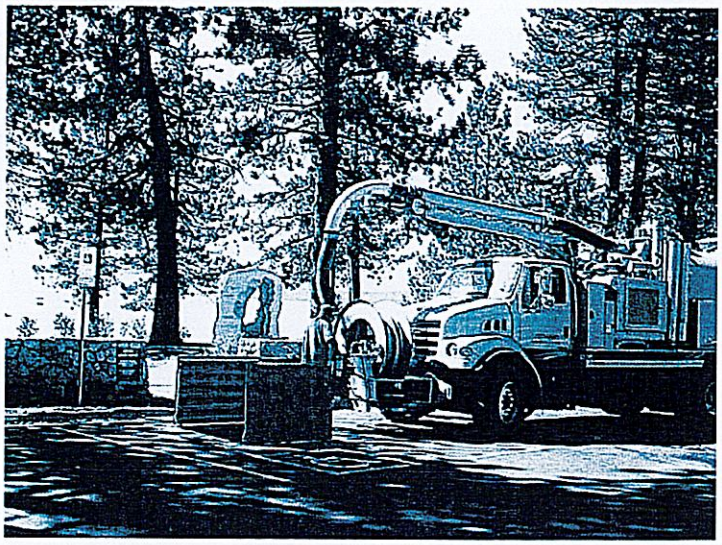
Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

Cascade Model:			Location:		
Date	Depth Below Invert to Top of Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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NJCAT TECHNOLOGY VERIFICATION

Removal Efficiency of Suspended Sediment with a Median Particle Size of 110 microns

Cascade Separator™

Contech Engineered Solutions, LLC

November 2019

(Amended Table A-1 August 2020)

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1. INTRODUCTION

In September 2019, the Cascade Separator™ received New Jersey Corporation for Advanced Technology (NJCAT) verification for testing completed under the New Jersey Department of Environmental Protection (NJDEP) Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device (NJDEP Protocol) dated January 25, 2013. The Cascade Separator met the NJDEP Protocol requirements by demonstrating 50% weighted TSS removal with a target median particle size (D_{50}) of 75 µm at a target inlet sediment concentration of 200 mg/L.

Many jurisdictions in the United States are interested in data demonstrating solids removal for coarser particle sizes than that tested for NJDEP certification. A common standard used to evaluate and size hydrodynamic separators in other parts of North America is to utilize a sediment gradation with a D_{50} of 110 µm. The objective of this additional laboratory evaluation was to determine the total suspended solids (TSS) removal by the Cascade over a range of operating rates using a sediment gradation with a median particle size (D_{50}) of 110 µm at a target inlet sediment concentration of 280 mg/L. **The results of the study were submitted to NJCAT for verification, but the testing procedure falls outside of the NJDEP Protocol and process and therefore was not submitted to NJDEP for certification.**

2. DESCRIPTION OF TECHNOLOGY

The Cascade Separator is a manufactured treatment device (MTD) designed to protect waterways from stormwater runoff. The hydrodynamic separator device separates and traps trash, debris and sediment, even at high flow rates, and provides easy access for maintenance. The Cascade Separator is commonly used as a standalone stormwater quality control practice and as pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems and Low Impact Development designs.

The Cascade Separator (**Figure 1**) accepts flow through an inlet. Water enters the inlet chamber where a specially designed insert splits the flow into two flumes, creating vortices that rotate in opposite directions in the center chamber. This creates high and low velocity regions in the center chamber that facilitates the settling of particles. As water travels downward through the center chamber, sediment settles into the sump area where it is retained until maintenance is performed. The slanted skirt provides scour protection during peak events and its incline facilitates sediment transport into the sump. Treated stormwater moves upwards, leaves the center cylinder through the outlet window and travels through the outlet channel before exiting the system. Refer to the black flow arrows in **Figure 2** for the treatment flow path. The outlet deck incorporates two pipes that extend downward and allow the system to drain to the outlet pipe invert elevation after the storm event has subsided, while also preventing captured floating materials from leaving the system. The green arrows in **Figure 2** show the flow path through these components.

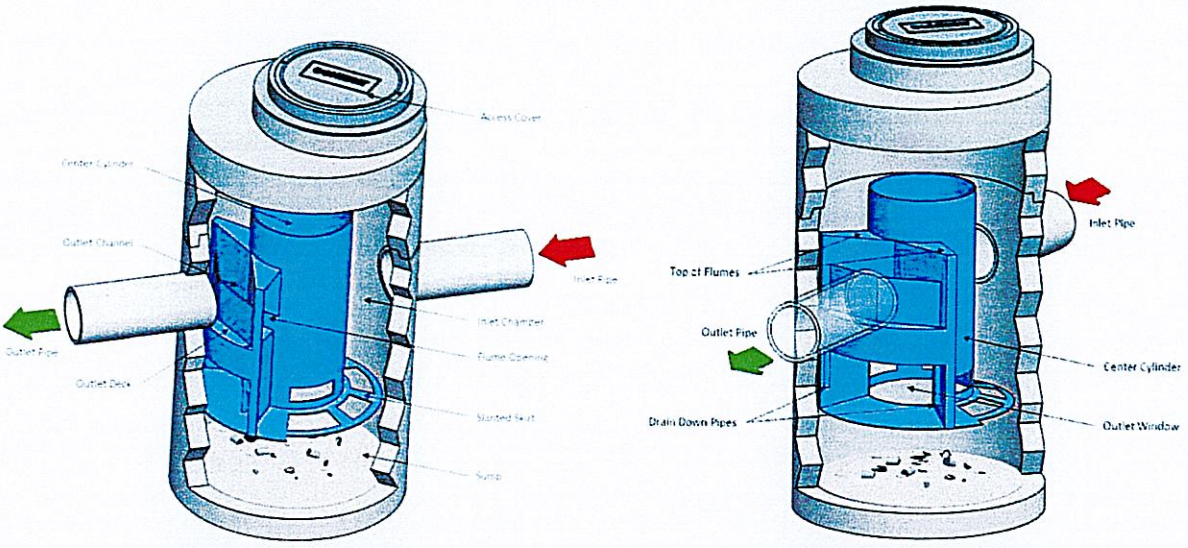


Figure 1: Model of the Cascade Separator

The Cascade Separator is designed to handle high flow rates without scouring previously captured pollutants. Each model is designed to allow a maximum flow rate through the treatment chambers and has an internal flow bypass for storm events that exceed the specific flow rate. While in internal bypass, the unit continues to treat the stormwater that enters the flumes while the excess flow passes over the flumes and exits the system untreated. This internal bypass feature allows the Cascade Separator to be installed online, therefore eliminating the need for additional bypass structures. The red arrows in **Figure 2** show how excess flow is bypassed over the flumes.

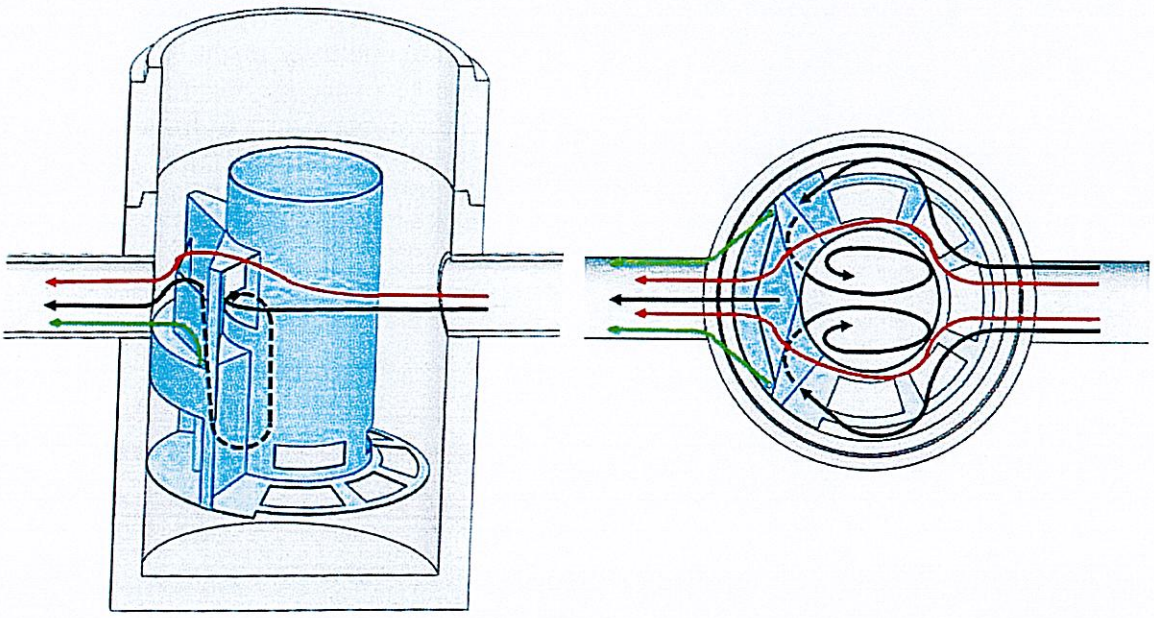


Figure 2: Cascade Separator Flow Paths

3. Laboratory Testing

All removal efficiency testing for this project was carried out at Contech's Portland, Oregon laboratory in April and May 2019. Independent third-party oversight was provided by Scott Wells, Ph.D. and his associate Chris Berger, Ph.D. Dr. Scott Wells and Dr. Chris Berger, from Portland State University, have extensive backgrounds in water quality including direct experience with the laboratory evaluation of stormwater MTDs. Dr. Scott Wells and Dr. Chris Berger have no conflict of interest that would disqualify them from serving as independent third-party observers during this testing process.

Test sediment samples for particle size distribution (PSD) analysis were processed in-house, under third-party observation according to ASTM D6913/D6913M-17 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis. Test sediment samples for moisture content were processed in-house, under third-party observation according to ASTM D2216-2019 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass. TSS samples were processed in-house, under third-party observation according to ASTM D3977-97(2013) Standard Test Methods for Determining Sediment Concentration in Water Samples.

3.1. Test Unit

Laboratory testing was completed on a full-scale, dimensionally accurate 4 ft diameter Cascade Separator (CS-4) lab model, whose components and material are comparable to the commercially available product (**Figure 3**). The Cascade Separator was housed in a 4 ft diameter aluminum manhole with aluminum influent and effluent pipes, with the same inside diameter (ID) as a 24 in. PVC pipe (22.5 in. ID). The CS-4 has a depth of 48 in. from housing floor to effluent pipe invert. The CS-4 outlet channel height is 10.5 in. above the outlet pipe invert. The effective treatment area is 12.6 ft^2 and the maximum sediment storage capacity is 18.8 ft^3, or a depth of 18 in. above the floor. Removal efficiency was conducted at 50% of the maximum sediment storage depth. To accomplish this, an aluminum false floor was installed at 50% of the sediment storage depth, or 39 in. below the outlet pipe invert. The CS-4 permanent pool volume is 40.8 ft^3 from 50% sediment storage depth to outlet pipe invert. For this testing, the approximate full operation volume of 58.6 ft^3 (50% sediment storage depth to internal bypass elevation, 56 in. height) will be used to calculate the detention time as it is more conservative.

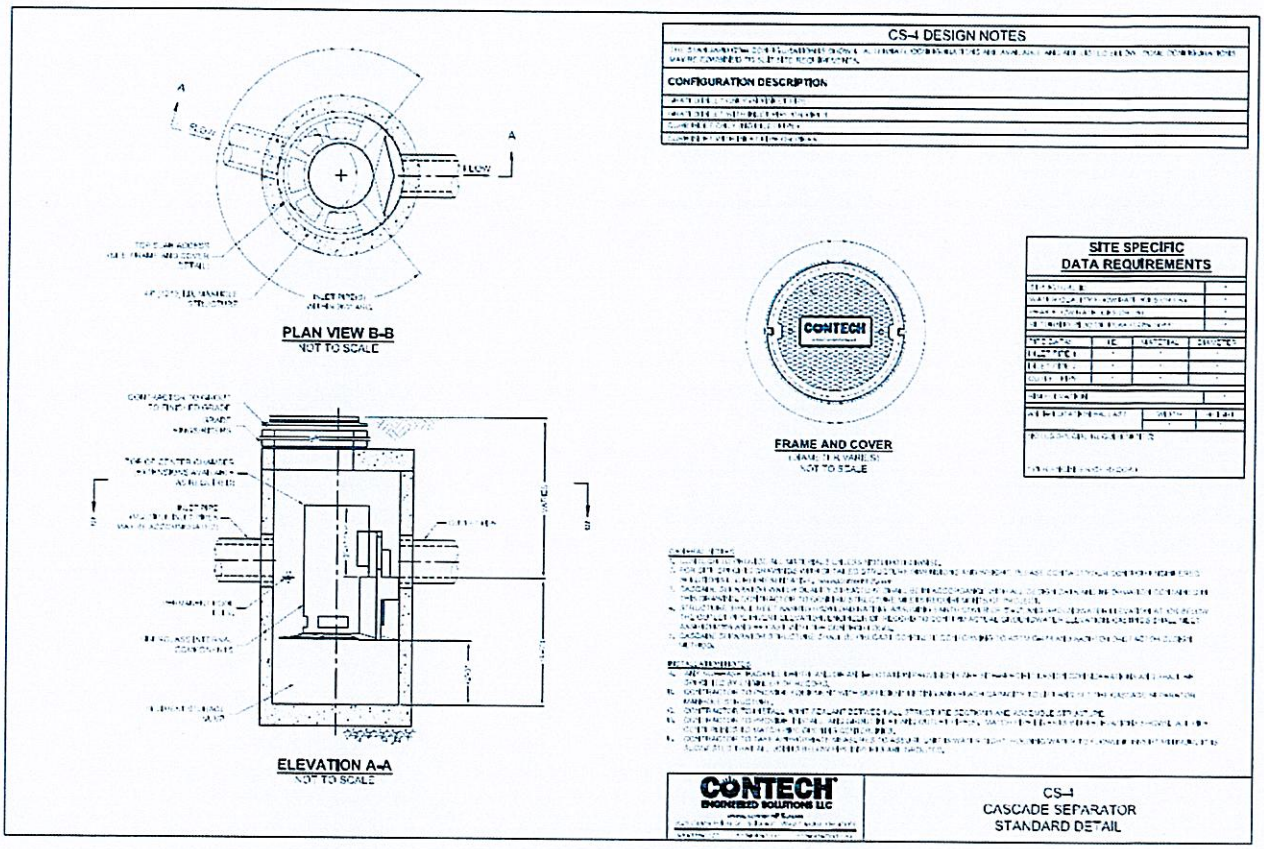


Figure 3: Cascade Separator Standard Detail

3.2. TEST SYSTEM

The Cascade Separator was tested on a recirculating laboratory system capable of delivering flow rates up to 5 cfs (**Figure 4**). During removal efficiency tests, clean water was drawn from a 3,500-gal influent tank using a 15 HP, Berkeley B6ZPLS centrifugal pump (Pump 1). Closed loop flow-control was maintained with a proportional-integral-derivative controlled variable frequency drive (VFD). The feedback signal to the VFD was provided from a Seametrics IMAG 4700 8 in. flowmeter. All flow from Pump 1 to the test unit was measured by the flowmeter (+/- 1.0% of reading) and logged at 5 sec intervals. Influent flow traveled through an inlet junction and into the influent pipe where background TSS samples were taken from a ¾ in. PVC pipe sampling port at the bottom of the influent pipe, upstream of the sediment injection point (**Figure 5**). Influent water was then dosed with sediment at the crown of the pipe from an Auger Feeders VF2 volumetric sediment feeder, located 112.5 in. upstream of the test unit (**Figure 6**). Influent water entered the manhole housing, was treated by the Cascade Separator, and exited the unit via the effluent pipe. Water exited the effluent pipe in a free-fall stream, where effluent TSS grab samples were taken by making a single sweeping pass through the cross section of the effluent stream before it entered the 2,350 gal effluent tank (**Figure 7**).

Effluent water traveled through an array of bag filters located inside the effluent tank and was then pumped through cartridge filter housings using a 25 HP Berkeley B5ZPBHS centrifugal pump (Pump 2). To maintain water balance between the isolated influent and effluent tanks, a closed-looped flow-control on Pump 2 was maintained using feedback from a Seametrics IMAG 4700 8

in. flowmeter. The filtered water was discharged into the influent tank for re-use. Flocculants were not used to reduce background TSS at any time.

The test water temperature was maintained using a Coates 32024CPH 24 kW heater, which recirculated influent water. Water temperature was measured in the inlet junction with an Omega HSRTD-3-100-B-80-E resistance temperature detector and logged at 5 sec intervals.

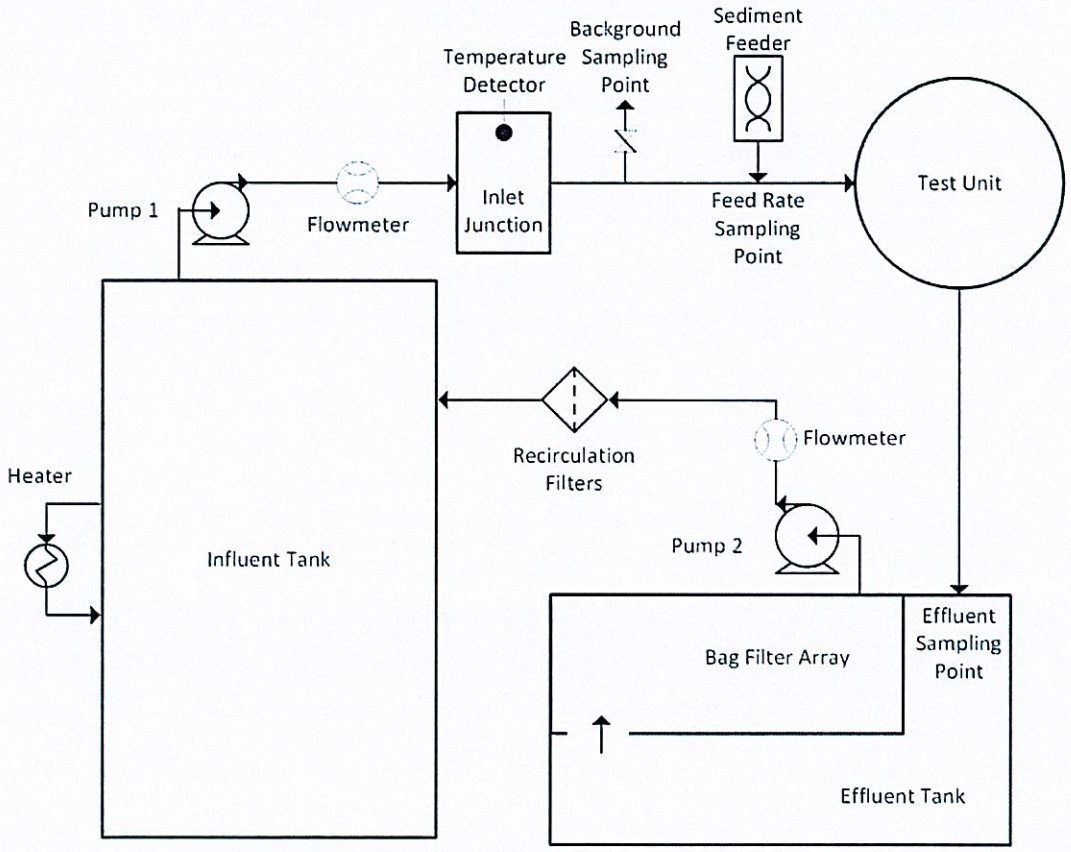


Figure 4: Lab Setup for Removal Efficiency Tests

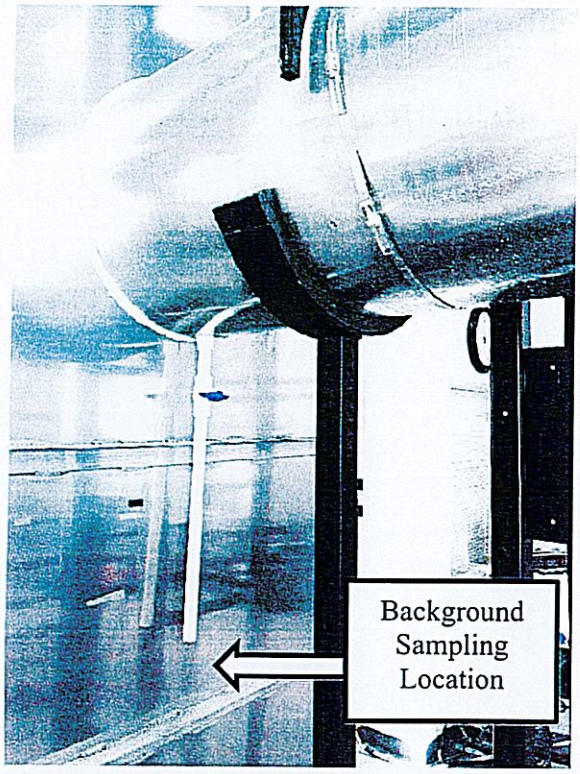


Figure 5: Background Sampling Location

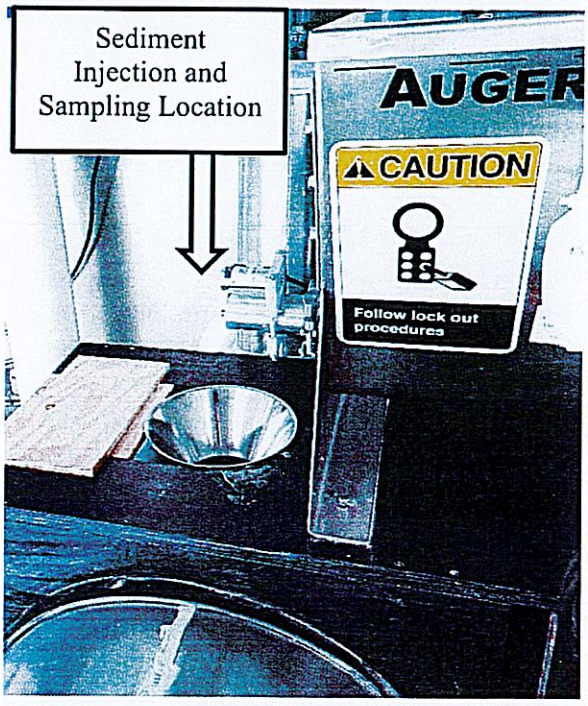


Figure 6: Sediment Injection Location and Feed Rate Sampling Location

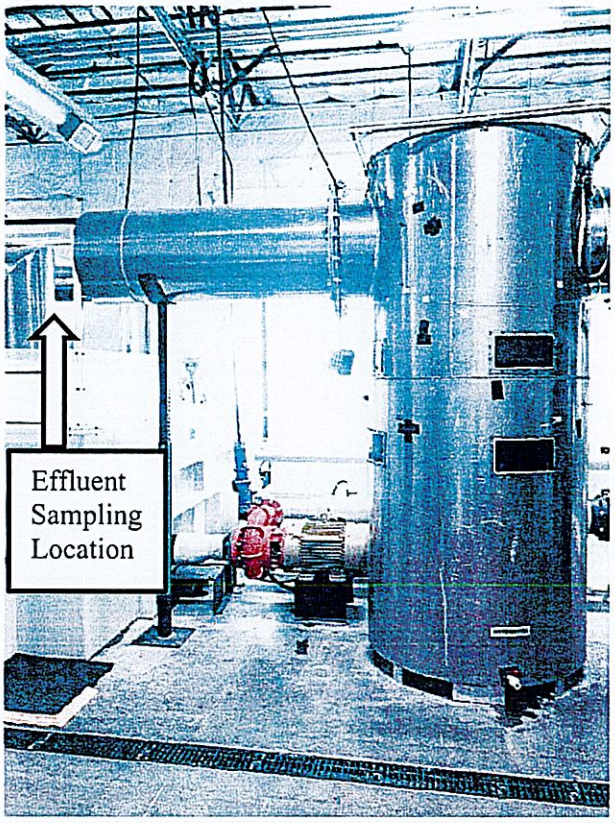


Figure 7: Manhole and Effluent Grab Sampling Location

3.3. TEST SEDIMENT

The sediment used for removal efficiency tests was a custom silica blend with a specific gravity of 2.65. The test sediment was blended in-house and used as an alternative to US Silica OK-110 sediment (**Figure 8**), which is no longer produced commercially. The custom sediment had a target D_{50} of 110 µm, with a range of particle sizes from 53 µm to 250 µm. After blending, the test sediment was batched, labeled and stored in covered bins for the duration of this project. Sediment sampling and analysis were conducted in-house, under third party observation. Twelve subsamples, taken from various locations within the test sediment bins were composited. From the composite, three samples were taken for PSD analysis and three samples for moisture content analysis. The average PSD (**Table 2**) derived from the three samples was used to determine compliance with the target PSD (**Figure 8**). The average sediment moisture content was used in feed rate calculations (**Equation 1**) and carried through in influent mass calculations (**Equation 2**).

U.S. SILICA

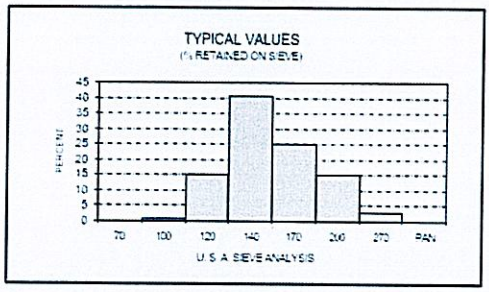
Sands of Time

PRODUCT DATA

OK-110

UNGROUND SILICA

PLANT: MILL CREEK, OKLAHOMA



USA STD SIEVE SIZE		TYPICAL VALUES % RETAINED		% PASSING
MESH	MILLIMETERS	INDIVIDUAL	CUMULATIVE	CUMULATIVE
70	0.212	0.2	0.2	99.8
100	0.150	1.0	1.2	98.8
120	0.125	15.0	16.2	83.8
140	0.106	40.8	57.0	43.0
170	0.088	25.0	82.0	18.0
200	0.075	15.0	97.0	3.0
270	0.053	3.0	100.0	0.0
PAN		0.0	100.0	

Figure 8: US Silica OK-110 Product Data Sheet

3.4. Removal Efficiency Testing Procedure

Three separate, continuous removal efficiency tests were performed over a range of hydraulic loading rates. The three resulting removal efficiency values at each hydraulic loading rate were plotted with a curve fit applied.

Each continuous test started with the highest target flow rate and continued with flow rates decreasing incrementally through the target values: 1.50 cfs, 1.20 cfs, 0.90 cfs, 0.60 cfs and 0.30 cfs. During each continuous test, each flow rate trial commenced once the feed rate was set and the flow rate was stabilized at the target rate for a minimum of three detention times. A sediment feed rate sample was taken at the beginning of each flow rate trial and a minimum of three detention times passed before the six effluent samples and six paired background samples were taken. After all effluent and background samples were collected, the second feed rate sample was taken. Each flow rate trial ended following the second feed rate sample. The flow rate and corresponding feed rate were then re-adjusted and allowed to stabilize before starting the next flow rate trial. Testing continued in this manner until the full set of flow rates were evaluated. The sampling procedure was the same for all flow rate trials, but the sample spacing and trial duration varied to accommodate differences in detention time (**Table 1**). The system was cleaned prior to each continuous test, but not between the flow rate trials within a test.

Table 1: Continuous Test Sampling Plan

Time (mm:ss)	Sample		
START OF CONTINUOUS TEST			
Stabilize flow for minimum duration of 01:57			
00:00	START 1.5 CFS TRIAL		
00:00	FEED 1		
03:00		EFF 1	BACK 1
03:30		EFF 2	BACK 2
04:00		EFF 3	BACK 3
04:30		EFF 4	BACK 4
05:00		EFF 5	BACK 5
05:30		EFF 6	BACK 6
05:30	FEED 2		
06:30	STOP 1.5 CFS TRIAL		
Stabilize flow for minimum duration of 02:27			
00:00	START 1.2 CFS TRIAL		
00:00	FEED 1		
03:30		EFF 1	BACK 1
04:00		EFF 2	BACK 2
04:30		EFF 3	BACK 3
05:00		EFF 4	BACK 4
05:30		EFF 5	BACK 5
06:00		EFF 6	BACK 6
06:00	FEED 2		
07:00	STOP 1.2 CFS TRIAL		
Stabilize flow for minimum duration of 03:15			
00:00	START 0.9 CFS TRIAL		
00:00	FEED 1		
04:30		EFF 1	BACK 1
05:00		EFF 2	BACK 2
05:30		EFF 3	BACK 3
06:00		EFF 4	BACK 4
06:30		EFF 5	BACK 5
07:00		EFF 6	BACK 6
07:00	FEED 2		
08:00	STOP 0.9 CFS TRIAL		

Time (mm:ss) *Continued*	Sample *Continued*		
Stabilize flow for minimum duration of 04:53			
00:00	START 0.6 CFS TRIAL		
00:00	FEED 1		
06:00		EFF 1	BACK 1
06:30		EFF 2	BACK 2
07:00		EFF 3	BACK 3
07:30		EFF 4	BACK 4
08:00		EFF 5	BACK 5
08:30		EFF 6	BACK 6
08:30	FEED 2		
09:30	STOP 0.6 CFS TRIAL		
Stabilize flow for minimum duration of 09:46			
00:00	START 0.3 CFS TRIAL		
00:00	FEED 1		
11:00		EFF 1	BACK 1
11:30		EFF 2	BACK 2
12:00		EFF 3	BACK 3
12:30		EFF 4	BACK 4
13:00		EFF 5	BACK 5
13:30		EFF 6	BACK 6
13:30	FEED 2		
14:30	STOP 0.3 CFS TRIAL		
END OF CONTINUOUS TEST			

During all testing the flow rate was held steady at ±10% of the target value with a target coefficient of variation (COV) of less than 0.03. Water temperature remained below 80 °F during all testing.

For each flow trial, sediment was injected at a known rate to produce a target average influent concentration of 280 mg/L (± 10%) with a COV of less than 0.10. Feed rates were determined by sampling the injection stream once at the beginning and once at the end of each flow trial. Samples were collected in clean, 1 L bottles at the injection point (**Figure 6**) for a target duration of 60 s. Sediment sample collection time was measured using a Thomas Scientific 1235026 traceable stopwatch. The samples were weighed to the mg (in-house) using an Ohaus AR3130 calibrated balance and feed rate for each run was calculated using **Equation 1**. Average influent TSS concentration was calculated from the average test feed rate and average flow rate for the flow trial using **Equation 2**.

$$\text{Feed Rate } \left({}^{g}/_{\text{min}}\right) = \frac{\text{Mass}_{\text{sample+bottle}}(\text{g}) - \text{Mass}_{\text{bottle}}(\text{g})}{\text{Time}_{\text{collection}}(\text{s}) \times \frac{\text{min}}{60\ \text{s}}} \times \left[1 - \text{Sediment Moisure Content}\right]$$

Equation 1

$$\textit{Average Influent TSS } \left({}^{mg}/_{L}\right) = \frac{\textit{Average Feed Rate } \left({}^{g}/_{min}\right) \times \frac{1000\ mg}{g}}{\textit{Average Flow Rate } \left({}^{gal}/_{min}\right) \times \frac{3.78541\ L}{gal}}$$

Equation 2

Six effluent grab samples were collected at evenly-spaced intervals during each flow rate trial. After the first feed rate sample was collected, effluent sampling began after a minimum of three detention times passed. Each sample volume was a minimum of 0.5 L. Samples were collected in clean, 1 L bottles by sweeping the bottle through the cross-section of the free-discharge effluent stream in a single pass. In the cases where the effluent TSS concentration was non-detect (ND), a value of half the detection limit was substituted. The detection limit is 1.55 mg/L.

Background samples were taken simultaneously with every effluent sample. Each sample was a minimum of 0.5 L in volume and was collected in a clean, 1 L bottle from the background sampling port. Background samples were collected after the sampling port was opened and the line was flushed for 3 sec. In the cases where the background TSS concentration was non-detect (ND), a value of half the detection limit was substituted. Average background concentration did not exceed 20 mg/L during any test. Paired effluent and background TSS concentration measurements were used to calculate an average adjusted effluent TSS value (**Equation 3**).

$$\text{Average Adjusted Effluent TSS } \left({}^{\text{mg}}/_{\text{L}}\right) = \frac{1}{6}\sum_{i=1}^{6}\left[\text{Effluent TSS}\left({}^{\text{mg}}/_{\text{L}}\right) - \text{Background TSS } \left({}^{\text{mg}}/_{\text{L}}\right)\right]_{i}$$

Equation 3

Removal efficiency at each flow rate was calculated using **Equation 4**. All removal efficiency values were plotted against the applicable hydraulic loading rate with a linear curve fit applied. The curve fit equation was used to determine the hydraulic loading rate at which 80% removal efficiency and 80% annualized weighted removal efficiency would occur. The New Jersey rainfall weighting factors used for the annualized removal efficiency determination are outlined in Table 1 of Appendix A, Section A in the NJDEP Protocol.

$$Removal\ Efficiency\ (\%) = \frac{Average\ Influent\ TSS\ (^{mg}/_{L}) - Average\ Adjusted\ Effluent\ (^{mg}/_{L})}{Average\ Influent\ TSS\ (^{mg}/_{L})} \times 100$$

Equation 4

4. Performance Claims

Some of the following performance claims are specific to the 4 ft Cascade Separator, the model size tested in this study. Additional information for all models is provided in **Table A-1.**

Verified Total Suspended Solids Removal Rate

In general, the 'point on a curve' method to size an MTD for a target removal efficiency of a target particle size is a straightforward approach. The hydraulic loading rate which achieves the target removal efficiency is determined by interpolating or using a curve fit equation from the hydraulic loading rate v removal efficiency data set, which typically spans a large range of tested flow rates.

The testing performed on the Cascade Separator resulted in a hydraulic loading rate v removal efficiency curve fit equation on a data set spanning from 0.31 to 1.51 cfs. Removal efficiencies ranged from 60.3% to 100% respectively. The curve fit equation was used to determine that the hydraulic loading rate of 33.78 gpm/ft^2 of effective treatment area achieved 80% removal efficiency of the target particle size with a D_{50} of 110 µm at the target sediment inlet concentration of 280 mg/L.

Verified Annualized Total Suspended Solids Removal Rate

Net annual sizing is another method for sizing MTDs for a target removal efficiency of a target particle size. This sizing method predicts MTD performance over a typical rain year by using annual rainfall intensity distributions from long-term records to develop a model. The net annual model will vary based on regional rainfall differences, allowing sizing for specific site needs. The model ties the annual occurrence of rainfall intensities to expected performance by applying weighting factors to the MTD removal efficiencies over a range of hydraulic loading rates. The fractional removal efficiencies are then summed to represent the net annualized removal efficiency of the MTD at the treatment flow rate.

In this laboratory testing, the New Jersey rainfall weighting factors in the NJDEP protocol were applied to the Cascade curve fit equation to determine the hydraulic loading rate at which an annualized weighted removal efficiency of 80% would occur. The Cascade Separator achieved 80% annualized TSS removal of the 110 µm test particle size at a hydraulic loading rate of 52.99 gpm/ft^2.

Maximum Sediment Storage Depth and Volume

The maximum sediment storage depth is 18 in. on all Cascade Separator models. The CS-4 has a maximum sediment storage volume of 18.8 ft^3.

Effective Treatment Area

The effective treatment area, or sedimentation area is 12.6 ft^2 on the CS-4.

DETENTION TIME AND VOLUME

The operational volume of the CS-4 is 58.6 ft^3 from the 50% maximum sediment storage depth to inlet water surface elevation at full treatment capacity. Detention time will vary by flow rate, the detention time for the annualized maximum treatment flow rate (MTFR) of 1.48 cfs (666 gpm) is 39 s.

ONLINE OR OFFLINE INSTALLATION

In September 2019, the Cascade Separator received NJDEP certification qualifying it for online installation for the New Jersey water quality design storm.

5. SUPPORTING DOCUMENTATION

Copies of collected and measured data, spreadsheets containing original data from all performance test runs and particle size analysis, as well as all pertinent calculations have been provided to NJCAT for verification.

5.1. TEST SEDIMENT PSD

The average moisture content of the test sediment was determined to be 0.02%. The average PSD of the test sediment and US Silica standard are presented in **Table 2** and **Figure 9**. For a clear comparison, the percent finer values were interpolated to match the particle diameters listed in the US Silica OK-110 product data sheet (**Figure 8**). The test sediment distribution has a D_{50} particle size of 110 µm.

Table 2: Average Removal Efficiency Test Sediment PSD

Particle Diameter (µm)	Percent Finer by Mass (%)	
	US Silica OK-110 (Typical)	Average Test Sediment
500	-	99.9
212	99.8	99.2
150	98.8	98.2
125	83.8	79.0
106	43.0	41.9
88	18.0	18.6
75	3.0	1.4
53	0.0	0.1
D50	109 µm	110 µm

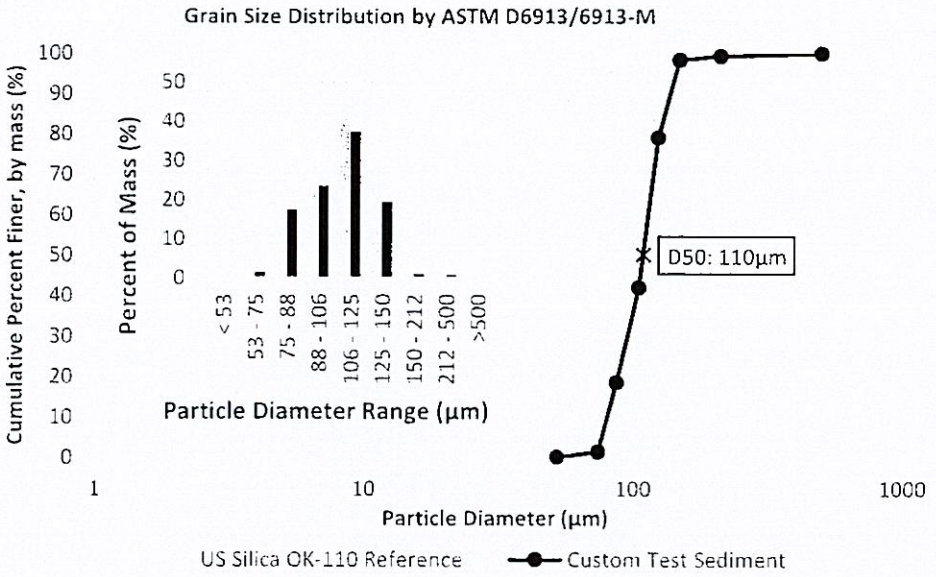


Figure 9: Test Sediment PSD

5.2. Removal Efficiency Test Results

A total of three continuous tests, comprised of five flow rate trials each, were conducted to evaluate TSS removal of a sediment gradation with a D50 of 110 µm. The CS-4 Cascade Separator achieved a TSS removal efficiency of 80% at a flow rate of 0.946 cfs or 424 gpm (33.78 gpm/ft^2) and an annualized weighted removal efficiency of 80% at a flow rate of 1.484 cfs or 666 gpm (52.99 gpm/ft^2). These performance claims were determined from a curve that is based on the verified test data generated in this study. This approach, while not typical of previous NJCAT verifications, is standard engineering practice.

Summary results from all continuous tests are included in **Table 3**, **Table 4** and **Figure 10**. Detailed results including sampling times, sample data and QA/QC results from each test are presented in **Table 5** through **Table 25.**

Table 3: Summary of Removal Efficiency Results

Average Flow Rate (cfs)	Average Hydraulic Loading Rate (gpm/ft²)	Flow Rate (cfs)	Hydraulic Loading Rate (gpm/ft²)	Influent TSS (mg/L)	Adjusted Effluent TSS (mg/L)	Removal Efficiency (%)	Average Removal Efficiency (%)
1.51	54.0	1.51	54.0	279	111	60.3	61.2
		1.51	54.0	275	102	62.8	
		1.51	54.0	277	110	60.4	
1.21	43.2	1.21	43.3	275	80.5	70.7	69.9
		1.21	43.2	274	81.1	70.4	
		1.21	43.3	275	86.3	68.7	
0.91	32.5	0.91	32.5	286	53.8	81.2	81.2
		0.91	32.5	281	53.2	81.1	
		0.91	32.5	277	51.5	81.4	
0.61	21.7	0.61	21.7	274	16.6	94.0	94.0
		0.61	21.7	269	14.2	94.7	
		0.61	21.7	268	18.2	93.2	
0.31	11.0	0.31	11.0	262	0.30	99.9	99.9
		0.31	11.0	272	0.28	99.9	
		0.31	11.0	260	0.13	100	

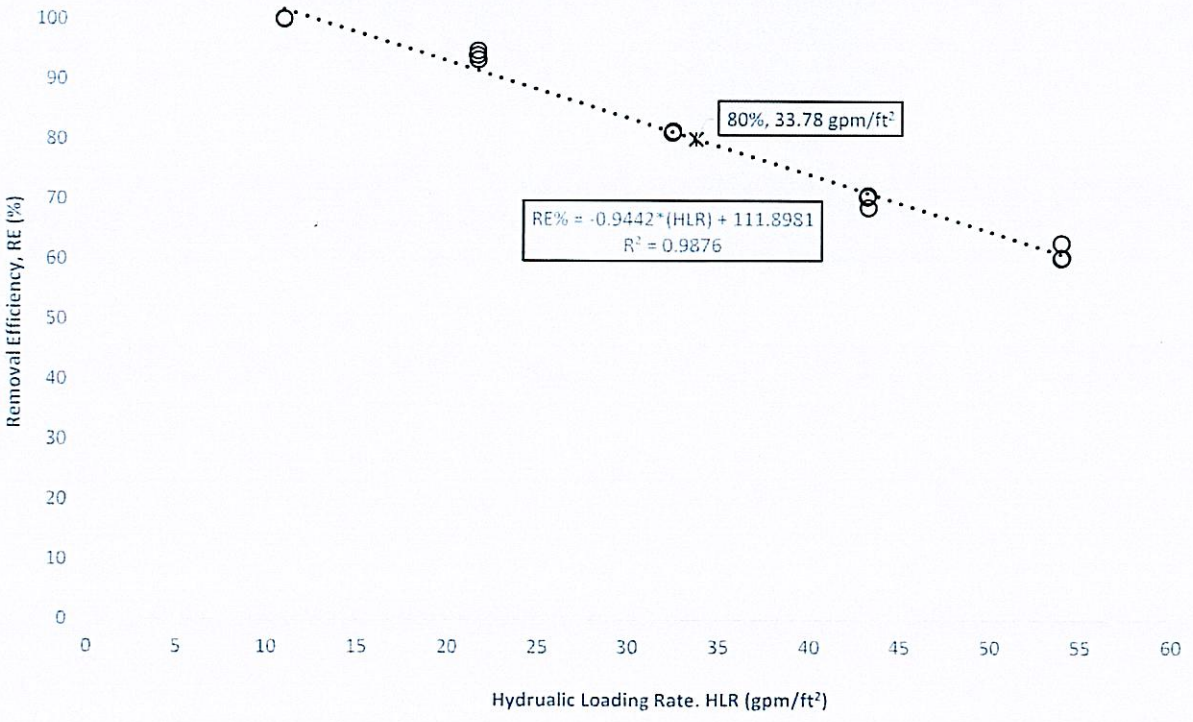


Figure 10: Removal Efficiency Results

Table 4: Annualized Removal Efficiency Results*

Annualized Treatment Hydraulic Loading Rate (gpm/ft²)	Annualized Treatment Flow Rate for CS-4 (cfs)	Percent of Treatment Flow Rate (%)	Flow Rate (cfs)	Removal Efficiency (%)	Weighting Factor	Weighted Removal Efficiency (%)
52.99	1.48	25	0.37	99.4	0.25	24.8
		50	0.74	86.9	0.30	26.1
		75	1.11	74.4	0.20	14.9
		100	1.48	61.9	0.15	9.3
		125	1.85	49.4	0.10	4.9
				Annualized Removal Efficiency at 52.99 gpm/ft² (%):		80.0

*Per NJDEP Protocol methodology

TEST 01 RESULTS

The results from Test 01 (T01) are summarized in **Table 5**. Complete sample data for each flow rate trial can be found in **Table 6** through **Table 10**. QA/QC results can be found in **Table 11**. The flow rate COV for trial T01-0.3 (0.05) exceeded the QA/QC limit of 0.03

The slightly higher flow rate variability (**Table 11**) did not appear to impact the removal efficiency result for this flow trial. The removal for T01-0.3 was 99.9%, which is equivalent to the removal efficiencies in the repeat flow rate trials (T02-0.3 at 99.9% and T03-0.3 at 100%). If the data point for this trial was excluded from the linear fit (**Figure 10**), the Cascade CS-4 would still achieve a removal efficiency of 80% at 0.946 cfs. The data point for trial T01-0.3 is considered representative and is included in the data set used for calculations.

Table 5: Test 01 Summary Results

Flow Trial ID	Average Flow Rate (cfs)	Average Hydraulic Loading Rate (gpm/ft²)	Detention Time (mm:ss)	Sediment Injection Duration (min)	Average Influent TSS (mg/L)	Average Adjusted Effluent TSS Conc. (mg/L)	Removal Efficiency (%)
T01-1.5	1.51	54.0	0:38	4.50	279	111	60.3
T01-1.2	1.21	43.3	0:48	5.00	275	80.5	70.7
T01-0.9	0.91	32.5	1:04	6.00	286	53.8	81.2
T01-0.6	0.61	21.7	1:36	7.50	274	16.6	94.0
T01-0.3	0.31	11.0	3:10	12.50	262	0.30	99.9

APPENDIX H:

SOIL SUITABILITY

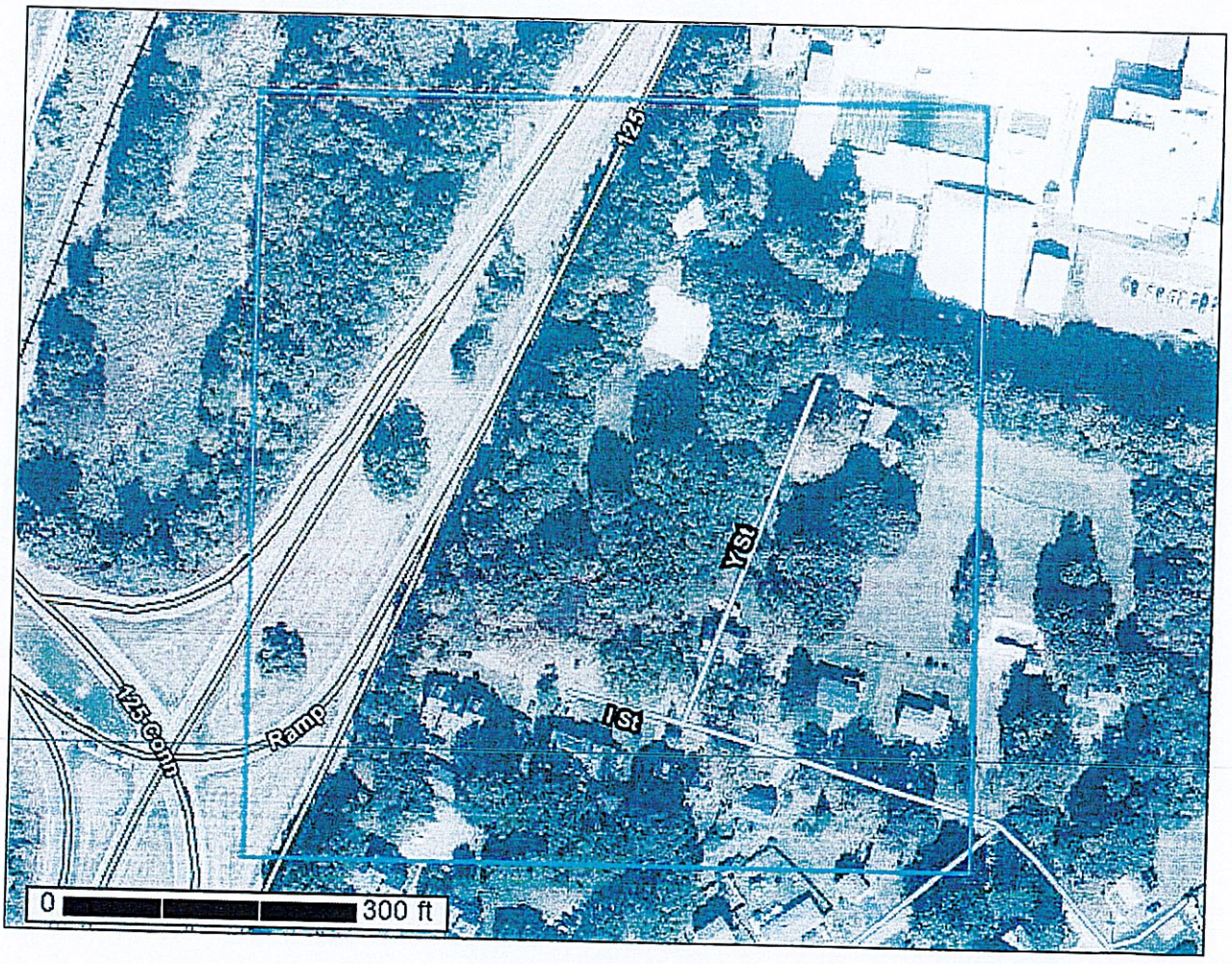
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

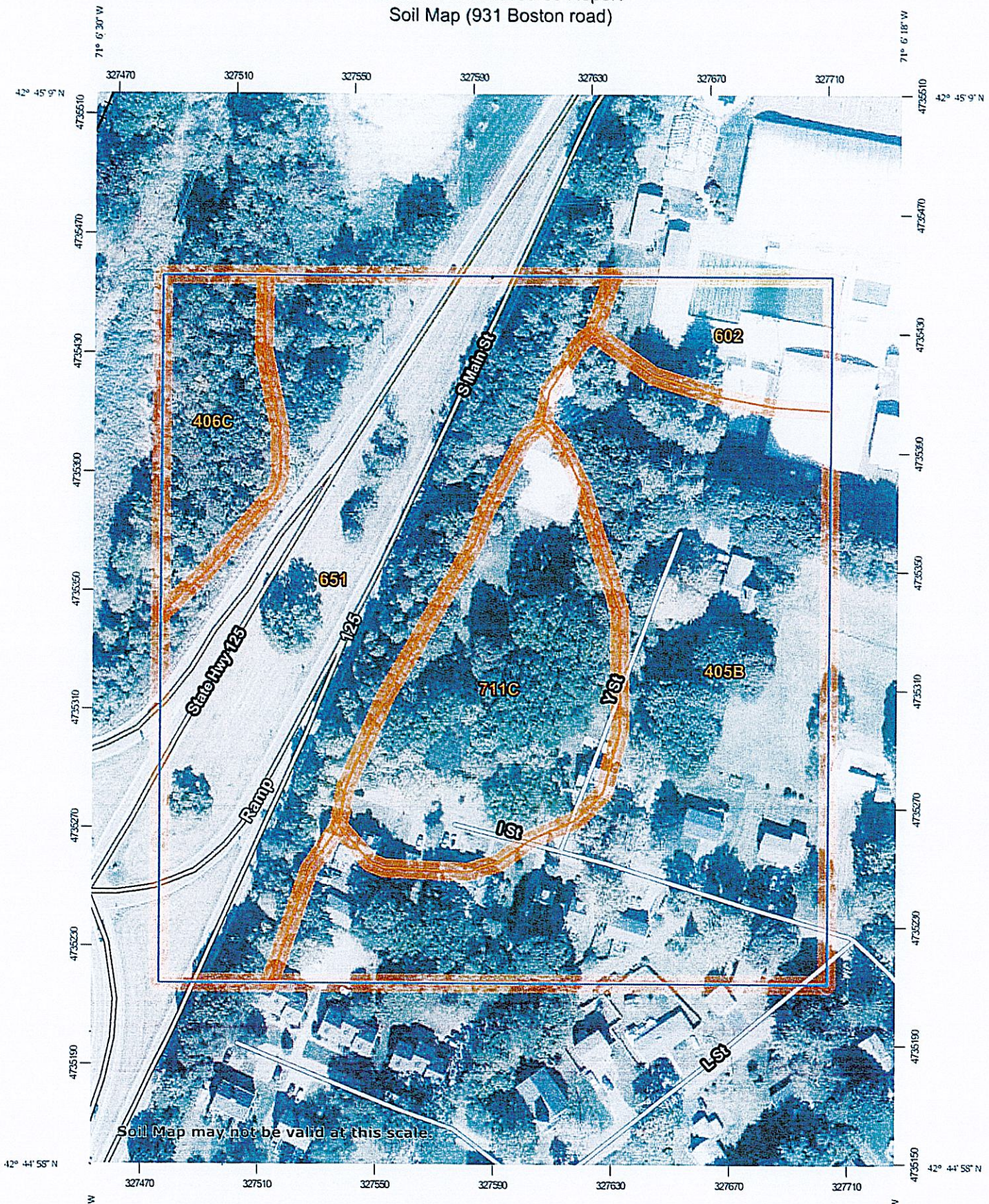
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Essex County, Massachusetts, Northern Part



November 4, 2025

Custom Soil Resource Report
Soil Map (931 Boston road)



Map Scale: 1:1,760 if printed on A portrait (8.5" x 11") sheet.

N

0 25 50 100 150 Meters

0 50 100 200 300 Feet

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 21, Sep 5, 2025

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

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

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

Map Unit Legend (931 Boston road)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
405B	Charlton fine sandy loam, 3 to 8 percent slopes	5.1	37.9%
406C	Charlton fine sandy loam, 8 to 15 percent slopes, very stony	0.9	6.6%
602	Urban land	0.7	5.4%
651	Udorthents, smoothed	4.5	33.8%
711C	Charlton-Rock outcrop-Hollis complex, 8 to 15 percent slopes	2.2	16.2%
Totals for Area of Interest		**13.4**	**100.0%**

Map Unit Descriptions (931 Boston road)

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

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

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

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

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

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

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

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

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

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

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

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

Essex County, Massachusetts, Northern Part

405B—Charlton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2wh0n
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Charlton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

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

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw - 7 to 22 inches: gravelly fine sandy loam
C - 22 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton

Percent of map unit: 8 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Paxton

Percent of map unit: 5 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Leicester

Percent of map unit: 1 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Chatfield

Percent of map unit: 1 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

406C—Charlton fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2wh0p
Elevation: 0 to 1,570 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Charlton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Paxton, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex

Hydric soil rating: No

Chatfield, very stony

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 2 percent
Landform: Drainageways, depressions, ground moraines, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

602—Urban land

Map Unit Setting

National map unit symbol: vjx3
Frost-free period: 125 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Excavated and filled land

Minor Components

Udorthents

Percent of map unit: 10 percent
Hydric soil rating: No

Merrimac

Percent of map unit: 2 percent
Hydric soil rating: No

Windsor

Percent of map unit: 2 percent
Hydric soil rating: No

Charlton

Percent of map unit: 2 percent
Hydric soil rating: No

Paxton

Percent of map unit: 2 percent
Hydric soil rating: No

Hinckley

Percent of map unit: 2 percent
Hydric soil rating: No

651—Udorthents, smoothed

Map Unit Setting

National map unit symbol: vjwk
Elevation: 0 to 3,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Udorthents

Setting

Parent material: Excavated and filled land loamy and/or excavated and filled land sandy and gravelly

Typical profile

H1 - 0 to 6 inches: variable
H2 - 6 to 60 inches: variable

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Hydric soil rating: Unranked

Minor Components

Urban land
Percent of map unit: 10 percent
Hydric soil rating: Unranked

Beaches
Percent of map unit: 8 percent
Hydric soil rating: Unranked

Dumps
Percent of map unit: 2 percent
Hydric soil rating: Unranked

711C—Charlton-Rock outcrop-Hollis complex, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: vj71
Elevation: 0 to 280 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 125 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Charlton and similar soils: 60 percent
Rock outcrop: 16 percent
Hollis and similar soils: 15 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over friable coarse-loamy basal till derived from granite and gneiss

Typical profile
H1 - 0 to 4 inches: fine sandy loam
H2 - 4 to 28 inches: gravelly fine sandy loam
H3 - 28 to 60 inches: gravelly fine sandy loam

Properties and qualities
Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Parent material: Granite and gneiss

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Description of Hollis

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Shallow, friable loamy basal till derived from granite and gneiss over granite and gneiss

Typical profile

O - 0 to 1 inches: muck
H2 - 1 to 6 inches: fine sandy loam
H3 - 6 to 17 inches: gravelly fine sandy loam
H4 - 17 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge

Percent of map unit: 5 percent
Hydric soil rating: No

Ridgebury

Percent of map unit: 4 percent
Landform: Depressions
Hydric soil rating: Yes

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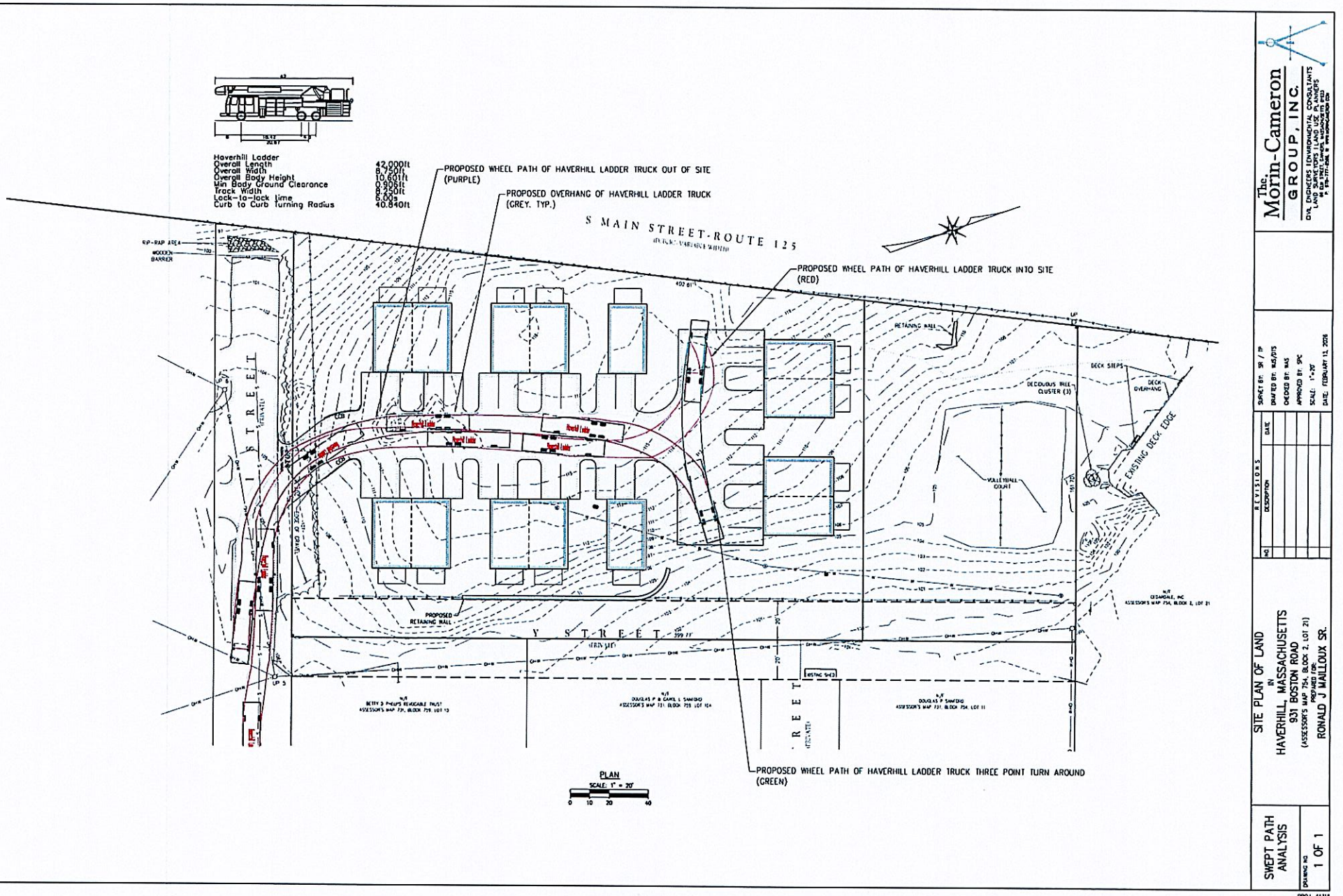
APPENDIX G:
SWEPT PATH ANALYSIS



The Morin-Cameron GROUP, INC.

CIVIL ENGINEERS ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS LAND USE PLANNERS

REVISIONS

NO	DESCRIPTION	DATE

SURVEY BY: SR / IP
DRAFTED BY: MJS/DTS
CHECKED BY: MJS
APPROVED BY: SPC
SCALE: 1"=20'
DATE: FEBRUARY 13, 2026

SITE PLAN OF LAND
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(ASSESSOR'S MAP 734, BLOCK 2, LOT 21)
PREPARED FOR
RONALD J MALLOUX SR.

SWEPT PATH ANALYSIS

DRAWING NO 1 OF 1

PROJ. #4316
DRAWING 4316_MAIN.dwg

	A	B	C	D	E	F	G	H	I	J	K
105	731-767-15			S ST	WARD HILL		CITY OF HAVERHILL	4 SUMMER ST	HAVERHILL	MA	01830
106	731-770-3	83		CROSS RD	HAVERHILL		DENARO ROWLAND W JR ETUX L/E	83 CROSS RD	WARD HILL	MA	01835
107	731-772-187	187		FERRY RD	HAVERHILL		SANGAYA EGBE JULIUS JR TAMBE	187 FERRY RD, Unit 2	HAVERHILL	MA	01835
108	731-772-189	189		FERRY RD	HAVERHILL		BARNES RUSSELL L-ETUX	P O BOX 8542	BRADFORD	MA	01835
109	731-772-19			FERRY RD	HAVERHILL		HARDAL, LLC	136 NECK RD	WARD HILL	MA	01835
110	731-772-20	211	213	FERRY RD	HAVERHILL		DALE F ROGERS, JR REVOCABLE TRUST	211 FERRY RD	HAVERHILL	MA	01835
111	731-772-21-199	199		FERRY RD	HAVERHILL		MACHADO KARINE-ETUX	199 FERRY RD	BRADFORD	MA	01835
112	731-772-21-1A	205		FERRY RD	HAVERHILL		KAIRALLA WAHID	205 FERRY RD, UNIT 1	BRADFORD	MA	01835
113	731-772-21-1B	203		FERRY RD	HAVERHILL		KAIRALLA MINA	2 SUNRISE DR	HAVERHILL	MA	01835
114	731-772-21-201	201		FERRY RD	HAVERHILL		MAINA JOSEPH N	201 FERRY RD	WARD HILL	MA	01835
115	731-772-21A-1	197		FERRY RD	HAVERHILL		CATALDO ROBERT M-ETUX	197 FERRY RD	WARD HILL	MA	01835
116	731-772-21A-2	195		FERRY RD	HAVERHILL		MALDONADO HECTOR M	1851 STRATFORD PARK PL #115	RESTON	VA	20190
117	752-1-217	15		KNIPE RD	WARD HILL		145 OXFORD CROSSING LLC	6 MOULTON WAY	HAVERHILL	MA	01832
118	754-1-101	101		FERRY RD	HAVERHILL		PALACIOS MARTHA E-ETUX	101 FERRY RD, UNIT 101	BRADFORD	MA	01835
119	754-1-103	103		FERRY RD	HAVERHILL		WALSH TIMOTHY S	103 FERRY RD	WARD HILL	MA	01835
120	754-1-105	105		FERRY RD	HAVERHILL		KASIRYE NOAH	105 FERRY	HAVERHILL	MA	01835
121	754-1-107	107		FERRY RD	HAVERHILL		PETROSILLO STEVEN C	35 CHADWICK ST	NORTH ANDOVER	MA	01845
122	754-1-109	109		FERRY RD	HAVERHILL		MESA SEBASTISAN-ETUX	109 FERRY RD	WARD HILL	MA	01835
123	754-1-111	111		FERRY RD	HAVERHILL		BRISSETTE AMANDA	111 FERRY RD	HAVERHILL	MA	01835
124	754-1-14-1	89		FERRY RD	HAVERHILL		MANRIQUE ROGER P	89 FERRY RD	HAVERHILL	MA	01835
125	754-1-14-2	91		FERRY RD	HAVERHILL		PASCUCCI CHRISTOPHER J-ETUX	91 FERRY RD	WARD HILL	MA	01835
126	754-1-14-81	81		FERRY RD	WARD HILL		POORE MATTHEW S-ETAL	81 FERRY RD, UNIT 2	WARD HILL	MA	01835
127	754-1-14-83	83		FERRY RD	WARD HILL		MANRIQUE ROGER P	83 FERRY RD, UNIT 1	HAVERHILL	MA	01835
128	754-1-14A			FERRY RD	HAVERHILL		CITY OF HAVERHILL	4 SUMMER ST	HAVERHILL	MA	01830
129	754-1-14B			FERRY RD	HAVERHILL		FERRY ROAD REALTY TRUST	15 RIVERDALE AVE	BRADFORD	MA	01835
130	754-1-15	125		FERRY RD	HAVERHILL		LOVATO MELISSA P	125 FERRY RD	BRADFORD	MA	01835
131	754-1-16	139		FERRY RD	HAVERHILL		FERRY ROAD REALTY TRUST	P.O. BOX 804478	CHICAGO	IL	60680
132	754-1-26	96		FERRY RD	HAVERHILL		COUSINS JOHN-ETUX	96 FERRY RD	WARD HILL	MA	01835
133	754-1-27	108		FERRY RD	HAVERHILL		DUNHAM DAVID ETUX	108 FERRY ROAD	WARD HILL	MA	01835
134	754-1-97	97		FERRY RD	HAVERHILL		FIGLIOLA LAWRENCE J-ETUX	97 FERRY RD	WARD HILL	MA	01835
135	754-1-99	99		FERRY RD	HAVERHILL		CASSELL PAUL	99 FERRY RD	WARD HILL	MA	01835
136	754-2-19	50		FERRY RD	HAVERHILL		STORAGE PORTFOLIO I LLC	P O BOX# 71870	SALT LAKE CITY	UT	84171
137	754-2-20	887		BOSTON RD	HAVERHILL		HAVERHILL LAND HOLDINGS I LLC	1115 WESTFORD ST	LOWELL	MA	01851
138	754-2-20-2			SOUTH MAIN ST	HAVERHILL		D. BLINN PROPERTIES, LLC	15 MOCCASIN PATH	HAVERHILL	MA	01832
139	754-2-20A	901		SOUTH MAIN ST	HAVERHILL		SOUTH MAIN CAPITAL GROUP, LLC	231 SUTTON ST., STE 1B	NORTH ANDOVER	MA	01845
140	754-2-21	931		BOSTON RD	HAVERHILL		CEDARDALE, INC	931 BOSTON RD	WARD HILL	MA	01835
141	754-2-21B	939		BOSTON RD	HAVERHILL		CEDARDALE INC	931 BOSTON RD	WARD HILL	MA	01835
142	754-2-23	915		SOUTH MAIN ST	HAVERHILL		SOUTH MAIN CORNER LLC	3 PLUFF AVE	NORTH READING	MA	01864
143	754-2-24			SOUTH MAIN ST	HAVERHILL		M BAY TRANS AUTHORITY	45 HIGH ST	BOSTON	MA	02110
144	755-1-1	183		FERRY RD	HAVERHILL		OLD FERRY ROAD, LLC	12 ROGERS RD, STE 1	WARD HILL	MA	01835
145	771-780-32F	3		DORIAN DR	HAVERHILL		PARRISH WILLIAM-ETUX	3 DORIAN DR	BRADFORD	MA	01835
146	771-780-32G	4		DORIAN DR	HAVERHILL		SULLIVAN PAMELA ETUX	4 DORIAN DRIVE	BRADFORD	MA	01835
147	771-780-32H			BOSTON RD	HAVERHILL		CEDARDALE, INC	931 BOSTON RD	WARD HILL	MA	01835

	A	B	C	D	E	F	G	H	I	J	K
1	ParcelID	StreetNum	AltStreetNum	StreetName	LocCity	CondoUnit	Owner1	BillingAddress	City	State	Zip
2	730-780M-2	880	888	BOSTON RD	HAVERHILL		CEDARDALE, INC	931 BOSTON RD	WARD HILL	MA	01835
3	731-754-1	951		BOSTON RD	HAVERHILL		CHAREST BOSTON ROAD REALTY TR	951 BOSTON ROAD	WARD HILL	MA	01835
4	731-754-11	33		E ST	HAVERHILL		SANFORD DOUGLAS P	33 E ST	WARD HILL	MA	01835
5	731-754-4			E ST	HAVERHILL		WILLIAMS ELIZABETH D	37 I ST	WARD HILL	MA	01835
6	731-755-1	965		BOSTON RD	HAVERHILL		ROWELL ANDREW D	965 BOSTON RD	WARD HILL	MA	01835
7	731-755-10-5	5		OXFORD AVE	WARD HILL		SULLIVAN PATRICK E	5 OXFORD AV	BRADFORD	MA	01835
8	731-755-10-7	7		OXFORD AVE	WARD HILL		AUSTIN ANDREW T	7 OXFORD AVE	BRADFORD	MA	01835
9	731-755-1A	1		OXFORD AVE	WARD HILL		BASHER GRACE	1 OXFORD AVE	WARD HILL	MA	01835
10	731-755-4			L ST	WARD HILL		WILLIAMS ELIZABETH D	37 I ST	WARD HILL	MA	01835
11	731-755-7	25		OXFORD AVE	WARD HILL		QUIMBY FAMILY IRREVOCABLE TRUS	25 OXFORD AVE	WARD HILL	MA	01835
12	731-755-7A	33		I ST	HAVERHILL		DAVIS MICHAEL S.A.-ETAL	33 I ST	WARD HILL	MA	01835
13	731-755-7B			L ST	WARD HILL		BETTY D PHELPS REVOCABLE TRUST	37 I ST	WARD HILL	MA	01835
14	731-755-9-11	11		OXFORD AVE	WARD HILL		BOYLE MAUREEN C	11 OXFORD AVENUE	WARD HILL	MA	01835
15	731-755-9-9	9		OXFORD AVE	WARD HILL		FITZGERALD MICHAEL W-ETAL	9 OXFORD AVE	WARD HILL	MA	01835
16	731-756-1	989		BOSTON RD	HAVERHILL		STURGIS JAMES M	989 BOSTON RD	BRADFORD	MA	01835
17	731-756-1A	10		OXFORD AVE	WARD HILL		MOOSEHEAD 2024 IRREVOCABLE TRUST	6 OXFORD AV	WARD HILL	MA	01835
18	731-756-1B	6		OXFORD AVE	WARD HILL		MOOSEHEAD 2024 IRREVOCABLE TRUST	6 OXFORD AVE	WARD HILL	MA	01835
19	731-756-2	20		OXFORD AVE	WARD HILL		J AND J REALTY TRUST	480 BOXFORD RD	BRADFORD	MA	01835
20	731-756-5	1007		BOSTON RD	HAVERHILL		BOURQUE JOHN	26 CROSBY ST	STONEHAM	MA	02180
21	731-756-7-1001	1001		BOSTON RD	HAVERHILL		BOTE NYANI P-ETUX	1001 BOSTON RD	BRADFORD	MA	01835
22	731-756-7-999	999		BOSTON RD	HAVERHILL		MITRANO MARYSA-ETAL	999 BOSTON RD	BRADFORD	MA	01835
23	731-757-1	30		OXFORD AVE	WARD HILL		LOTTI MATTHEW	30 OXFORD AVE	WARD HILL	MA	01835
24	731-757-10	1031		BOSTON RD	HAVERHILL		HATCH CHRISTOPHER ETUX	1031 BOSTON RD	BRADFORD	MA	01835
25	731-757-12	1025		BOSTON RD	HAVERHILL		ROBERTS JR JOSEPH P ETUX	1025 BOSTON RD	BRADFORD	MA	01835
26	731-757-13	1019		BOSTON RD	HAVERHILL		TEN NINETEEN BOSTON RD NOM REALTY TRUST	1019 BOSTON RD	BRADFORD	MA	01835
27	731-757-14-1015	1015		BOSTON RD	HAVERHILL		DENISE L CANALE LIVING TRUST	1015 BOSTON RD	BRADFORD	MA	01835
28	731-757-14-1017	1017		BOSTON RD	HAVERHILL		BONASORO ANTHONY M	1017 BOSTON RD	BRADFORD	MA	01835
29	731-757-2	36		OXFORD AVE	WARD HILL		BETTY D PHELPS REVOCABLE TRUST	37 I ST	WARD HILL	MA	01835
30	731-757-4	40		OXFORD AVE	WARD HILL		KUN LASZIO	40 OXFORD AVE	WARD HILL	MA	01835
31	731-757-5	42		OXFORD AVE	WARD HILL		KIMBALL DONALD S	42 OXFORD AVE	WARD HILL	MA	01835
32	731-757-6A			OXFORD AVE	WARD HILL		CITY OF HAVERHILL	4 SUMMER ST	HAVERHILL	MA	01830
33	731-757-7	52		OXFORD AVE	WARD HILL		ARBOLEDA GIOVANNI A	52 OXFORD AVE	WARD HILL	MA	01835
34	731-757-8	5		M ST	HAVERHILL		HOANG SIDNEY MINH-ETUX	5 M STREET	WARD HILL	MA	01835
35	731-757-9	1		M ST	HAVERHILL		HENDERSON NATHANIAL	1 M ST	HAVERHILL	MA	01835
36	731-758-1	40		L ST	WARD HILL		DAVIS WAYNE R DAVIS II	40 L ST	WARD HILL	MA	01835
37	731-758-10	47		OXFORD AVE	WARD HILL		CANDELARIO AURA-ETAL	47 OXFORD AVE	WARD HILL	MA	01835
38	731-758-11	39		OXFORD AVE	WARD HILL		BOULE CHARLES H ETUX	39 OXFORD AV	WARD HILL	MA	01835
39	731-758-14	29		OXFORD AVE	WARD HILL		L & T LAMBERT 29 OXFORD AVENUE	29 OXFORD AVE	WARD HILL	MA	01835
40	731-758-3	48		L ST	WARD HILL		FLAHERTY LYNN A	48 L STREET	BRADFORD	MA	01835
41	731-758-4	58		L ST	WARD HILL		MOUSTAFA NICHOLAS G-ETAL	66 CRAWFORD ST	HAVERHILL	MA	01832
42	731-758-6			L ST	WARD HILL		WARD HILL CHURCH OF CHRIST	34 M ST	WARD HILL	MA	01835
43	731-758-8			OXFORD AVE	WARD HILL		WARD HILL CHURCH OF CHRIST	34 M ST	WARD HILL	MA	01835
44	731-759-1	37		I ST	HAVERHILL		BETTY D PHELPS REVOCABLE TRUST	37 I ST	WARD HILL	MA	01835
45	731-759-10	59		I ST	HAVERHILL		BETTY D PHELPS REVOCABLE TRUST	37 I ST	WARD HILL	MA	01835
46	731-759-10A			I ST	HAVERHILL		SANFORD DOUGLAS P ETUX	33 E ST	WARD HILL	MA	01835
47	731-759-11	51		I ST	HAVERHILL		JUSKO KEVIN R	P.O. BOX 8058	WARD HILL	MA	01835
48	731-759-13	45		I ST	HAVERHILL		DEROCHE DANIEL A-ETUX	45 I STREET	WARD HILL	MA	01835
49	731-761-29		RR	OXFORD AVE	WARD HILL		CITY OF HAVERHILL	4 SUMMER ST	HAVERHILL	MA	01830
50	731-762-1	49		L ST	WARD HILL		BUCKLEY FAMILY TRUST	49 L ST	WARD HILL	MA	01835
51	731-762-12			L ST	WARD HILL		WARD HILL CHURCH OF CHRIST	34 M ST	WARD HILL	MA	01835
52	731-762-12A			L ST	WARD HILL		WARD HILL CHURCH OF CHRIST	34 M ST	WARD HILL	MA	01835

730-780M-2
CEDARDALE, INC
931 BOSTON RD
WARD HILL, MA 01835

731-754-1
CHAREST BOSTON ROAD REALTY TR
951 BOSTON ROAD
WARD HILL, MA 01835

731-754-11
SANFORD DOUGLAS P
33 E ST
WARD HILL, MA 01835

731-754-4
WILLIAMS ELIZABETH D
37 I ST
WARD HILL, MA 01835

731-755-1
ROWELL ANDREW D
965 BOSTON RD
WARD HILL, MA 01835

731-755-10-5
SULLIVAN PATRICK E
5 OXFORD AV
BRADFORD, MA 01835

731-755-10-7
AUSTIN ANDREW T
7 OXFORD AVE
BRADFORD, MA 01835

731-755-1A
BASHER GRACE
1 OXFORD AVE
WARD HILL, MA 01835

731-755-4
WILLIAMS ELIZABETH D
37 I ST
WARD HILL, MA 01835

731-755-7
QUIMBY FAMILY IRREVOCABLE TRUS
25 OXFORD AVE
WARD HILL, MA 01835

731-755-7A
DAVIS MICHAEL S.A.-ETAL
33 I ST
WARD HILL, MA 01835

731-755-7B
BETTY D PHELPS REVOCABLE TRUST
37 I ST
WARD HILL, MA 01835

731-755-9-11
BOYLE MAUREEN C
11 OXFORD AVENUE
WARD HILL, MA 01835

731-755-9-9
FITZGERALD MICHAEL W-ETAL
9 OXFORD AVE
WARD HILL, MA 01835

731-756-1
STURGIS JAMES M
989 BOSTON RD
BRADFORD, MA 01835

731-756-1A
MOOSEHEAD 2024 IRREVOCABLE TRUST
6 OXFORD AV
WARD HILL, MA 01835

731-756-1B
MOOSEHEAD 2024 IRREVOCABLE TRUST
6 OXFORD AVE
WARD HILL, MA 01835

731-756-2
J AND J REALTY TRUST
480 BOXFORD RD
BRADFORD, MA 01835

731-756-5
BOURQUE JOHN
26 CROSBY ST
STONEHAM, MA 02180

731-756-7-1001
BOTE NYANI P-ETUX
1001 BOSTON RD
BRADFORD, MA 01835

731-756-7-999
MITRANO MARYSA-ETAL
999 BOSTON RD
BRADFORD, MA 01835

731-757-1
LOTTI MATTHEW
30 OXFORD AVE
WARD HILL, MA 01835

731-757-10
HATCH CHRISTOPHER ETUX
1031 BOSTON RD
BRADFORD, MA 01835

731-757-12
ROBERTS JR JOSEPH P ETUX
1025 BOSTON RD
BRADFORD, MA 01835

731-757-13
TEN NINETEEN BOSTON RD NOM REALTY TRUST
1019 BOSTON RD
BRADFORD, MA 01835

731-757-14-1015
DENISE L CANALE LIVING TRUST
1015 BOSTON RD
BRADFORD, MA 01835

731-757-14-1017
BONASORO ANTHONY M
1017 BOSTON RD
BRADFORD, MA 01835

731-757-2
BETTY D PHELPS REVOCABLE TRUST
37 I ST
WARD HILL, MA 01835

731-757-4
KUN LASZIO
40 OXFORD AVE
WARD HILL, MA 01835

731-757-5
KIMBALL DONALD S
42 OXFORD AVE
WARD HILL, MA 01835

731-757-6A
CITY OF HAVERHILL
4 SUMMER ST
HAVERHILL, MA 01830

731-757-7
ARBOLEDA GIOVANNI A
52 OXFORD AVE
WARD HILL, MA 01835

731-757-8
HOANG SIDNEY MINH-ETUX
5 M STREET
WARD HILL, MA 01835

731-757-9
HENDERSON NATHANIAL
1 M ST
HAVERHILL, MA 01835

731-758-1
DAVIS WAYNE R DAVIS II
40 L ST
WARD HILL, MA 01835

731-758-10
CANDELARIO AURA-ETAL
47 OXFORD AVE
WARD HILL, MA 01835

731-758-11
BOULE CHARLES H ETUX
39 OXFORD AV
WARD HILL, MA 01835

731-758-14
L & T LAMBERT 29 OXFORD AVENUE
29 OXFORD AVE
WARD HILL, MA 01835

731-758-3
FLAHERTY LYNN A
48 L STREET
BRADFORD, MA 01835

731-758-4
MOUSTAFA NICHOLAS G-ETAL
66 CRAWFORD ST
HAVERHILL, MA 01832

731-758-6
WARD HILL CHURCH OF CHRIST
34 M ST
WARD HILL, MA 01835

731-758-8
WARD HILL CHURCH OF CHRIST
34 M ST
WARD HILL, MA 01835

731-759-1
BETTY D PHELPS REVOCABLE TRUST
37 I ST
WARD HILL, MA 01835

731-759-10
BETTY D PHELPS REVOCABLE TRUST
37 I ST
WARD HILL, MA 01835

731-759-10A
SANFORD DOUGLAS P ETUX
33 E ST
WARD HILL, MA 01835

731-759-11
JUSKO KEVIN R
P.O. BOX 8058
WARD HILL, MA 01835

731-759-13
DEROCHE DANIEL A-ETUX
45 I STREET
WARD HILL, MA 01835

731-761-29
CITY OF HAVERHILL
4 SUMMER ST
HAVERHILL, MA 01830

731-762-1
BUCKLEY FAMILY TRUST
49 L ST
WARD HILL, MA 01835

731-762-12
WARD HILL CHURCH OF CHRIST
34 M ST
WARD HILL, MA 01835

731-762-12A
WARD HILL CHURCH OF CHRIST
34 M ST
WARD HILL, MA 01835

731-762-13
RIVERA ANGEL L ETUX
59 L ST
BRADFORD, MA 01835

731-762-13A
DIBURRO JOSHUA
61 L STREET
WARD HILL, MA 01835

731-762-14
WILKINS EDWIN A ETUX
30 I STREET
WARD HILL, MA 01835

731-762-14A-1
TARANTI GERALDINE S
53 M ST
WARD HILL, MA 01835

731-762-14A-2
TIMOTHEE JEAN PIERRE-ETAL
51 M ST
WARD HILL, MA 01835

731-762-14A-3
KELLEY PAULA D
49 M ST
WARD HILL, MA 01835

731-762-14B-1
FUGERE COREY N ETAL
61 M ST
WARD HILL, MA 01835

731-762-14B-2
BOUCHARD DONALD P
59 M ST
WARD HILL, MA 01835

731-762-14B-3
FREITAS MANUEL-ETUX
57 M STREET
WARD HILL, MA 01835

731-762-14C-1
NUNEZ JOSE M
67 M STREET
WARD HILL, MA 01835

731-762-14C-2
FLORES-REYES JOSE MAURICIO
65 M ST, UNIT 2
WARD HILL, MA 01835

731-762-14C-3
DURE JOEL
63 M STREET
WARD HILL, MA 01835

731-762-2
CMA FAMILY REALTY TRUST OF 2014
58 LINCOLNSHIRE DR
BRADFORD, MA 01835

731-762-2A-1
GIOVANNI CARLENE MARIE-ETUX
66 I STREET
WARD HILL, MA 01835

731-762-2A-2
MARTIN KELSEY-ETAL
68 I STREET
BRADFORD, MA 01835

731-762-2A-3
SMITH MELISSA M
70 I STREET
HAVERHILL, MA 01835

731-762-2B-80
PAD REALTY TRUST
P O BOX 2032
METHUEN, MA 01844

731-762-2B-82
CAROLPAD, LLC
36 HAMPSTEAD ST
METHUEN, MA 01844

731-762-2B-84
PADVAISKAS ANTHONY JR
36 HAMPSTEAD ST
METHUEN, MA 01844

731-763-1
NGUYEN CESYLEE
48 M ST
HAVERHILL, MA 01835

731-763-2
DIAMANTOPOULOS STEPHEN W-ETAL
75 L STREET
BRADFORD, MA 01835

731-763-3
RODRIGUEZ CECILIA Y-ETUX
81 L ST
WARD HILL, MA 01835

731-763-4
DAVIDSON MICHAEL G-ETUX
91 L STREET
WARD HILL, MA 01835

731-763-5-1
RICH ANDREW PATRICK
60 M ST
WARD HILL, MA 01835

731-763-5-2
THE VAM REALTY TRUST
62 M STREET
HAVERHILL, MA 01835

731-763-5A
LANCEY AMBER M
95 L ST
WARD HILL, MA 01835

731-763-9-1
GARY RYAN-ETUX
64 M ST
WARD HILL, MA 01835

731-763-9-2
ACKERMAN DONALD
66 M ST
WARD HILL, MA 01835

731-764-1
WARD HILL CHURCH OF CHRIST
34 M ST
WARD HILL, MA 01835

731-764-10
MALYNN CHRISTOPHER ETUX
75 OXFORD AVE
BRADFORD, MA 01835

731-764-11-69
YORK ARIEL LEA
69 OXFORD AVE
WARD HILL, MA 01835

731-764-11-71
O`CONNOR DANIEL J
71 OXFORD AV
WARD HILL, MA 01835

731-764-13
AYER MERCEDES I
65 OXFORD AV
WARD HILL, MA 01835

731-764-3
THE TERROUX IRREVOCABLE TRUST
P.O. BOX 8095
WARD HILL, MA 01835

731-764-4
KOKARAS BILL A
P.O. BOX 8072
WARD HILL, MA 01835

731-764-5
GHAFARI SYLVIA L
84 L ST
WARD HILL, MA 01835

731-764-6
GENDRON FAMILY REALTY TRUST
94 L ST
WARD HILL, MA 01835

731-764-7
STAPEL EDWARD E JR ETUX
27 S STREET
WARD HILL, MA 01835

731-764-9
PENA ADOLFO SANDOVAL
81 OXFORD AVE
WARD HILL, MA 01835

731-765-1-58
GONZALEZ PRISCILLA M
58 OXFORD AVE
WARD HILL, MA 01835

731-765-1-60
GEOGHEGAN KAREN A
60 OXFORD AVE
HAVERHILL, MA 01835

731-765-11
FADEL HANY
1057 BOSTON RD
WARD HILL, MA 01835

731-765-13-1049
PEREZ MAX WILLY ADAM FERNANDEZ
1049 BOSTON RD
HAVERHILL, MA 01835

731-765-13-1051
TEMPLE ROYDON
1051 BOSTON RD
HAVERHILL, MA 01835

731-765-14
GINA B PEARSON LIVING TRUST
64 OXFORD AV
BRADFORD, MA 01835

731-765-3-64
GINA B PEARSON LIVING TRUST
64 OXFORD AVE
WARD HILL, MA 01835

731-765-3-66
GUERRA FAMILY LIVING REVOCABLE TRUST
66 OXFORD AVE
WARD HILL, MA 01835

731-765-5
78 OXFORD AVENUE REALTY TRUST
78 OXFORD AV
WARD HILL, MA 01835

731-765-5A
THE ARMAND G REDDEN LIVING TRUST
1061 BOSTON RD
HAVERHILL, MA 01830

731-765-7A
MERCADO RICARDO
86 OXFORD AV
WARD HILL, MA 01835

731-767-1
CITY OF HAVERHILL
4 SUMMER ST
HAVERHILL, MA 01830

731-767-11
BRADFORD CHRISTIAN ACADEMY,INC
97 OXFORD AVE
WARD HILL, MA 01835

731-767-15
CITY OF HAVERHILL
4 SUMMER ST
HAVERHILL, MA 01830

731-770-3
DENARO ROWLAND W JR ETUX L/E
83 CROSS RD
WARD HILL, MA 01835

731-772-187
SANGAYA EGBE JULIUS JR TAMBE
187 FERRY RD, Unit 2
HAVERHILL, MA 01835

731-772-189
BARNES RUSSELL L-ETUX
P O BOX 8542
BRADFORD, MA 01835

731-772-19
HARDAL, LLC
136 NECK RD
WARD HILL, MA 01835

731-772-20
DALE F ROGERS, JR REVOCABLE TRUST
211 FERRY RD
HAVERHILL, MA 01835

731-772-21-199
MACHADO KARINE-ETUX
199 FERRY RD
BRADFORD, MA 01835

731-772-21-1A
KAIRALLA WAHID
205 FERRY RD, UNIT 1
BRADFORD, MA 01835

731-772-21-1B
KAIRALLA MINA
2 SUNRISE DR
HAVERHILL, MA 01835

731-772-21-201
MAINA JOSEPH N
201 FERRY RD
WARD HILL, MA 01835

731-772-21A-1
CATALDO ROBERT M-ETUX
197 FERRY RD
WARD HILL, MA 01835

731-772-21A-2
MALDONADO HECTOR M
1851 STRATFORD PARK PL #115
RESTON, VA 20190

752-1-217
145 OXFORD CROSSING LLC
6 MOULTON WAY
HAVERHILL, MA 01832

754-1-101
PALACIOS MARTHA E-ETUX
101 FERRY RD, UNIT 101
BRADFORD, MA 01835

754-1-103
WALSH TIMOTHY S
103 FERRY RD
WARD HILL, MA 01835

754-1-105
KASIRYE NOAH
105 FERRY
HAVERHILL, MA 01835

754-1-107
PETROSILLO STEVEN C
35 CHADWICK ST
NORTH ANDOVER, MA 01845

754-1-109
MESA SEBASTISAN-ETUX
109 FERRY RD
WARD HILL, MA 01835

754-1-111
BRISSETTE AMANDA
111 FERRY RD
HAVERHILL, MA 01835

754-1-14-1
MANRIQUE ROGER P
89 FERRY RD
HAVERHILL, MA 01835

754-1-14-2
PASCUCCI CHRISTOPHER J-ETUX
91 FERRY RD
WARD HILL, MA 01835

754-1-14-81
POORE MATTHEW S-ETAL
81 FERRY RD, UNIT 2
WARD HILL, MA 01835

754-1-14-83
MANRIQUE ROGER P
83 FERRY RD, UNIT 1
HAVERHILL, MA 01835

754-1-14A
CITY OF HAVERHILL
4 SUMMER ST
HAVERHILL, MA 01830

754-1-14B
FERRY ROAD REALTY TRUST
15 RIVERDALE AVE
BRADFORD, MA 01835

754-1-15
LOVATO MELISSA P
125 FERRY RD
BRADFORD, MA 01835

754-1-16
FERRY ROAD REALTY TRUST
P.O. BOX 804478
CHICAGO, IL 60680

754-1-26
COUSINS JOHN-ETUX
96 FERRY RD
WARD HILL, MA 01835

754-1-27
DUNHAM DAVID ETUX
108 FERRY ROAD
WARD HILL, MA 01835

754-1-97
FIGLIOLA LAWRENCE J-ETUX
97 FERRY RD
WARD HILL, MA 01835

754-1-99
CASSELL PAUL
99 FERRY RD
WARD HILL, MA 01835

754-2-19
STORAGE PORTFOLIO I LLC
P O BOX# 71870
SALT LAKE CITY, UT 84171

754-2-20
HAVERHILL LAND HOLDINGS I LLC
1115 WESTFORD ST
LOWELL, MA 01851

754-2-20-2
D. BLINN PROPERTIES, LLC
15 MOCCASIN PATH
HAVERHILL, MA 01832

754-2-20A
SOUTH MAIN CAPITAL GROUP, LLC
231 SUTTON ST., STE 1B
NORTH ANDOVER, MA 01845

754-2-21
CEDARDALE, INC
931 BOSTON RD
WARD HILL, MA 01835

754-2-21B
CEDARDALE INC
931 BOSTON RD
WARD HILL, MA 01835

754-2-23
SOUTH MAIN CORNER LLC
3 PLUFF AVE
NORTH READING, MA 01864

754-2-24
M BAY TRANS AUTHORITY
45 HIGH ST
BOSTON, MA 02110

755-1-1
OLD FERRY ROAD, LLC
12 ROGERS RD, STE 1
WARD HILL, MA 01835

771-780-32F
PARRISH WILLIAM-ETUX
3 DORIAN DR
BRADFORD, MA 01835

771-780-32G
SULLIVAN PAMELA ETUX
4 DORIAN DRIVE
BRADFORD, MA 01835

771-780-32H
CEDARDALE, INC
931 BOSTON RD
WARD HILL, MA 01835

LAW OFFICES OF
Phillips, Gerstein & Channen, LLP
25 Kenoza Avenue ■ Haverhill, MA 01830
Tel: (978) 374-1131 ■ Fax: (978) 372-3086
www.pgclawoffice.com

Herbert P. Phillips (1933 - 2017)
Michael A. Gerstein
Russell S. Channen

Of Counsel:
Jane M. Owens Triano

June 30, 2026

Timothy J. Jordan, President
Haverhill City Council
City Hall
4 Summer Street
Haverhill, MA 01830

Special Residential Regulations – 931 Boston Road, Haverhill, Massachusetts
City Council Rules and Regulations for Special Residential Regulations Required

General Criteria: General Special Permit Criteria

1. As required by the Special Permit criteria section of the Zoning Ordinance (Section 10.4.2) in order to grant a Special Permit, a Special Permit Granting Authority must make a written determination "that the proposed use or structure(s) shall not cause substantial determine to the neighborhood or the City, taking into account the characteristics of the site and of the proposal in relation to that site." Under Section 10.4.2, "[i]n addition to any specific factors that may be set forth in th[e] [zoning] chapter, such determination shall include consideration of each of the following:

2. Community needs served by the proposal:

3. Traffic and pedestrian flow and safety, including parking and loading;

4. Adequacy of utilities and other public services;

5. Neighborhood character and social structures;

6. Impacts on the natural environment:

7. Potential fiscal impact, including impact on City services, tax base, and employment.

Specific Findings Under Zoning Ordinance Section 10.4.2

8. **Community needs served by the proposal.**

The City of Haverhill is in desperate need for additional housing. The proposal contemplates 14 units with 6 duplexes and 2 single family structures. Each unit will have two parking spaces. This will create home ownership for 14 new families who can call Haverhill their home.

9. **Traffic and pedestrian flow and Safety, including parking and loading.**

The site is located behind Boston Road off of I street in a remote area of Bradford. Each unit will have two parking spaces so there will be no need for on street parking. A traffic study is being performed, but the Applicant believes that fourteen new units located in this section of Bradford will not create a traffic problem for Route 125 or the residents of Boston Road and I street. Upon completion, the traffic study will be uploaded for the Board's review.

10. **Adequacy of utilities and other public services.**

The project contemplates connection to public water and sewer. Engineering studies have been performed for storm water and drainage and the proposed development would not create an undue strain on any City services. Utility lines are already in the area and can easily be accessed for the development.

11. **Neighborhood character and social structures.**

The neighborhood consists of single-family homes and duplexes. The proposed project is consonant with neighborhood character and social structure as it will match the existing homes in the neighborhood. The Applicant has taken such factors into consideration in the architectural design for the project. The duplex and single-family units would fit in seamlessly and the area's social structure would not be changed by these additional homes.

12. **Impacts on the natural environment**

As evidenced by the plans and the development, there would be no adverse impact to the natural environment.

13. Potential fiscal impact, including impact on City services, tax base and employment.

With the addition of 14 new homes (and not rental units) the City will receive a boost to its tax base. With new families living in the area, it would be expected that these individuals will utilize local shops and help to revitalize the growing business community. Since trash and plowing will be private, the Applicant believes that such benefits far outweigh any minimal impact to City Services.

General Criteria: Special Residential Regulations Criteria for Approval and Findings under Zoning Ordinance Section 8.0 (SPECIAL RESIDENTIAL REGULATIONS)

1. As required by the Criteria Approval Section of the Zoning Ordinance (Chapter 255 Section 8.5.7) in order to approve the PDD Zoning Ordinance, the Special Permit granting authority must make a written determine that all of the following conditions are met:

(a) The site development and use plan is substantially in conformance with the PDD rezoning ordinance approved by the Council. The SPGA may permit insubstantial changes in view of the more detailed survey and engineering design provided that they do not conflict with the intent of the PDD rezoning ordinance.

(b) The PDD rezoning ordinance approved by City Council and the site development and use plan are incorporated into the PDD zoning ordinance by reference.

(c) Methods satisfactory to the SPGA of ensuring the performance of any special conditions included in the PDD rezoning ordinance have been submitted by the developer.

(d) Any land designated as common open space on the PDD rezoning ordinance shall, at the SPGA's discretion, be either conveyed to the City or protected by an easement granted to the City.

(e) The SPGA reserves the right to require that up to 20% of all new housing units be made affordable to persons of low and moderate income, according to the standards of the state and/or City, as determined by the SPG.

(f) The project meets the evaluation criteria specified in this section and the SPGA's rules and regulations.

(g) The SPGA in granting a PDD zoning ordinance may impose such additional conditions as the SPGA finds will serve the public interest and are consistent with the intent of the PDD rezoning ordinance.

(h) The SPGA may deny an application for PDD zoning ordinance and base its denial on the finding that the development proposed in the site development and use plan did not meet one or more of these criteria for approval.

(i) In the event the SPGA determines that the site development and use plan is not in substantial conformance with the PDD rezoning ordinance, the application for a PDD zoning ordinance shall be denied. The applicant shall be required to submit a new PDD rezoning ordinance and zoning amendment to the City Council in order to proceed.

Specific Findings under Sections 8.5.7 and 8.5.5

To begin, it is important to outline the intent of the Planned Development District (PDD) The PDD was designed to:

A. Permit some flexibility in the development of individual tracts of land by required and predetermined standards. For a Planned Residential Development District the PDD does not have any minimum lot size and there is no minimum lot areas required to seek a rezoning to the PDD.

B. Permit the use of development standards tailored to a specific site and more detailed than those for the standard zoning districts.

The Applicant believes the project meets the evaluation criteria specified in Section 8.5.7 as follows:

(a) The proposed project would create fourteen additional and desperately needed units for home ownership within the City of Haverhill.

(b) Each unit would have its own two designated parking spots and there is a specific area designated for trash pick-up.

(c) A traffic study is being performed and the Applicant believes that the additional units located off of I street would not create an unreasonable burden upon either Boston Road or I street.

(d) The plans provide for adequate utilities including water and sewer to the project and there are already established electrical lines that would provide the necessary heating and entertainment services for the project.

(e) The property does not abut any wetlands and any work to develop the project would not have a negative impact on the surrounding natural environment.

(f) Any impact on the City would be a positive one including increasing the tax base for the City and providing additional employment opportunities for individuals within the City. The applicant sees no negative impact. Since these units will be owner occupied, the individuals will become good stewards of the City of Haverhill.

(g) The site development plan has been prepared to minimize any disturbance within the area. The design of the buildings and units are compatible and with the surrounding neighborhood and the homes located therein.

(h) The site development plan complies with all site development standards outlined in Sectoin 8.5.5 2 (subsection a - h). The traffic study plan will be submitted and will amend this report upon completion.

Based on all of the above as well as the plans and documents filed with this application, the applicant believes that this Petition meets all of following requirements under Chapter 255 Section 8.0 et seq for a Special Permit:

(a) The proposed development will not cause substantial detriment to the neighborhood or the City taking into account the characteristics of the project (its size and location).

(b) No objections to this project were received during predevelopment and review.

(c) The community needs additional housing and is served by this proposal.

(d) The traffic and pedestrian flow and safety reports will be addressed to the Board's satisfaction and required parking for the units is provided. See Site Plan filed with this application.

(e) Adequate utilities and other public services are all supplied for this project. The property will be on City water and sewer.

(f) The current neighborhood character and structures were specifically looked at and taken into the consideration in the architectural designs for this project. The applicant believes that this project fits not only the lot that will fit in with the neighborhood.

(g) There will be no impact to natural environment.

(h) The project will increase the City's tax base, provide such necessary additional housing and have no adverse impact on City services and minimal impact on City schools.

Wherefore, the Applicant would request that the Council approve the Special Permit.

Respectfully submitted,
Pentucket North Development, LLC
By its Attorney,

Russell S. Channen, Esquire

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Haverhill

City Clerk's Office, Room 118
Phone: 978-374-2312 Fax: 978-373-8490
cityclerk@haverhillma.gov

August 3, 2026

PUBLIC HEARING
City Council Chambers, City Hall, Room 202, 4 Summer st

Notice is hereby given that a hearing will be held for all parties interested, in a hybrid meeting (in person/virtual), on Tuesday August 25, 2026 at 7:00 PM on a request from Attorney Russell Channen on behalf of client, Ronald Mailloux of Pentucket North Development, LLC requests to amend Chapter 255 Zoning Ordinance and Zoning Map by creating a Special Permit Planned Development District in accordance with Section 8.5 of the Zoning Ordinance. Applicant, Pentucket North Development, LLC is requesting a special permit of a planned residential development on a portion of land owned by Cedardale, Inc, located off of Boston Road known as 931 Boston Road (Map 754 Block 2 Lot 21) to construct six duplex units and two single family units. The property is currently zoned Commercial Highway (CH.

(Residents who are interested in commenting on this item can either (1) Attend in person (Council Chambers, Room 202) or (2) Attend remotely using the link provided on the public meeting calendar on the City's website.)

Description of area, maps and plans are on file in the City Clerk's Office.

Advertise: August 6 and August 13, 2026
Haverhill Gazette

Kaitlin M. Wright Esposito, CMC
City Clerk

REF: 2026006580.00

DATE: September 9, 2026

TO: Jacki Byerley, AICP
Planning Director
City of Haverhill
Economic Development & Planning, Room 201
4 Summer Street
Haverhill, MA 01830
JByerley@HaverhillMa.gov

FROM: Joseph P. Johnson, PE, PTOE – Transportation Market Leader

RE: Proposed Residential Development – I Street
Traffic Peer Review

Dear Ms. Byewrley,

On behalf of the City of Haverhill, McClure Engineering Co. (McClure) completed a peer review of the Traffic Impact Assessment (TIA) prepared in support of the proposed residential development to be located off I Street. The TIA was dated July 14, 2026 and was prepared by Vanesse & Associates, Inc. (VAI) on behalf of Cedardale, Inc. (Owner) and Pentucket North Development, LLC (Applicant). The proposed project includes the construction of 2 single-family houses and 6 duplex houses with primary access via a new full-access driveway on the north side of I Street.

Traffic Impact Evaluation

1. Study Area

The TIA defines a study area that includes the intersections of Oxford Avenue at I Street and Oxford Avenue at Boston Road. We'd agree that these two intersections would be most impacted by the project. However, we feel the TIA should provide more information about I Street regarding width, emergency access, and pavement conditions. There is also some concern about the sight distance at the existing intersection of I Street at L Street. We acknowledge that the existing volumes along I Street are low, but as such, the limited site generated traffic results in a significant percent increase in peak hour traffic. The AM peak hour volumes on I Street are expected to increase by 200% and the PM peak hour volume are expected to increase by 144% for the projected 2033 condition. Given the percent increase in trips for a relatively low volume road, the totality of I Street should be included in the study area to ensure its adequacy.

Operationally, the intersections evaluated as part of the TIA provided a reasonable extent for analyzing project-related traffic conditions. McClure concurs that the scope of the study is consistent with MassDOT guidelines.

2. Traffic Counts

The traffic counts used within the TIA were collected on June 23, 2026. The traffic counts collected during the weekday morning and weekday afternoon were reviewed for seasonal adjustment in accordance with MassDOT guidelines. It was found that June counts represent above average-month conditions for Urban Group 7 (local road or street) and were therefore not adjusted. McClure agrees that the methodology and final values are reasonable and in accordance with MassDOT guidelines. Additionally, McClure concurs that studying the weekday morning and weekday evening peak periods are appropriate for this residential development.

3. Background Growth

The TIA utilized an annual traffic growth factor of 1.0 percent per year. McClure concurs that this is reasonable and in accordance with MassDOT guidelines, as this a conservative percentage compared to the surrounding permanent count stations that yielded a growth rate of approximately 0.60 percent per year on average.

Three (3) projects were identified in the TIA that could add more traffic to the study area. These include 1) 3,908 square foot automatic car wash to be located at 28 Ferry Road, 2) a six story building with 230 residential units, 3,000 sf of retail space, a 1,200 sf bakery, and a 200-seat restaurant to be located at 145 Oxford Avenue, and 3) 153-unit multifamily residential community that includes 2,400 sf of retail space and a 2,700 sf bank to be located at 877 Boston Road.

Each of these projects' estimated site volumes from their respective TIAs (or ITE if a TIA was not available) were included in the future year No-build traffic volumes for this TIA. McClure concurs that these assumptions are reasonable and appropriate.

4. Crash Data

The TIA included crash data that was provided by the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period available (2019-2023). That data indicated that there were no reported crashes at the intersection of Oxford Avenue at I Street, and one (1) reported crash at the intersection of Oxford Avenue at Boston Road that resulted in property damage only. Based on the limited crash history, and the associated average crash rates below the MassDOT District 4 average rate for unsignalized intersections, McClure concurs that there are no evident safety concerns at these locations that could be further exasperated by the development and the associated site trips.

5. Parking Needs

The project includes 2 parking stalls per unit. McClure concurs with the parking provided for the development is appropriate.

6. Site Access

The proposed site plan was reviewed for access and circulation. The plan indicates that the driveway intersects I Street at a skew. It is most desirable that intersections are situated at 90-degree angles. It is suggested that the Applicant consider a more desirable driveway alignment that is perpendicular.

A plan was not provided showing fire truck turning movements. It is recommended that such a plan be provided by the Applicant for review.

The TIA included a discussion of the anticipated sight distances at the proposed site driveway along I Street.

American Association of State Highway and Transportation Officials (AASHTO) requirements were discussed relative to both Intersection Sight Distance (ISD) and Stopping Sight Distance (SSD). The field measurements indicated that the minimum recommended value for SSD was satisfied for vehicles approaching from the south. The minimum and desirable value for ISD was satisfied looking to the south from the driveway. For both the ISD and SSD, values to the north of the driveway were not satisfied since I Street terminates approximately 110' north of the proposed driveway. McClure concurs that the measured sight distances are sufficient to ensure safe operation at the driveway.

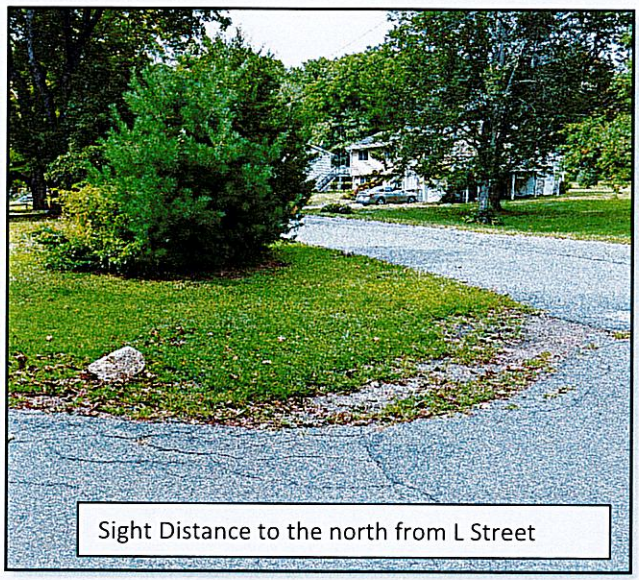
McClure conducted a site visit on 9/3/26 to review I Street. Field measurements were taken of the roadway width at several locations along its length. It was found that I Street varies in width from approximately 17 feet to 22 feet. The roadway width was most constrained just south of L Street. There are no sidewalks present along I Street.

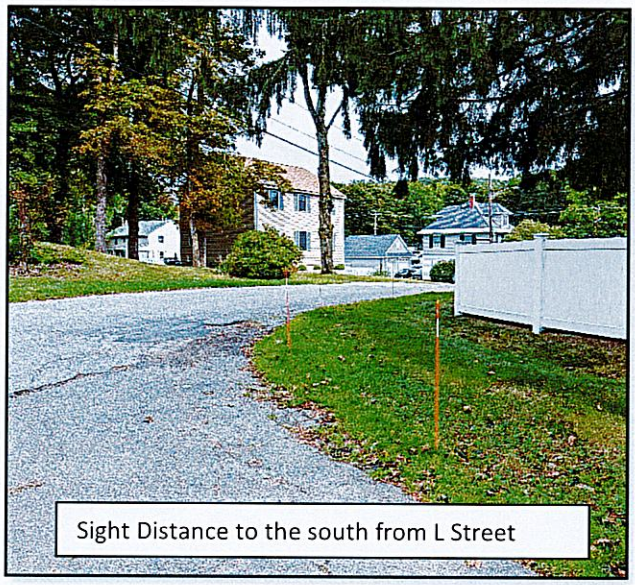
The areas of constrained pavement width along I Street are of concern, particularly since on-street parking is allowed. Per the Haverhill Rules and Regulations Governing the Subdivision of Land, the minimum required pavement width for Local access Street is twenty-eight (28) feet. Further coordination with Emergency Services will be required to determine what would be acceptable for I Street.

As shown in the adjacent photo, the pavement along I Street has recently been patched and there are areas where additional repair is needed. There is concern that truck traffic associated with the construction of the proposed development may accelerate the degradation of the pavement.

I Street is a dead-end roadway with its southerly terminus at Oxford Avenue. To facilitate I Street access to the larger roadway network, the extension of I Street to Route 125 would be ideal. However, it is understood that Route 125 is a limited access highway where it would be very difficult to obtain an I Street curb cut from MassDOT.

During the site visit it was also noted that the ISD for L Street was very constrained by vegetation to the north and a fence to the south. See photos below. In combination with the limited existing pavement width of L Street, it is recommended that consideration be made to make L Street one-way westbound between I Street and M Street to eliminate the limited sight distance issue at I Street. Further input with city staff will be required.


Sight Distance to the north from L Street


Sight Distance to the south from L Street

7. Site Trip Generation

Site trip generation was estimated using the Institute of Transportation Engineers (ITE) Trip Generation, 12th Edition. Land Use Code (LUC) 215, Single-Family Attached Housing, and LUC 210, Single-Family Detached Housing were utilized to predict the number of trips based on the current project proposal. McClure concurs with the methodology for trip generation as documented in the TIA.

8. Trip Distribution

The traffic generated by the proposed project was distributed based on existing traffic patterns within the study area. McClure agrees that the resulting assignment is balanced and reasonable for the project's location.

9. Capacity and Queue Analysis

The TIA evaluated operations using Synchro 11 (HCM 7) for the intersection of Oxford Avenue at I Street and SIDRA 10.0 (HCM 6) for the intersection of Oxford Avenue at Boston Road. SIDRA was utilized for the Boston Road intersection due to its unique configuration.

Level of service (LOS) analyses were performed for the 2026 Existing, 2033 No-Build, and the 2033 Build conditions. McClure concurs that the project's impact on queue, level of service (LOS) and control delay across the two (2) study intersections is negligible. The TIA demonstrates that all movements reviewed will operate at LOS A. Additionally, under the Build condition, none of the approaches at the study intersections are expected to have a queue of more than one vehicle length.

10. Recommendations and Conclusions

The TIA prepared by VAI concludes that the proposed 2 single family houses with 6 duplex houses development with 16 on-site parking spaces will be accessed via a single unsignalized driveway on I Street. Analyses indicate that the differences between the Build scenario and the No Build scenario are negligible. No off-site mitigation measures or geometric improvements were recommended by the applicant.

McClure has reviewed the analysis, conclusions, and recommendations for completeness and reasonableness. The methodologies are consistent with accepted MassDOT practices, and the findings are reasonable. However, McClure is concerned with the existing condition along I Street and would recommend the following additional coordination:

1. The proposed site driveway intersects I Street at a skew. It is recommended that the Applicant considers a more desirable alignment that is perpendicular to I Street.

2. The applicant should provide a fire truck turning movement plan showing fire apparatus navigating in and out of the proposed site.

3. Per the Haverhill Rules and Regulations Governing the Subdivision of Land, the maximum required pavement width for a Local access Street is twenty-eight (28) feet. Further coordination with Emergency Services will be required to determine an acceptable pavement width for I Street.

4. The existing pavement along I Street is in poor condition. There is concern that truck traffic associated with the construction of the proposed development may accelerate the degradation of the pavement. Dependent on the outcome of pavement widening associated with comment 3, pavement repairs will be required at the end of construction. The scope of repairs shall be closely coordinated with the City Engineer.

5. To address the existing constrained ISD at L Street, it is recommended that consideration be made to make L Street one-way westbound between I Street and M Street. The applicant shall coordinate further with city staff to determine the desire and feasibility of such a change.

McClure reserves the right to provide additional comments should new or revised project information be submitted for review. For any questions regarding this peer review, please do not hesitate to contact me at (603) 461-8841. We appreciate your consideration.

Sincerely,

Joseph P. Johnson, PE, PTOE
Transportation Market Leader

ORDERED:

TO AMEND THE CITY OF HAVERHILL ZONING ORDINANCE CHAPTER 255 BY ADDING THE FOLLOWING: "I STREET PLANNED RESIDENTIAL DEVELOPMENT DISTRTCT, (ISPRD)" AS SET FORTH IN SECTION 8.5.C:

Item 1. In Section 2.1.2, add "I Street Planned Residential Development District" to the list.
Item 2. Add the following new Section 8.5.C

8.5C

I STREET PLANNED RESIDENTIAL DEVELOPMENT DISTRICT (ISPRD)

8.5.C.1 Purpose. The purpose of the I Street Planned Residential Development District ("ISPRD") is as follows:

1. To promote a diversity of housing in the City; and
2. To promote the reuse of vacant land transforming the same into 14 condominium units.

8.5.C. 2 Location. The ISPRD is a portion of land located on Tax Parcel Map 754, Block 2, Lot21, containing approximately 55,820 square feet of land.

8.5.C.3 As of Right Uses. The following uses are allowed in the ISPRD upon the issuance of Development Review approval pursuant to Section 10.1.4:

1. Six (6) duplex and Two (2) single family Condominium units.

8.5.C.4 Dimensional and Density Regulations. The following dimensional and density regulations shall apply in the ISPRD:

Set Back	Proposed PD Lot
Lot Area	55,820'
Lot Area Required Per Dwelling Unit	3,972'
Lot Frontage	207.36'
Lot Depth	291'
Front Setback	40'
Side Setback	15'
Rear Setback	15'
Building Height	<40'
Building Height – Stores	<3.5'
Building Coverage	18.1%
Floor Area Ratio	<0.50'
Open Space	51%

8.5C.5 Parking and Loading. The following parking requirements shall apply in the BRPRD. Both surface and underground parking areas are permissible.

1. **Multifamily Dwellings:** 3.0 spaces per dwelling unit; 1 garage and 2 outdoor surface spaces.

Parking and loading shall generally comply with the standards set forth in Section 6.1 of this Ordinance, unless waived by the City during Development Review.

8.5.C.6 Roads and Utilities. The principal roadway(s) and driveways serving the site shall be adequate for the intended use and vehicular traffic and shall be maintained privately. The connection of all buildings in the ISPRD to the municipal water and sewer systems is required. All water, sewer, gas, electricity, cable, and telephone lines shall be installed underground.

8.5.C.7 Performance Standards. All development in the ISPRD shall comply with the performance standards set forth in the Zoning Code, unless waived during developmental review.

LAW OFFICES OF
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www.pgclawoffice.com

Herbert P. Phillips (1933 - 2017)
Michael A. Gerstein
Russell S. Channen

Of Counsel:
Jane M. Owens Triano

July 28, 2026

Via Email – jbyerley@haverhillma.gov

Jacki Byerley
City of Haverhill
Economic Development & Planning
City Hall - Room 201
4 Summer Street
Haverhill, MA 01830

Re: 931 Boston Road, Haverhill, Massachusetts

Dear Jacki:

Pursuant to our discussion, please accept this letter as our formal request to continue the Planning Board hearing for the above-referenced application from August 12, 2026 to September 9, 2026.

Thank you for your assistance in this regard.

Very truly yours,

Russell S. Channen

RSC:gdp

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COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

41 Main Street
Bolton, MA 01740
508.281.5160

August 28, 2026

Robert Moore, Conservation Agent
Haverhill Conservation Commission
4 Summer Street, City Hall Room 300
Haverhill, MA 01830

Re: Peer Review Services
931 Boston Road
Haverhill, MA

Dear Mr. Moore:

As requested by the City of Haverhill, CEI has completed a technical review of the materials and information listed below for the proposed development project located at 931 Boston Road in Haverhill, MA. Our review focuses on elements of the proposed project that pertain to the stormwater management design, based on the following information furnished to the Conservation Commission:

a. Stormwater Management Report, dated April 28, 2026, prepared by The Morin-Cameron Group Inc.;

b. Site Plans, dated April 28, 2026, prepared by The Morin-Cameron Group Inc.;

CEI offers the following comments based on our review of the design drawings and information listed above.

I. Compliance with Massachusetts Stormwater Management Standards, Town of Haverhill Stormwater Regulations, and Good Engineering Practice

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

1. A detail for each Flared End Section (FES) should be provided along with calculations that show adequate scour protection is provided.

Standard is not met.

Standard 2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

1. The proposed invert for the outlet of Stone Infiltration System (SIS) #2 is inconsistent between the plan view, side profile, HydroCAD model, and Outlet Control Structure (OCS) #1 detail. The plan view shows an invert for a 4" pipe at 101.67', the profile view shows the invert at 101.5', the OCS-1 detail shows a 12" pipe at invert 101.5' and the HydroCAD model shows a 4" pipe at invert 101.67'. Please rectify for consistency.
2. The proposed FES at the outlet of OCS-1 is shown as 100.50' in the detail for SIS#2, 101.5' in the detail for SIS#1 and shown as 100.0' in HydroCAD. Rectify invert discrepancies.

3. The HydroCAD model for SIS#3, SIS#4, and SIS#5 each show four 4" orifices flowing out of the system but the plan set does not show any outlet of the system.
4. The outlet invert of the 12" pipe from OCS-2 is shown as 102.0' in the HydroCAD model and 102.2' in the plan set. Please rectify.
5. The HydroCAD model shows oscillations for SIS#3, SIS#4, and SIS#5. These oscillations should be addressed to ensure the inflow and outflow of the proposed infiltration beds are accurate.
6. The time span and time step used in the existing and the proposed conditions HydroCAD models should remain consistent to ensure accurate comparisons.

Standard is not met.

Standard 3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures.

1. The test pits for infiltration should extend at a minimum 4' below the bottom of the system in order to accurately characterize soil conditions beneath the proposed infiltration systems. Infiltration systems should be at a minimum 2' above the Estimated Seasonal High Water Table (ESHWT). If the infiltration basin attenuates the 10-year storm or greater and the ESHWT is within 4' of the bottom of the infiltration basin, a mounding analysis is required.
    a. TP25-4 only went to an elevation of 104.34' while the bottom of the infiltration system is set at 104.50'. The assumption that no ESHWT was observed at 102.44', as shown in the profile view of SIS#3, is an extrapolation. Redoximorphic features or other indicators of ESHWT may be present but would not have been observed given that the test pits did not go to that depth. Additional test pits are needed.
    b. TP25-8 only went to an elevation of 106.87' while the bottom of the infiltration system is set at 107.67'. The assumption that no ESHWT was observed at 105.67', as shown in the profile view of SIS#5, is an extrapolation. Redoximorphic features or other indicators of ESHWT may be present but would not have been observed given that the test pits did not go to that depth. Additional test pits are needed.
2. Infiltration Basins are recommended to be a minimum of 100 feet away from any buildings that are downslope of the infiltration system. SIS#4 is approximately 60' away from Building 6 and 45' away from Building 5, both of which are downslope of the infiltration system.

Standard is not met.

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

1. The stormwater management systems retain the volume of runoff greater than 1.0 inch multiplied by the total post-construction impervious surface area on the new development site meeting the average annual pollutant removal of 90% TSS removal and 60% TP removal.

Standard is met.

Standard 5: For Land Uses with Higher Potential Pollutant Loads (LUHPPL), source control and pollution prevention shall be implemented.

The project is not considered a Land Use with Higher Potential Pollutant Load.

Standard is met.

Standard 6: Stormwater discharges near or to any critical area require the use of specific source control and pollution prevention measures and the specific structural stormwater best management practices.

The project site is not located within any critical areas.

Standard is met.

Standard 7: Redevelopments projects are required to meet the Massachusetts Stormwater Management Standards only to the maximum extent practicable.

The project is considered new development.

Standard is met.

Standard 8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities.

The applicant has provided an Erosion and Soil Control (ESC) Plan.

1. A concrete washout should be specified in the erosion control plan.
2. A proposed stockpile detail should be provided.
3. A settling basin is shown in the detail of the construction entrance but is not shown on the plan view. Please rectify for consistency.
4. Include the following notes with the Construction Period Erosion, Sedimentation, and Pollution Prevention Plan:
    a. *Proposed perimeter erosion & sediment controls shall manage all stormwater leaving the site during construction, including sheet flow onto adjacent private and public properties.*
    b. *Erosion and sediment control measures shall be installed prior to any soil disturbance, the area of disturbance shall be kept to a minimum, and any sediment in runoff shall be retained within the project area.*
    c. *In areas where final grading has not occurred, implement temporary stabilization measures within 7 days after initial disturbance for exposed soil areas within 100 feet of a surface water body or wetland and no more than 14 days after initial disturbance for all other areas.*
    d. *Permanent stabilization must be in place no more than 3 days (72 hours) following the completion of final grading of exposed soil areas.*
    e. *Runoff must be directed to temporary practices until stormwater BMPs are stabilized. Basins, ditches, and swales must be stabilized prior to directing runoff to them.*
    f. *Permanent or temporary basins shall be installed prior to installation of any connected drainage systems.*
    g. *All temporary erosion control measures are to be removed after final site stabilization. Trapped sediment and other disturbed soil areas shall be permanently stabilized prior to removal of temporary control measures.*
    h. *Construction BMPs must be maintained while construction or land disturbance activities continue.*

i. *The inspections of temporary erosion control measures following rain events shall verify that the construction BMPs shown and described on the plans are in good condition and are minimizing erosion. A maintenance and inspection report shall be made with each inspection. All site inspection reports shall be submitted to DPW on no longer than a monthly basis in a format approved by the DPW.*

j. *Off-site surface water and runoff from undisturbed areas shall be diverted away from disturbed areas and stockpiles where feasible or carried non erosively through the project area. Integrity of downstream drainage systems shall be maintained.*

k. *All proposed infiltration systems must be staked out and protected for the duration of construction activities from compaction, siltation, and erosion or will be restored or replaced such that the BMP will be capable of functioning as designed.*

l. *Waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control will be handled in compliance with applicable federal, state and local laws and regulations.*

5. The construction operation and maintenance plan references multiple BMPs that are not shown or referenced in the provided erosion and soil control plan. The O&M plan and ESC plan should match to ensure adequate installation and maintenance.

Standard is not met.

Standard 9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

The Applicant has provided a Long-Term Operation and Maintenance Plan for the Site.

Standard is met.

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

The Applicant has provided an Illicit Discharge Compliance Statement in compliance with Standard 10.

Standard is met.

We appreciate the opportunity to provide the City with peer review services. If you have any questions or comments regarding this report, please contact me at 774-843-2007 or cosullivan@ceiengineers.com.

Sincerely,

COMPREHENSIVE ENVIRONMENTAL, INC.

Conor O'Sullivan

Conor O'Sullivan
Project Review Engineer

Matthew Lundsted, P.E.
Principal Engineer

The Morin-Cameron GROUP, INC

September 30, 2026

Robert Moore, Conservation Agent
Haverhill Conservation Commission
4 Summer Street, City Hall Room 300
Haverhill, MA 01830

RE: Peer Review Response - 931 Boston Road

Dear Mr. Moore,

On behalf of Pentucket North Development LLC, The Morin-Cameron Group, Inc. (MCG) has provided the following responses to the peer review letter prepared by Comprehensive Environmental Inc. (CEI) dated August 28, 2026. CEI comments are *italicized*, followed by MCG's responses in **bold**.

I. *Compliance with Massachusetts Stormwater Management Standards, Town of Haverhill Stormwater Regulations, and Good Engineering Practice*

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

1. *A detail for each Flared End Section (FES) should be provided along with calculations that show adequate scour protection is provided.*

MCG Response: A FES detail and table reflecting the sizing of the riprap has been added to sheet 9 of 11. The riprap was sized for the 100-year storm flow rate.

Standard 2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

1. *The proposed invert for the outlet of Stone Infiltration System (SIS) #2 is inconsistent between the plan view, side profile, HydroCAD model, and Outlet Control Structure (OCS) #1 detail. The plan view shows an invert for a 4" pipe at 101.67', the profile view shows the invert at 101.5', the OCS-1 detail shows a 12" pipe at invert 101.5' and the HydroCAD model shows a 4" pipe at invert 101.67'. Please rectify for consistency.*

MCG Response: The plan view, section view, HydroCAD model and Outlet Control Structure (OCS) #1 detail have been revised to be correlate.

2. *The proposed FES at the outlet of OCS-1 is shown as 100.50' in the detail for SIS#2, 101.5' in the detail for SIS#1 and shown as 100.0' in HydroCAD. Rectify invert discrepancies.*

MCG Response: The FES invert has been revised in the HydroCAD model to match the site plan and details with an elevation of 100.50'.

3. *The HydroCAD model for SIS#3, SIS#4, and SIS#5 each show four 4" orifices flowing out of the system but the plan set does not show any outlet of the system.*

MCG Response: The intent of the 4" orifices/vertical cylinder is to model the roof leaders as an emergency outflow at the elevation the downspout/roof leader connection. The tee-wye is

approximately set at 6" above grade at the proposed dwellings in lieu of an outlet control structure.

For SIS#3, SIS #4 & SIS #5 during the 100-year storm the peak elevation does not discharge from 4" orifice (i.e. tee-wye) and this is intended as an emergency release if system failure occurs.

4. *The outlet invert of the 12" pipe from OCS-2 is shown as 102.0' in the HydroCAD model and 102.2' in the plan set. Please rectify.*

MCG Response: The site plan has been revised to match the HydroCAD model with a FES invert of 102.0'

5. *The HydroCAD model shows oscillations for SIS#3, SIS#4, and SIS#5. These oscillations should be addressed to ensure the inflow and outflow of the proposed infiltration beds are accurate.*

MCG Response: The surrounding stone on systems SIS#1, SIS#3, SIS#4, SIS#5 and SIS#6 were slightly increased, and the oscillation issues have been eliminated. The revised HydroCAD model has been included as an attachment.

6. *The time span and time step used in the existing and the proposed conditions HydroCAD models should remain consistent to ensure accurate comparisons.*

MCG Response: The HydroCAD models have been revised to have matching time span and time step. The revised HydroCAD models have been included as an attachment.

Standard 3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures.

1. *The test pits for infiltration should extend at a minimum 4' below the bottom of the system in order to accurately characterize soil conditions beneath the proposed infiltration systems. Infiltration systems should be at a minimum 2' above the Estimated Seasonal High Water Table (ESHWT). If the infiltration basin attenuates the 10-year storm or greater and the ESHWT is within 4' of the bottom of the infiltration basin, a mounding analysis is required.*

    a. *TP25-4 only went to an elevation of 104.34' while the bottom of the infiltration system is set at 104.50'. The assumption that no ESHWT was observed at 102.44', as shown in the profile view of SIS#3, is an extrapolation. Redoximorphic features or other indicators of ESHWT may be present but would not have been observed given that the test pits did not go to that depth. Additional test pits are needed.*
    b. *TP25-8 only went to an elevation of 106.87' while the bottom of the infiltration system is set at 107.67'. The assumption that no ESHWT was observed at 105.67', as shown in the profile view of SIS#5, is an extrapolation. Redoximorphic features or other indicators of ESHWT may be present but would not have been observed given that the test pits did not go to that depth. Additional test pits are needed.*

MCG Response: MCG agrees that soils beneath each infiltration system should be characterized a minimum of 4 feet below the proposed bottom, that a minimum 2-foot separation to ESHWT is required, and that a mounding analysis is required if the system attenuates the 10-year storm or greater and ESHWT is within 4 feet of the bottom, consistent with the Massachusetts Stormwater Handbook.

However, the extrapolation was determined based on surrounding test pits that did not observe any ESHWT observations at TP 25-2 and TP 25-5 which are located at a lower elevation. In addition, the following site information was also used for the ESHWT assumptions made:

- **The project sits on a local topographic high spot and is located at the top of a watershed.**
- **The adjacent highway is on the order of 20 feet lower than the proposed SIS's and no evidence of historical seasonal high groundwater breakout was observed.**
- **The lowest test pit completed on the site extended to elevation 96.84, which is approximately 7.7 feet below the bottom of SIS#3 (104.50) and approximately 10.8 feet below the bottom of SIS#5 (107.67). No ESHWT (i.e. redoximorphic features) was encountered in that pit.**

On these assumptions we anticipate the 2-foot separation to be met and that a mounding analysis will not be required. However, the applicant request that as a condition of approval that additional test pits be performed at the exact locations to confirm the assumptions noted. This would be completed by a licensed soil evaluator during site mobilization and prior to construction of the infiltration systems.

2. *Infiltration Basins are recommended to be a minimum of 100 feet away from any buildings that are downslope of the infiltration system. SIS#4 is approximately 60' away from Building 6 and 45' away from Building 5, both of which are downslope of the infiltration system.*

MCG Response: MCG acknowledges that the Massachusetts Stormwater Handbook Volume 2, Chapter 2 "Site Criteria for Infiltration Basins" notes that "Distance from any building foundations including slab foundations without basements - Minimum of 10 ft. downslope and 100 ft. upslope" *should apply*. It is our opinion that these are recommendations and not required setbacks. Additionally, the proposed BMP infiltration systems fall under "Subsurface Structures" in the Massachusetts Stormwater Handbook Volume 2, Chapter 2 and not Infiltration Basins, which does not note any setback criteria. It should also be noted that setback recommendations are not consistent in the Handbook (i.e. infiltration trenches note a minimum 20' setback to foundation/slabs and drywells note a minimum 10' setback to the building foundation). Typical engineering practices maintain a minimum 10' setback to foundation walls/slabs, which the design maintained. It is our opinion that the systems as design are in accordance with standard engineering practices and will not impact or be impacted by the buildings.

SIS#4 is a subsurface infiltration system, not a surface basin. Volume 1, Chapter 1, page 9 of the Massachusetts Stormwater Handbook states that setbacks from building foundations range from greater than 10 feet to 100 feet depending on the type of recharge BMP. SIS#4 is a subsurface infiltration system (leaching chambers). MassDEP's UIC Class V guidelines set the building-foundation setback for dry wells and leaching chambers at 10 feet (20 feet for stormwater trenches). Volume 2, Chapter 2, page 98 specifies 20 feet from building foundations for infiltration trenches. The Handbook's subsurface-structure specification (Vol. 2, Ch. 2, pp. 103–104) does not impose a 100-foot downslope building setback. SIS#4 is 45 feet and 60 feet from the downslope buildings, which exceeds the 10- to 20-foot subsurface/UIC setbacks

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

1. *The stormwater management systems retain the volume of runoff greater than 1.0 inch multiplied by the total post construction impervious surface area on the new development site meeting the average annual pollutant removal of 90% TSS removal and 60% TP removal.*

MCG Response: No response warranted

Standard 5: For Land Uses with Higher Potential Pollutant Loads (LUHPPL), source control and pollution prevention shall be implemented.

The project is not considered a Land Use with Higher Potential Pollutant Load.

MCG Response: No response warranted

Standard 6: Stormwater discharges near or to any critical area require the use of specific source control and pollution prevention measures and the specific structural stormwater best management practices.

The project site is not located within any critical areas.

MCG Response: No response warranted

Standard 7: Redevelopments projects are required to meet the Massachusetts Stormwater Management Standards only to the maximum extent practicable.

The project is considered new development.

MCG Response: No response warranted

Standard 8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities.

The applicant has provided an Erosion and Soil Control (ESC) Plan.

1. *A concrete washout should be specified in the erosion control plan.*

MCG Response: The erosion control plan has been revised to include a designated concrete washout area near the stabilized construction entrance.

2. *A proposed stockpile detail should be provided.*

MCG Response: A stockpile detail has been added to the erosion control plan.

3. *A settling basin is shown in the detail of the construction entrance but is not shown on the plan view. Please rectify for consistency.*

MCG Response: The settling basin has been modified and is now shown on the plan view.

4. *Include the following notes with the Construction Period Erosion, Sedimentation, and Pollution Prevention Plan:*

   a. Proposed perimeter erosion & sediment controls shall manage all stormwater leaving the site during construction, including sheet flow onto adjacent private and public properties.

   b. Erosion and sediment control measures shall be installed prior to any soil disturbance, the area of disturbance shall be kept to a minimum, and any sediment in runoff shall be retained within the project area.

   c. In areas where final grading has not occurred, implement temporary stabilization measures within 7 days after initial disturbance for exposed soil areas within 100 feet of a surface water body or wetland and no more than 14 days after initial disturbance for all other areas.

   d. Permanent stabilization must be in place no more than 3 days (72 hours) following the completion of final grading of exposed soil areas.

   e. Runoff must be directed to temporary practices until stormwater BMPs are stabilized. Basins, ditches, and swales must be stabilized prior to directing runoff to them.

   f. Permanent or temporary basins shall be installed prior to installation of any connected drainage systems.

   g. All temporary erosion control measures are to be removed after final site stabilization. Trapped sediment and other disturbed soil areas shall be permanently stabilized prior to removal of temporary control measures.

h. Construction BMPs must be maintained while construction or land disturbance activities continue

i. The inspections of temporary erosion control measures following rain events shall verify that the construction BMPs shown and described on the plans are in good condition and are minimizing erosion. A maintenance and inspection report shall be made with each inspection. All site inspection reports shall be submitted to DPW on no longer than a monthly basis in a format approved by the DPW.

j. Off-site surface water and runoff from undisturbed areas shall be diverted away from disturbed areas and stockpiles where feasible or carried non erosively through the project area. Integrity of downstream drainage systems shall be maintained.

k. All proposed infiltration systems must be staked out and protected for the duration of construction activities from compaction, siltation, and erosion or will be restored or replaced such that the BMP will be capable of functioning as designed.

l. Waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control will be handled in compliance with applicable federal, state and local laws and regulations.

MCG Response: All notes have been added to the "Construction Phase Best Management Practices" document.

5. The construction operation and maintenance plan references multiple BMPs that are not shown or referenced in the provided erosion and soil control plan. The O&M plan and ESC plan should match to ensure adequate installation and maintenance.

MCG Response: The O&M plan and ESC plan have been revised to only include BMPs proposed.

Standard 9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

1. The Applicant has provided a Long-Term Operation and Maintenance Plan for the site.

MCG Response: No response warranted

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

1. The Applicant has provided an Illicit Discharge Compliance Statement in compliance with Standard 10.

MCG Response: No response warranted

In addition to the comment responses noted above, the following supplemental materials are also included in this response:

- Revised Site Development Plans
- Revised "Construction Phase Best Management Practices"
- Revised Pre and Post HydroCAD analyses

We trust this information adequately addresses the peer review comments by CEI about the proposed development at 931 Boston Road.

If you have any questions, please do not hesitate to contact our office at (978) 777-8586.

Sincerely,
THE MORIN-CAMERON GROUP, INC.

William A. Schkuta, P.E.
Director of Engineering

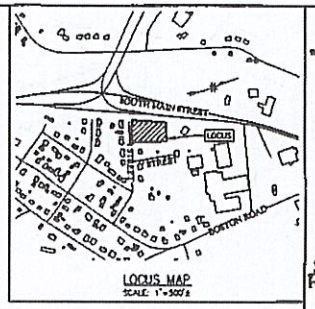
Attachments

cc: Pentucket North Development, LLC

SITE DEVELOPMENT PLANS

FOR A
MULTI-FAMILY DEVELOPMENT
LOCATED AT
931 BOSTON ROAD
HAVERHILL, MASSACHUSETTS

(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)

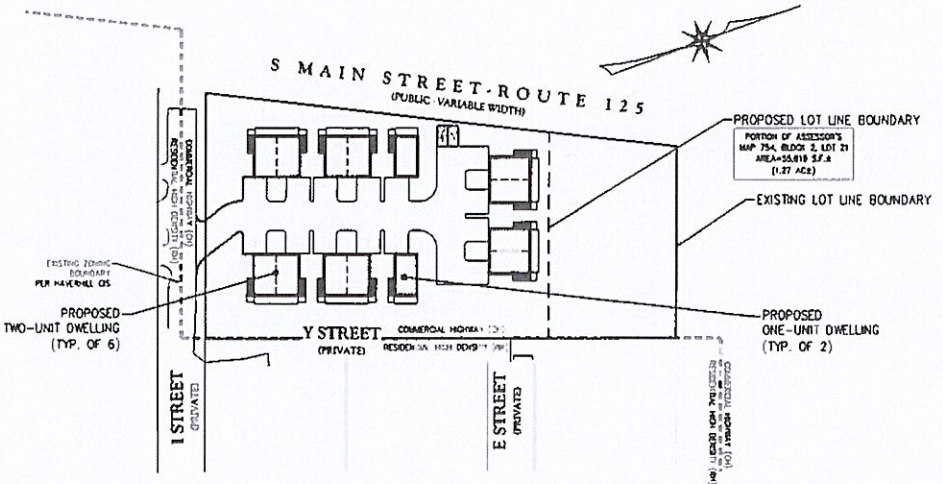


LOCUS MAP
SCALE: 1"=500'±

SCHEDULE OF PLAN SET DRAWINGS:

SHEET 1 OF 11	COVER SHEET
SHEET 2 OF 11	SITE CONTEXT PLAN
SHEET 3 OF 11	EXISTING CONDITIONS PLAN
SHEET 4 OF 11	SITE PREPARATION & EROSION CONTROL
SHEET 5 OF 11	SITE LAYOUT PLAN
SHEET 6 OF 11	GRADING, DRAINAGE & UTILITY PLAN
SHEET 7 OF 11	DETAILS
SHEET 8 OF 11	DETAILS
SHEET 9 OF 11	STORMWATER DETAILS
SHEET 10 OF 11	STORMWATER DETAILS
SHEET 11 OF 11	STORMWATER DETAILS
SHEET A0.0	SITE PLAN
SHEET A1.1	1ST FLOOR PLAN DUPLEX BUILDING
SHEET A1.2	2ND FLOOR PLAN DUPLEX BUILDING
SHEET A1.3	3RD FLOOR PLAN DUPLEX BUILDING
SHEET A1.4	ROOF PLAN DUPLEX BUILDING
SHEET A2.1	ELEVATIONS DUPLEX BUILDING
SHEET A2.2	ELEVATIONS DUPLEX BUILDING
SHEET A2.3	STREET ELEVATIONS
SHEET A1.1B	1ST & 2ND FLOOR PLAN SINGLE BUILDING
SHEET A1.2B	3RD FLOOR & ROOF PLAN SINGLE BUILDING
SHEET A2.1B	ELEVATIONS SINGLE BUILDING
SHEET L-100	LANDSCAPE PLAN

ZONING DISTRICT: COMMERCIAL HIGHWAY (CH)
PROPOSED ZONING DISTRICT: PLANNED RESIDENTIAL DEVELOPMENT DISTRICT (PDD)
(PENDING CITY COUNCIL APPROVAL)



PLAN
SCALE: 1" = 50'
0 25 50 100

APPLICANT:
PENTUCKET NORTH DEVELOPMENT LLC
C/O RONALD J. MALLOUK SR.
55 CHASE STREET
METHUEN, MA 01844

OWNER:
CEDARDALE, INC
931 BOSTON ROAD
HAVERHILL, MA 01835
BOOK 8023, PAGE 614

CIVIL ENGINEER/SURVEYOR:
THE MORIN-CAMERON GROUP, INC.
68 ELM STREET
DANVERS, MA 01923
PHONE: 978-777-8505

ARCHITECT:
SCOTT BROWN ARCHITECTS
48 MARKET STREET
NEWBURYPORT, MA 01950
PHONE: 978-465-3535

LANDSCAPE DESIGNER:
CORLISS LANDSCAPE & IRRIGATION
31 ESSEX ROAD
IPSWICH, MA 01938
PHONE: 978-356-4324

DIG SAFE
MA - RI - ME - NH - VT
CALL BEFORE YOU DIG
1-888-344-7233
UTILITY UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM

NOTE:
UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED UPON VISIBLE ABOVE GROUND UTILITIES AND RECORD INFORMATION OF BELOW GROUND UTILITIES AND ARE APPROXIMATE ONLY. CONTRACTOR IS RESPONSIBLE FOR TAKING ALL NECESSARY PRECAUTIONS BEFORE BEGINNING ANY EXCAVATION.

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS / ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS / PROJECT MANAGERS
68 ELM STREET, DANVERS, MASSACHUSETTS 01923
P: 978.777.8505 • F: 978.777.8506 • WWW.MORIN-CAMERON.COM

REVISIONS
NO. 1 — DESCRIPTION: PER BOARD & CITY COMMENTS — DATE: 9/30/2020

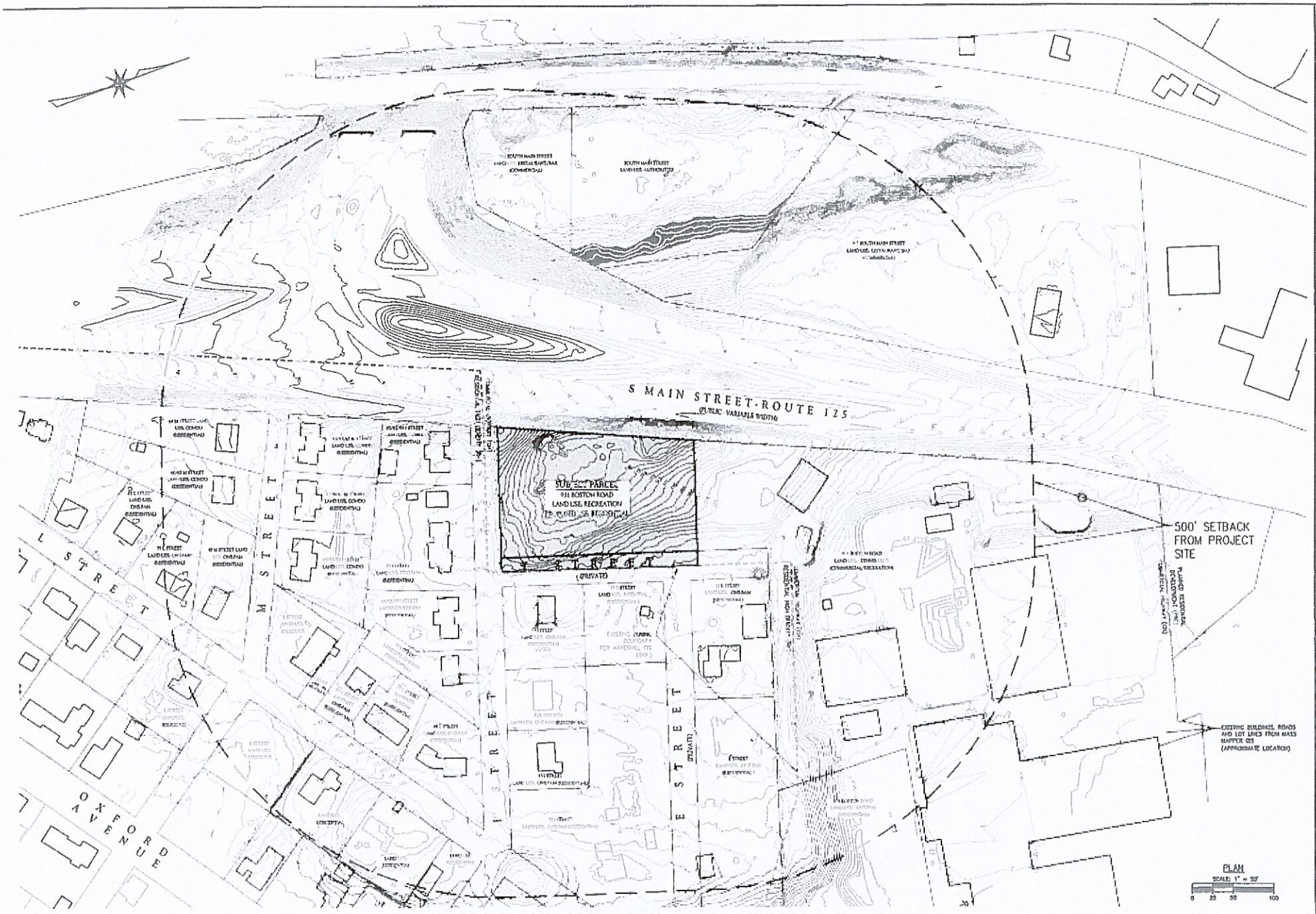
SURVEY BY: MCG
DRAFTED BY: DTS
DESIGNED BY: MAS
APPROVED BY: JMC
SCALE: AS NOTED
DATE: APRIL 30, 2020

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR
PENTUCKET NORTH DEVELOPMENT LLC

COVER SHEET

DRAWING NO. 1 OF 11

PROJ. #43
DRAWING: 4318_MAP04-0



The Morin-Cameron GROUP, INC.

CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: SAS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 28, 2021

REVISIONS

NO.	DESCRIPTION	DATE
1	PEER REVIEW & CITY COMMENTS	8/30/2020

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR:
DEMTLOVET MORTH DEVELOPMENT LLC

SITE CONTEXT PLAN

DRAWING NO. 2 OF 11

PROJ. #63
DRAWING: 4316_MAP1.6

LEGEND

CONTOURS
MAJOR
MINOR
CHAIN LINK FENCE
FIRE HYDRANT
GUY WIRE
IRRIGATION CONTROL VALVE
LIGHT POLE
OVERHEAD WIRE
PROPERTY LINE
SANITARY SEWER MANHOLE
SANITARY SEWER MAIN/SERVICE
SQUARE CATCH BASIN
STORM SEWER/DRAINAGE
TREE LINE
UTILITY POLE
WATER GATE
WATER SPRICKET MANHOLE

GENERAL NOTE:

1. THESE PLANS ARE PREPARED FOR OUR CLIENTS USE FOR THE SPECIFIC PURPOSE OF OBTAINING PERMITS AND LOCAL APPROVALS, AND ARE NOT TO BE USED OR RELIED UPON AS A CONSTRUCTION DOCUMENT OR ANY OTHER USE BY OTHER WITHOUT THE WRITTEN CONSENT OF THE MORIN-CAMERON GROUP, INC.

PLAN NOTES:

1. THE EXISTING CONDITIONS DEPICTED HEREON ARE BASED ON INFORMATION PROVIDED BY ON THE GROUND SURVEY BY THE MORIN-CAMERON GROUP, INC., ON AUGUST 18, 2025.
2. ABUTTER INFORMATION SHOWN HEREON WAS TAKEN FROM THE HAVERHILL GIS DATABASE.
3. THE PROPERTY BOUNDARY IS BASED ON A PLAN ENTITLED "PLAN OF LAND, LOCATED IN HAVERHILL, MA" PREPARED BY CHRISTIANSEN & SEROL DATED JANUARY 6, 1998 AND RECORDED AT THE SOUTH ESSEX DISTRICT REGISTRY OF DEEDS IN BOOK 14530, PAGE 428
4. ELEVATIONS HEREON REFER TO VERTICAL DATUM NAVD88.
5. PROJECT SITE LOCATED WITHIN ZONING AREA COMMERCIAL HIGHWAY (CH).
6. PROJECT SITE IS NOT LOCATED WITHIN A WETLANDS AREA.
7. PROJECT SITE IS NOT LOCATED WITHIN A FEMA FLOOD ZONE.

FLOOD NOTE:

THE SUBJECT PROPERTY IS LOCATED IN A ZONE X: AREA OF MINIMAL FLOOD HAZARD ABOVE 500-YEAR FLOOD LEVEL AS ILLUSTRATED ON THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO. 25009C0035G, WHICH HAS AN EFFECTIVE DATE OF JULY 8, 2025.

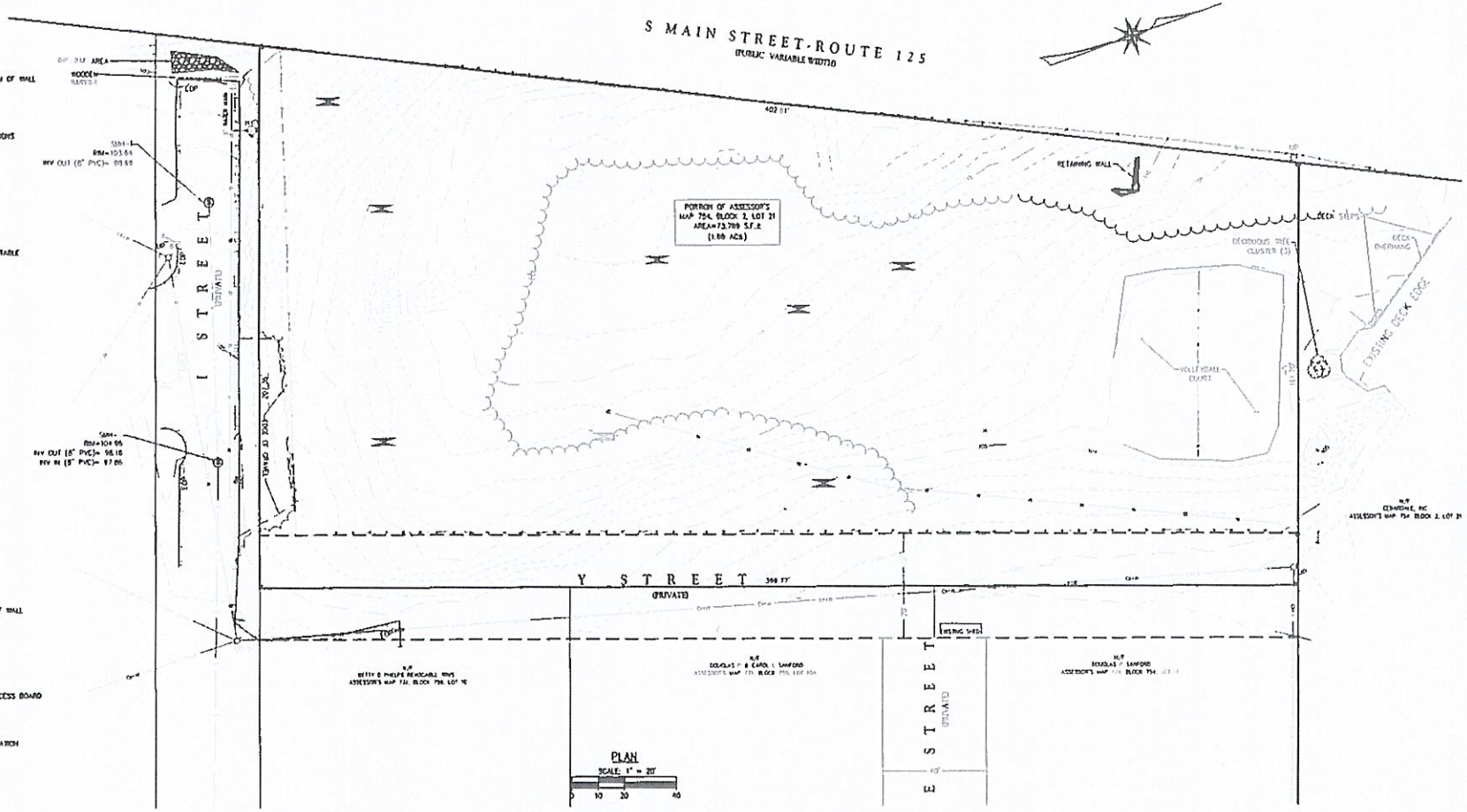
SOIL LOGS

DATE PERFORMED: NOVEMBER 13, 2025
PERFORMED BY: WILL SCIBILIA, SE #14030

TP-25-1 ELEV = 112.5±
TP-25-2 ELEV = 104.0±
TP-25-3 ELEV = 113.0±
TP-25-4 ELEV = 131.5±
TP-25-5 ELEV = 103.7±
TP-25-6 ELEV = 112.7±
TP-25-7 ELEV = 116.9±
TP-25-8 ELEV = 113.7±

ABBREVIATIONS:

AC	ACRES
APPROX	APPROXIMATE
BIT	BITUMINOUS
BLDG	BUILDING
BVW	BORDERING VEGETATED WETLAND
BW	BASEMENT WALL
CCB	CAPE COD BERM
CB	CATCH BASIN
CF	CUBIC FEET
CI	CAST IRON
CLDI	CEMENT LINED DUCTILE IRON
CMR	CODE OF MASSACHUSETTS REGULATIONS
CONC	CONCRETE
CY	CUBIC YARD
DI	DUCTILE IRON
DIA	DIAMETER
DMH	DRAIN MANHOLE
DS	DOWNSTREAM
DYL	DOUBLE YELLOW LINE
ELEC	ELECTRIC
EL/ELEV	ELEVATION
EOG	EDGE OF GRAVEL
EOP	EDGE OF PAVEMENT
ESHWT	ESTIMATED SEASONAL HIGH WATER TABLE
EXIST	EXISTING
FG	FINAL GRADE
FT	FEET
GAR	GARAGE
GG	GAS GATE
HDPE	HIGH DENSITY POLYETHYLENE
ID	INNER DIAMETER
IN	INCH
INV	INVERT
L	LENGTH
LB	POUNDS
MAX	MAXIMUM
MOC	MONOLITHIC CONCRETE CURB
MIN	MINIMUM
N/F	NOW OR FORMERLY
OC	ON CENTER
OHW	OVERHEAD WIRES
PE	POLYETHYLENE
#	PLUS OR MINUS
PCC	PRECAST CONCRETE CURB
RCP	RIGID CONCRETE PIPE
REC	RECORDED
PROP	PROPOSED
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
R	RADIUS
RC	RELATIVE COMPACTION
REQ'D	REQUIRED
ROW	RIGHT OF WAY
S	SLOPE
SF	SQUARE FEET
SOG	SAND, GAS AND OIL SEPARATOR
SMH	SEWER MANHOLE
SQ	SQUARE
TBD	TO BE DETERMINED
TC	TOP OF CURB/TRANSITION CURB
TW	FINISH GRADE ADJACENT TO TOP OF WALL
TYP	TYPICAL
UGE	UNDERGROUND ELECTRIC
UNK	UNKNOWN
VAR	VARIANCE
VGC	VERTICAL GRANITE CURB
VIF	VERIFY IN FIELD
LSA	LANDSCAPE AREA
LF	LINEAR FEET
MAAB	MASSACHUSETTS ARCHITECTURE ACCESS BOARD
MEP	MECHANICAL ELECTRICAL PLUMBING
MCC	MONOLITHIC CONCRETE CURB
MIL	MILLIMETER
NF	NOT FOUND
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
US	UPSTREAM
WF	WETLAND FLAG
WG	WATER GATE
WQU	WATER QUALITY UNIT
WSO	WATER SHUTOFF
W/	WITH



The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
18 ELA TERR., SALEM, MASSACHUSETTS 01970
P: 978-777-3050 • WWW.MORINCAMERON.COM

REVISIONS		
NO.	DESCRIPTION	DATE
1	PEER REVIEW & CITY COMMENTS	9/30/2026

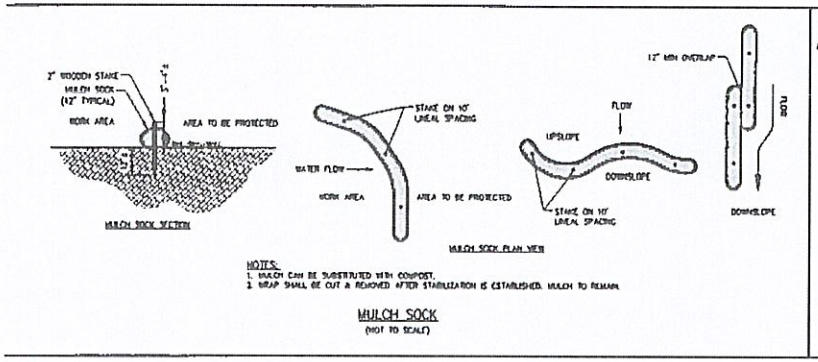
SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: RAS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 28, 2026

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 754, BLOCK 2, LOT 21)
PREPARED FOR:
DEVELOPMENT GROUP OF AMERICA, LLC

EXISTING CONDITIONS PLAN

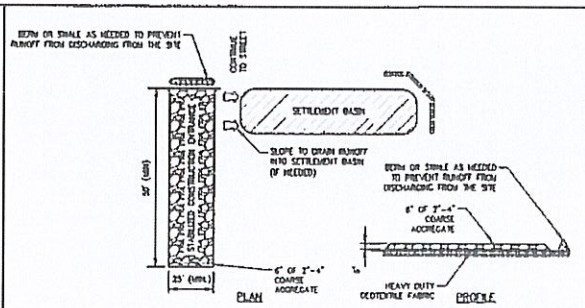
DRAWING NO. 3 OF 11

FINAL PLAN
DRAWING #358_MAP6.dwg



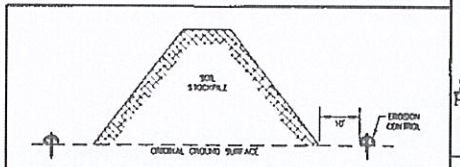
NOTES:
1. MULCH CAN BE SUBSTITUTED WITH COMPOST.
2. WRAP SHALL BE CUT & REMOVED AFTER STABILIZATION IS ESTABLISHED. MULCH TO REMAIN.

MULCH SOCK
(NOT TO SCALE)



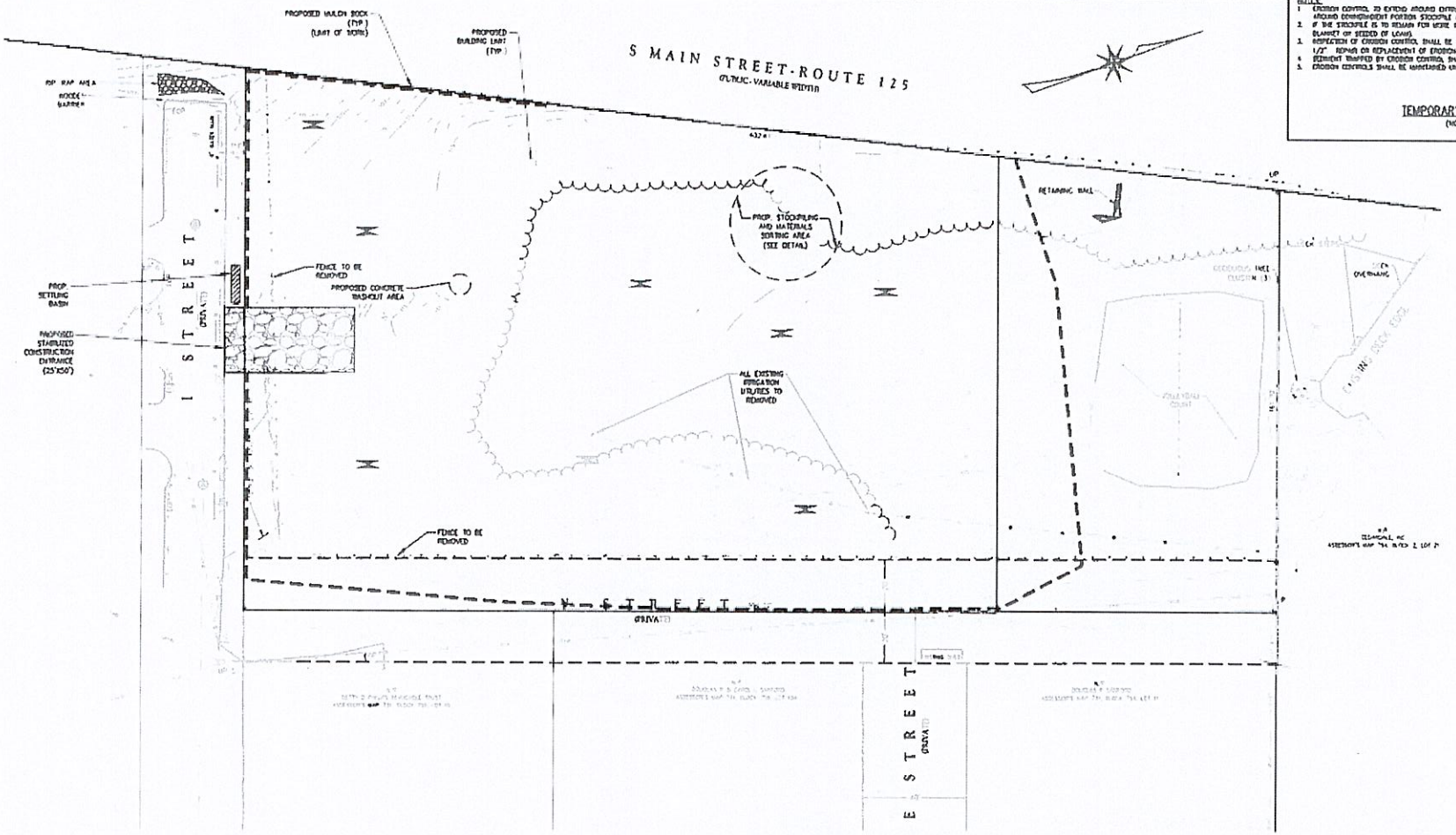
SITE CONSTRUCTION EXIT SPECIFICATIONS:
1. STONE FOR STABILIZATION CONSTRUCTION ENTRANCE SHALL BE 3"-4" STONE.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 40 FEET.
3. THE WIDTH OF THE ENTRANCE SHALL BE NO LESS THAN THE WIDTH OF THE ACCESS OR EGRESS DRIVE, OR 10 FEET, WHICHEVER IS GREATER.
4. GEOTEXTILE FILTER FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
5. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARDS THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH MINIMUM 1 TO 5 SLOPES THAT CAN BE CROSSED BY VEHICLES CAN BE SUBSTITUTED.
6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO RIGHTS OF WAY. THIS MAY REQUIRE PERIODIC TOPDRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. SEDIMENT SPILLED, WASHED OR TRACKED ONTO THE RIGHT OF WAY MUST BE REMOVED IMMEDIATELY.

STABILIZED CONSTRUCTION ENTRANCE DETAIL
(NOT TO SCALE)



NOTES:
1. EROSION CONTROL TO EXTEND AROUND ENTIRE PERIMETER OF STOCKPILE IF ON LEVEL GROUND OR TO EXTEND AROUND DOWNGRADIENT PORTION STOCKPILE IS ON SLOPE.
2. IF THE STOCKPILE IS TO REMAIN FOR MORE THAN 14 DAYS IT SHALL BE STABILIZED WITH AN EROSION CONTROL BLANKET OR SEEDED OF LOAM).
3. INSPECTION OF EROSION CONTROL SHALL BE AT LEAST ONCE PER WEEK AND AFTER RAIN EVENTS IN EXCESS OF 1/2". REPAIR OR REPLACEMENT OF EROSION CONTROL SHALL BE MADE PROMPTLY AS NEEDED.
4. SEDIMENT TRAPPED BY EROSION CONTROL SHALL BE REMOVED AND PROPERLY DISPOSED OF
5. EROSION CONTROLS SHALL BE MAINTAINED UNTIL STOCKPILE IS ELIMINATED

TEMPORARY SOIL STOCKPILE
(NOT TO SCALE)



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

The Morin-Cameron GROUP, INC.
CIVIL ENGINEERS | ENVIRONMENTAL CONSULTANTS
LAND SURVEYORS | LAND USE PLANNERS
[illegible]

SURVEY BY: MCG
DRAFTED BY: DTS
CHECKED BY: MAS
APPROVED BY: SPC
SCALE: AS NOTED
DATE: APRIL 28, 2020

#	DESCRIPTION	DATE
1	PER PEER & CITY COMMENTS	9/25/2020

SITE DEVELOPMENT PLANS
IN
HAVERHILL, MASSACHUSETTS
931 BOSTON ROAD
(PORTION OF ASSESSOR'S MAP 734, BLOCK 2, LOT 21)
PREPARED FOR
PRIMARK/MFT NORTH (DEVELOPMENT) LLC

SITE PREPARATION & EROSION CONTROL

DRAWING NO. 4 OF 11

FINAL PLAN
DRAWING #398_MAIN.dwg