

RESTAURANT DEPOT SITE PLAN & CONDITIONAL USE PERMIT

SP# 01-26 & CUP# 01-26

STAFF REPORT

June 24, 2026

SITE: 273 Lowell Road, Map 234 /Lot 034-000

ZONING: General - 1 (G-1)

PURPOSE OF PLAN: to depict the construction of a new commercial building for a wholesale cash-and-carry foodservice supplier, along with associate site improvements. The project has been designed to avoid any direct impacts to on-site wetlands, with all proposed work located outside of the wetland boundary. However, certain construction activities and site improvements are proposed within the 75-foot wetland buffer.

PLAN UNDER REVIEW:

Proposed Restaurant Depot Site Development Plans, SP# 01-26 & CUP# 01-26, Map 234 Lot 034, 273 Lowell Road, Hudson, New Hampshire; prepared by: Bohler Engineering, 3 Executive Park Drive Floor 2, Bedford, NH 03110; prepared for: Restaurant Depot 17-10 Whitestone Expressway, Whitestone, NY 11357; consisting of 22 sheets and general notes 1-32 on Sheet C-102; dated January 23, 2026, last revised June 9, 2026.

ATTACHMENTS:

- 1) Site Plan & CUP Applications received January 27, 2026– Attachment “**A**”.
- 2) Project Narrative – Attachment “**B**”.
- 3) Department Review Comments– Attachment “**C**”.
- 4) Conservation Commission Recommendation, dated April 13, 2026 – Attachment “**D**”.
- 5) Response to Conservation Commission Comments, prepared by Bohler Engineering, dated May 11, 2026 – Attachment “**E**”.
- 6) Peer Review, prepared by F&O, dated June 4, 2026 – Attachment “**F**”
- 7) Response to peer review, prepared by Bohler Engineering, dated June 9, 2026 – Attachment “**G**”.
- 8) CAP fee sheet – Attachment “**H**”.
- 9) Public Comment, Chestnut Realty Management, LLC (Mercury Systems), received May 19, 2026 – Attachment “**I**”.
- 10) Traffic Impact Response Comments, prepared by Chappell Engineering Associates, LLC, dated March 6, 2026 – Attachment “**J**” (Digital Only).
- 11) Truck Turn Exhibit, Proposed Site Driveway at Green Meadow Drive, and Exterior Elevations – Attachment “**K**”.
- 12) Planning Board Member Jim Crowley’s Comments, dated May 31, 2026 – Attachment “**L**”.
- 13) Site Plan dated January 23, 2026, last revised June 9, 2026, and Operation and Maintenance Plan.

APPLICATION TRACKING:

- January 27, 2026 – Site plan & CUP applications received.
- April 8, 2026 – Public Hearing held, continued to May 27, 2026.
- May 27, 2026 – Public Hearing deferred to June 24, 2026.
- June 24, 2026 – Public Hearing Scheduled.

WAIVERS REQUESTED:

- §275-8.C.(2) – Parking Calculations
- §275-8.C.(6)(a) – Loading Spaces Required
- §275-17.D.6 – General Lighting Requirements
- §275-8.C.(7).(d) – Landscaping

COMMENTS & RECOMMENDATIONS:

BACKGROUND

The site is approximately 10.5 acres and is located in the General – One (G-1) zone, and is currently undeveloped. This site is proposed to be serviced by Town water and septic. The site does contain wetlands along the central, northwestern, and western portions of the property. The site currently has no curb cut, and is proposed to be serviced by shared access with Mercury Systems via an easement through the Target site. Utilities are proposed to be delivered via the same easement. The applicant is proposing a slight encroachment into the wetland buffer as part of the development, for which a Conditional Use Permit has been recommended by the Conservation Commission. Full recommendation can be found in **Attachment “D”**.

WAIVER REQUESTS

The applicant has submitted three waivers at this time:

§275-8.C.(2) – Parking Calculations – To allow for 166 parking spaces where otherwise 250 would be required. The applicant states that based on their other locations they have a better measurement of how many spaces are needed for the site.

§275-8.C.(6)(a) – Loading Spaces Required – To allow for a reduced count of docking spaces. The applicant has stated that this count has been sufficient at other locations.

§275-17.D.6 – General Lighting Requirements – To allow the proposed off-site lighting to facilitate lighting along the driveway into the site as some of the driveway is not on the property.

§275-8.C.(7).(d) – Landscaping - To allow for 248 shrubs where 280 would otherwise be required. The applicant states that planting at the required density would result in overcrowding, leading to problems with plant health and visual clutter, including sight-line obstructions in the parking lot.

DEPARTMENT COMMENTS

A few comments were flagged from Fuss & O’Neill’s June 4, 2026 review regarding the Drainage Design/Stormwater Management. These comments have since been resolved with the applicant and the Engineering Department. Full Comments can be found in **Attachment “C”**.

PEER REVIEW

Revised materials were reviewed by Fuss & O’Neill, dated June 4, 2026 (Attachment “F”). The applicant has submitted a response letter dated June 9, 2026, along with related plan materials (Attachment “G”). Comments at this stage are relatively minimal, and review of the applicant’s response by staff indicates that all outstanding items have been resolved.

CONSERVATION COMMISSION

The Conditional Use Permit was submitted to the Conservation Commission, and a site walk was held on March 21, 2026. At the follow up hearing on April 13, 2026, a motion to recommend was voted on, with the following stipulations:

- 1) It is recommended to increase the 3 to 1 slope to a 2 to 1 slope wherever possible along the southwesterly portion of the driveway. This will help reduce the wetland buffer impact.
 - a) *The Engineering Department respectfully disagrees with this stipulation regarding the maintenance driveway slope of 2:1 and adhering to the standard 3:1 slope, which provides safer maintenance vehicle access and helps reduce long-term erosion.*
- 2) A stipulation and/or note should be added to the plan(s) that states: “During construction and restoration erosion control barriers shall be installed and maintained, to the satisfaction of the Town Engineer, along the limits of disturbance within, and/or adjacent to, any wetland(s) and/or wetland buffer(s).”
- 3) A stipulation and/or note should be added to the plan(s) that states: "Construction vehicles (non-refueling vehicles) shall not be parked within twenty-five (25) feet of any wetland or wetland buffer boundaries overnight".
- 4) A stipulation and/or note should be added to the plan(s) that states: "Refueling vehicles shall not be parked overnight or left unattended within seventy-five (75) feet of any wetland or wetland buffer boundaries".
- 5) A stipulation and/or note should be added to the plan(s) that states: "Stockpiling of construction materials is not allowed within the wetland or wetland buffer areas of the site or in areas designated for permanent conservation".
- 6) It is recommended that the applicant install approved “Do Not Cut/Do Not Disturb” town conservation markers along the conservation districts boundaries (75-foot wetland buffer).
- 7) A stipulation and/or note should be added to the plan(s) that states: "Any vegetation associated with post-construction BMPs and slope restoration including storm water management area shall be suitably established to withstand erosion and shall be inspected by the Town Engineer and the property owner shall be required to provide a suitable replacement for any vegetation not suitably established during the relevant monitoring period.”
- 8) A stipulation and/or note should be added to the plan(s) that states: "Fertilizers utilized for landscaping and lawn care shall be slow release, low-nitrogen types (<5%), and shall not be used within seventy-five (75) feet of wetland resource areas. Pesticides and herbicides shall not be used within seventy-five (75) feet of a wetland resource area.”

- 9) It is recommended to reduce the driveway width from thirty (30) feet to a minimum functional width required for safe and efficient operations, shifting the edge of pavement and the corresponding slope grading and associated work away from the wetland and wetland buffer, thereby reducing wetland buffer impacts and helping preserve the function of the wetland buffer by maintaining existing groundcover and mature vegetation.
 - a) *The Engineering Department also respectfully disagrees with this stipulation to reduce the entrance width from 30 feet to 24 feet due to past experience that narrower entrances tend to result in vehicle wheel paths encroaching over pavement edges, curbs, and landscaped areas -particularly 18-wheel trucks.*
- 10) It is recommended to specify native shrub plantings along proposed slopes facing the wetlands. Species to be selected shall be salt-tolerant and appropriate for the respective slopes.

STAFF COMMENTS

For parking purposes, staff has classified the proposed use as “Retail”, which results in a parking requirement necessitating a waiver request. In support of this request, the applicant has indicated that, as of January 1, 2026, Restaurant Depot operates 164 locations across 35 states and has established operational experience to help inform appropriate parking demand. As recommended by the Board, the applicant revised the parking calculation from 173 spaces to 166 spaces in order to eliminate the seven (7) parking spaces previously proposed within the setback areas.

Staff further notes that the applicant originally requested a waiver from §275-8.C.(4) to allow reduced parking space dimensions. However, a formal waiver is not required, as the Board may vote to allow the reduction of parking dimensions of 9 feet by 18 feet.

Staff would also like to note that the applicant has taken measures to address abutter concerns raised during the previous public hearing, including the addition of a proposed 12-foot-high noise barrier wall to screen the loading dock area and trash compactor, as well as revising the exterior paint color on the west elevation to be a more neutral tone.

For purposes of the Impact Fee (CAP Fee), staff finds that the designation of “Shopping Center” is the closest applicable category within the CAP Fee Matrix.

RECOMMENDATIONS

Staff recommends that the Board discuss any remaining questions and concerns with the applicant, including the requested waivers. Staff has not identified any outstanding issues or additional information required for the board to make an appropriate decision on these applications.

DRAFT MOTIONS:

TO CONTINUE:

I move to continue the Non-Residential **Site Plan** for Restaurant Depot Site Development Plan, SP# 01-26, Map 234 Lot 034, 273 Lowell Road, Hudson, NH, to date certain _____, 2026.

Motion by: _____ Second: _____ Carried/Failed: _____

I move to continue the **Conditional Use Permit** for Restaurant Depot Site Development Plan, CUP# 01-26, Map 234 Lot 034, 273 Lowell Road, Hudson, NH, to date certain _____, 2026.

Motion by: _____ Second: _____ Carried/Failed: _____

TO GRANT A WAIVER:

I move to grant a waiver **§275-8.C.(2) – Parking Calculations** – To allow for 166 parking spaces where otherwise 250 would be required, based on the Board’s discussion, the testimony of the Applicant’s representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____ Second: _____ Carried/Failed: _____

I move to grant a waiver **§275-17.D.6 – Light Trespass** – To permit off-site lighting where it would otherwise not be allowed, based on the Board’s discussion, the testimony of the Applicant’s representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____ Second: _____ Carried/Failed: _____

I move to grant a waiver **§275-8.C.(6).(a) – Loading Space Count** – To allow for a reduced count of docking spaces, based on the Board’s discussion, the testimony of the Applicant’s representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____ Second: _____ Carried/Failed: _____

I move to grant a waiver **§275-8.C.(7).(d) – Landscaping** - To allow for 248 shrubs where 280 would otherwise be required, based on the Board’s discussion, the testimony of the Applicant’s representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____ Second: _____ Carried/Failed: _____

TO APPROVE:

I move to approve the **Site Plan Application & Conditional Use Permit Application** for the Proposed Retail Building: Proposed Restaurant Depot Site Development Plans, SP# 01-26 & CUP# 01-26, Map 234 Lot 034, 273 Lowell Road, Hudson, New Hampshire; prepared by: Bohler Engineering, 3 Executive Park Drive Floor 2, Bedford, NH 03110; prepared for: Restaurant Depot 17-10 Whitestone Expressway, Whitestone, NY 11357; consisting of 22 sheets and general notes 1-32 on Sheet C-102; dated January 23, 2026, last revised June 9, 2026; and:

That the Planning Board finds that this application complies with the Zoning Ordinance, and with the Land Use Regulations with consideration of the waivers granted and for the reasons set forth in the written submissions, together with the testimony and factual representations made by the applicant during the public hearing;

Subject to, and revised per, the following stipulations:

1. All stipulations of approval shall be incorporated into the Development Agreement, which shall be recorded at the HCRD, together with the Site-Plan-of-Record.
2. All improvements shown on the Site Plan-of-Record, including all Notes, shall be completed in their entirety and at the expense of the applicant or the applicant's assigns.
3. Prior to the Planning Board endorsement of the Plan, it shall be subject to final administrative review by Town Planner, Town Engineer, and Town Counsel.
4. Prior to the issuance of a final certificate of occupancy, an L.L.S. Certified "As-Built" site plan shall be provided to the Town of Hudson Development Services Department, confirming that the site conforms to the Planning Board approved Site Plan.
5. A cost allocation procedure (CAP) fee amount of \$207,000.00, be paid prior to the issuance of the Certificate of Occupancy.
6. Prior to application for a building permit, the Applicant shall schedule a pre-construction meeting with the Town Engineer.
7. Maintenance of the onsite drainage system shall be constructed and maintained in compliance with NHDES requirements for such systems.
8. Construction activities involving the subject lot shall be limited to the hours between 7:00 A.M. and 7:00 P.M., Monday through Saturday. No exterior construction activities shall be allowed on Sundays.
9. If development involves blasting and/or ramming of bedrock materials, said activities shall be limited to the hours between 7:00 A.M. and 5:00 P.M. Monday through Friday only. Said blasting/ramming activities shall be prohibited on Saturday and Sunday.
10. Hours of refuse removal shall be exclusive to the hours between 7:00 A.M. and 7:00 P.M., Monday through Friday only.
11. During construction and restoration erosion control barriers shall be installed and maintained, to the satisfaction of the Town Engineer, along the limits of disturbance within, and/or adjacent to, any wetland(s) and/or wetland buffer(s).
12. Construction vehicles (non-refueling vehicles) shall not be parked within twenty-five (25) feet of any wetland or wetland buffer boundaries overnight.
13. Refueling vehicles shall not be parked overnight or left unattended within seventy-five (75) feet of any wetland or wetland buffer boundaries.
14. Stockpiling of construction materials is not allowed within the wetland or wetland buffer areas of the site or in areas designated for permanent conservation.
15. Town Conservation markers shall be installed at 50-foot intervals, at the Applicant's expense, along the conservation districts boundaries (75-foot wetland buffer).
16. Any vegetation associated with post-construction BMPs and slope restoration including storm water management area shall be suitably established to withstand erosion and shall be inspected by the Town Engineer and the property owner shall be required to provide a suitable replacement for any vegetation not suitably established during the relevant monitoring period.

17. Fertilizers utilized for landscaping and lawn care shall be slow release, low-nitrogen types (<5%), and shall not be used within seventy-five (75) feet of wetland resource areas. Pesticides and herbicides shall not be used within seventy-five (75) feet of a wetland resource area.
18. It is recommended to specify native shrub plantings along proposed slopes facing the wetlands. Species to be selected shall be salt-tolerant and appropriate for the respective slopes.

Motion by: _____ Second: _____ Carried/Failed: _____



*Town of Hudson
12 School Street
Hudson, NH 03501*

SITE PLAN APPLICATION

Revised September 2025

The following information must be filed with the Planning Department *at the time of filing a site plan application*:

1. One (1) original completed application with original signatures.
2. One (1) full plan set *folded* (sheet size: 22" x 34").
3. One (1) original copy of the project narrative.
4. A list of direct abutters and a list of indirect abutters, and two (2) sets of mailing labels for abutter notifications.
5. Site Plan Review Checklist.
6. All of the above application materials, including plans, shall also be submitted in electronic form as a PDF.
7. **All plans shall be folded** and all pertinent data shall be attached to the plans with an elastic band or other enclosure.
8. **Plans requiring third party consultant review** – Complete submittal must be sent to:
Fuss & O'Neill
c/o Steve Reichert, PE
50 Commercial Street Unit 2S
Manchester, NH 03101

The following information is required to be filed with the Planning Department *no later than 10:00 A.M., Tuesday ONE WEEK prior to the scheduled Planning meeting. The purpose of these materials is hardcopy distribution to Planning Board members, not review.*

Any plan revisions that require staff review must be submitted no later than 10:00A.M., Tuesday TWO WEEKS prior to the scheduled Planning meeting. Depending on the complexity of changes, more time may be required for review. Please contact the Town Planner if you have any questions on this matter.

1. Submission of fifteen (15) 11" X 17" plan sets *folded*, revised if applicable.
2. Submission of one (1) full plan set *folded* (sheet size: 22" x 34"), if revised.
3. All of the above application materials, including plans, shall also be submitted in electronic form as a PDF.

Note: Prior to filing an application, it is recommended to schedule an appointment with the Town Planner.

SITE PLAN APPLICATION

Date of Application: 01/23/26 Tax Map #: 243 Lot #: 34

Site Address: 273 Lowell Road

Name of Project: Proposed Restaurant Depot

Zoning District: GENERAL ONE ZONE (G-1) & WETLAND CONSERVATION DISTRICT General SP#: _____
(For Town Use Only)

Z.B.A. Action: _____

PROPERTY OWNER:

Name: IQ EQ Trustee, Thomas Friel Admin Trust
c/u Thomas Friel 2021 Rev Trust
3 Executive Park Drive, Suite 302
Address: Bedford, NH 03110 &
Philip J Friel III
Address: 94 Chritian Hill Rd
Amherst NH 03031
Telephone # 617.897.5674
Email: kburgener@sheehan.com

DEVELOPER:

LARRY COHEN - RESTAURANT DEPOT, LLC
17-10 WHITESTONE EXPRESSWAY
WHITESTONE, NY 11357
718-559-4290
lcohen@jetrord.com

PROJECT ENGINEER:

Name: KEITH CURRAN, P.E. - BOHLER, LLC
Address: 3 EXECUTIVE PARK, SUITE 202
Address: BEDFORD, NH 03110
Telephone # 603.441.2900
Email: kcurran@bohlereng.com

SURVEYOR:

KEACH-NORDSTROM ASSOCIATES, LLC
10 COMMERCE PARK NORTH, SUITE 3B
BEDFORD, NH 03110
603.627.2881
chickey@keachnordstrom.com

PURPOSE OF PLAN:

Please refer to attached cover letter.

(For Town Use Only)

Routing Date: _____ Deadline Date: _____ Meeting Date: _____

_____ I have no comments _____ I have comments (attach to form)

_____ Title: _____ Date: _____

(Initials)

Department: _____

Zoning: ___ Engineering: ___ Assessor: ___ Police: ___ Fire: ___ DPW: ___ Consultant: ___

SITE DATA SHEETPLAN NAME: Site Development Plans for Restaurant Depot, LLCPLAN TYPE: SITE PLANLEGAL DESCRIPTION: MAP 243 LOT 34

DATE: _____

Location by Street: 273 Lowell Road

Zoning: G-1 & Wetland Conservation District

Proposed Land Use: Commercial

Existing Use: Vacant Land

Surrounding Land Use(s): Residential - East, Commercial - All other sides

Number of Lots Occupied: One (1) Lot

Existing Area Covered by Building: N/A Vacant Land

Existing Buildings to be removed: N/A Vacant Land

Proposed Area Covered by Building: 50,000± SF

Open Space Proposed: (11.7% Interior Landscape)

Open Space Required: 10% Interior Landscape

Total Area: S.F.: 457,281 Acres: 10.5

Area in Wetland: 0.248 AC Area Steep Slopes: 17,865 SF EXIST

Required Lot Size: 87,120 SF

Existing Frontage: 405.09 FT

Required Frontage: 200.0 FT

Building Setbacks:	<u>Required*</u>	<u>Proposed</u>
Front:	<u>50 FT</u>	<u>168.8 FT</u>
Side:	<u>15 FT</u>	<u>64.8 FT</u>
Rear:	<u>15 FT</u>	<u>382.2 FT</u>

SITE DATA SHEET
(Continued)

Flood Zone Reference: Zone X

Width of Driveways: 30 FT

Number of Curb Cuts: One (1)

Proposed Parking Spaces: 173

Required Parking Spaces: 84/250

Basis of Required Parking (Use): Will vary depending on how Zoning will classify the use, we are showing between retail and industrial warehouse required parking, please see site plan.

Dates/Case #/Description/Stipulations of ZBA, Conservation Commission, NH Wetlands Board Actions: N/A
(Attach stipulations on separate sheet)

Waiver Requests

Town Code Reference: _____ *Regulation Description:* _____

Please see attached waiver request form.

(For Town Use Only)	
Data Sheets Checked By: _____	Date: _____

SITE PLAN APPLICATION AUTHORIZATION

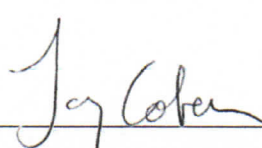
I hereby apply for *Site Plan* Review and acknowledge I will comply with all of the Ordinances of the Town of Hudson, New Hampshire State Laws, as well as any stipulations of the Planning Board, in development and construction of this project. I understand that if any of the items listed under the *Site Plan* specifications or application form are incomplete, the application will be considered rejected.

Pursuant to RSA 674:1-IV, the owner(s) by the filing of this application as indicated above, hereby given permission for any member of the Hudson Planning Board, the Town Planner, the Town Engineer, and such agents or employees of the Town or other persons as the Planning Board may authorize, to enter upon the property which is the subject of this application at all reasonable times for the purpose of such examinations, surveys, tests and inspections as may be appropriate. The owner(s) release(s) any claim to or right he/she (they) may now or hereafter possess against any of the above individuals as a result of any examinations, surveys, tests and/or inspections conducted on his/her (their) property in connection with this applications.

Signature of Owner:  Date: 1/20/26

Print Name of Owner: PHILIP J. FRIER, JR.

- ❖ If other than an individual, indicate name of organization and its principal owner, partners, or corporate officers.

Signature of Developer:  Date: 1/15/26

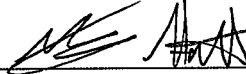
Print Name of Developer: Larry Cohen

- ❖ The developer/individual in charge must have control over all project work and be available to the Code Enforcement Officer/Building Inspector during the construction phase of the project. The individual in charge of the project must notify the Code Enforcement Officer/Building Inspector within two (2) working days of any change.

SITE PLAN APPLICATION AUTHORIZATION

I hereby apply for *Site Plan* Review and acknowledge I will comply with all of the Ordinances of the Town of Hudson, New Hampshire State Laws, as well as any stipulations of the Planning Board, in development and construction of this project. I understand that if any of the items listed under the *Site Plan* specifications or application form are incomplete, the application will be considered rejected.

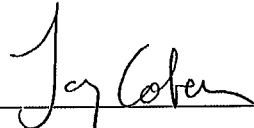
Pursuant to RSA 674:1-IV, the owner(s) by the filing of this application as indicated above, hereby given permission for any member of the Hudson Planning Board, the Town Planner, the Town Engineer, and such agents or employees of the Town or other persons as the Planning Board may authorize, to enter upon the property which is the subject of this application at all reasonable times for the purpose of such examinations, surveys, tests and inspections as may be appropriate. The owner(s) release(s) any claim to or right he/she (they) may now or hereafter possess against any of the above individuals as a result of any examinations, surveys, tests and/or inspections conducted on his/her (their) property in connection with this applications.

Signature of Owner:  Date: 1/20/2026

Thomas Hart, Trust Officer IQ EQ - Ttee of Administrative Trust c/u Thomas

Print Name of Owner: Friel 2021 Revocable Trust

- ❖ If other than an individual, indicate name of organization and its principal owner, partners, or corporate officers.

Signature of Developer:  Date: 1/15/26

Print Name of Developer: Larry Cohen

- ❖ The developer/individual in charge must have control over all project work and be available to the Code Enforcement Officer/Building Inspector during the construction phase of the project. The individual in charge of the project must notify the Code Enforcement Officer/Building Inspector within two (2) working days of any change.

SCHEDULE OF FEES**A. REVIEW FEES:**

1. <u>Site Plan Use</u>	<u>Project Size/Fee</u>	
Multi-Family	\$105.00/unit for 3-50 units \$78.50/unit for each additional unit over 50	\$ _____
Commercial/Semi Public/Civic or Recreational	\$157.00/1,000 sq. ft. for first 100,000 sq.ft. (bldg. area): \$78.50/1,000 sq.ft. thereafter.	\$ <u>7,850.00</u>
Industrial	\$150.00/1,000 sq.ft for first 100,000 sq.ft. (bldg. area); \$78.50/1,000 sq.ft thereafter.	\$ _____
No Buildings	\$30.00 per 1,000 sq.ft. of proposed developed area	\$ _____

CONSULTANT REVIEW FEE: (Separate Check)

Total 10.498 acres @ \$600.00 per acre, or \$1,250.00,
whichever is greater. \$ 6,298.80

This is an estimate for cost of consultant review. The fee is expected to cover the amount. A complex project may require additional funds. A simple project may result in a refund.

LEGAL FEE:

The applicant shall be charged attorney costs billed to the Town for the Town's attorney review of any application plan set documents.

B. POSTAGE:

<u>11</u>	Direct Abutters Applicant, Professionals, etc. as required by RSA 676:4.1.d @\$6.08 (or Current Certified Mail Rate)	\$ <u>66.88</u>
<u>2</u>	Indirect Abutters (property owners within 200 feet) @\$0.78 (or Current First Class Rate)	\$ <u>1.56</u>

C. TAX MAP UPDATING FEE: (FLAT FEE) \$ 275.00

TOTAL \$ 14,492.24

SCHEDULE OF FEES
(Continued)

(For Town Use)	
AMOUNT RECEIVED: \$ _____	DATE RECEIVED: _____
RECEIPT NO.: _____	RECEIVED BY: _____

NOTE: fees below apply only upon plan approval, not collected at time of application.

D. RECORDING:

*****The applicant shall be responsible for the recording of the approved plan, and all documents as required by an approval, at the Hillsborough County Registry of Deeds (HCRD), located at 19 Temple Street, Nashua, NH 03061. Additional fees associated with recording can be found at HCRD.*****

E. COST ALLOCATION PROCEDURE AMOUNT CONTRIBUTION AND OTHER IMPACT FEE PAYMENTS:

To be determined by the Planning Board at time of plan approval and shall be paid by the applicant at the time of submittal of the Certificate of Occupancy Permit requests.

*****The applicant shall be responsible for all fees incurred by the town for processing and review of the applicant's application, plan and related materials.*****

**TOWN OF HUDSON
SITE PLAN REVIEW CHECKLIST**

This checklist is intended to help the applicant and staff to ensure application completeness. Please refer to the regulations on the exact language of each requirement.

Key: Y=Yes P =Pending W=Waiver Request

Relevant Regulations:

§ 276-11.1 General Plan Requirements

§§ 275-8 – 275-9 Site Plan Requirements

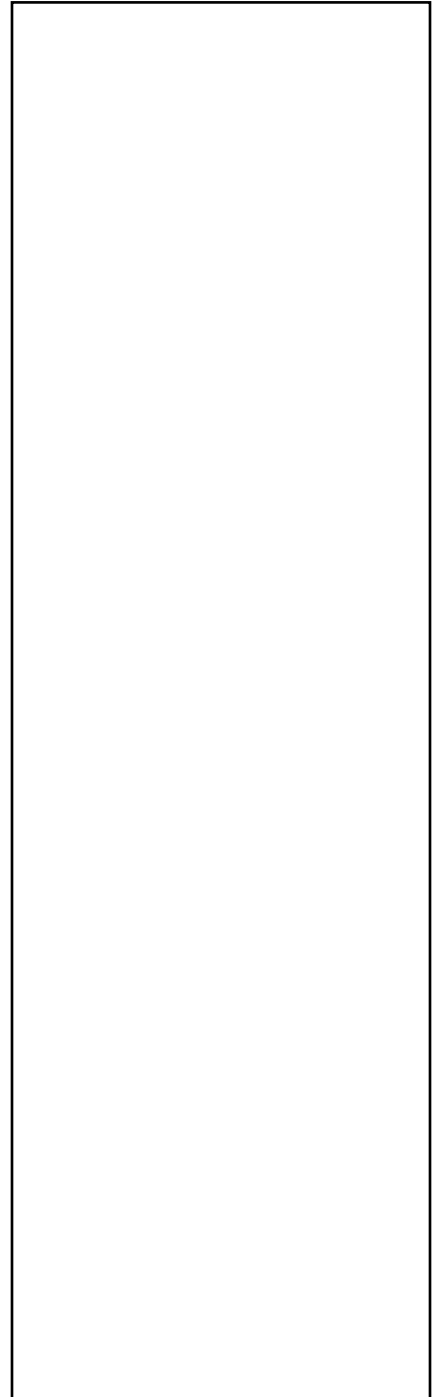
- | | <u>Y</u> | <u>P</u> | <u>W</u> | |
|-----|-------------------------------------|--------------------------|--------------------------|--|
| 1. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - A list of the names and addresses of the owner(s) of the property, the applicant(s), and all abutters as indicated in the office of the Town Assessor records not more than five (5) days prior to the day of filing [§ 276-11.1.A.] |
| 2. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Sets of plans and copies as indicated on application. |
| 3. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Scale no smaller than 50 feet to the inch (1" = 50') [§ 276-11.1.B.(2)] |
| 4. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Title block in the lower right-hand corner of the plan, containing: [§ 276-11.1.B.(3)] |
| 5. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Title, including the term "site plan" or "subdivision plan" |
| 6. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - The name for whom the plan was prepared |
| 7. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Preparer of the plan |
| 8. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - The scale(s) of the plan |
| 9. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Date of the plan |
| 10. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Appropriate revision block |
| 11. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Approval block (2"x6") located on the lower left corner of each sheet, with the required language and signature line [§ 276-11.1.B.(4) & § 289-27.A] |
| 12. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Owner's printed name and address and signature [§ 276-11.1.B.(6)] |
| 13. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Name and address of all abutting property owners [§ 276-11.1.B.(7)] |
| 14. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - A locus plan at one inch equals 1,000 feet (1" = 1,000') [§ 276-11.1.B.(8)] |

(Continue next page)

Notes

15. - Boundary of the entire parcel held in single ownership with boundary dimensions and bearings [§ 276-11.1.B.(9)]
16. - Error of closure shown and certified by a licensed land surveyor
17. - North point arrow
18. - Zoning classification note of the tract and location of the zoning district boundaries if the property is located in two or more zoning district [§ 276-11.1.B.(10)]
19. - The location of all buildings within 50 feet of the tract [§ 276-11.1.B.(15)]
20. - The location of roadways, driveways, travel areas or parking areas within 200 feet of the tract, in accordance with § 276-11.1.B.(16)
21. - Existing topography at two-foot contour intervals of that portion of the tract being proposed for development from a topographic survey and contours on the remainder of the tract from a reliable plan source [§ 276-11.1.B.(17)]
22. - Proposed topography at two-foot contour intervals [§ 276-11.1.B.(18)]
23. - A note identifying the Tax Map and Lot Number of the tract [§ 276-11.1.B.(19)]
24. - The location of all existing buildings (including size and height), driveways, sidewalks, parking spaces, loading area, open spaces, large trees, open drainage courses, signs, exterior lighting, service areas, easements landscaping and other pertinent items. [§ 276-11.1.B.(20)]
25. - The location of all proposed construction, buildings, structures, pavement, etc. [§ 276-11.1.B.(21)]
26. - A green area shown between the right-of-way line and any pavement, gravel or structure meeting the required minimum width [§ 276-11.1.B.(22)]
29. - Note any pertinent highway projects. [§ 276-11.1.B.(23)]

(Continue next page)



**TOWN OF HUDSON
SITE PLAN REVIEW CHECKLIST**

This checklist is intended to help the applicant and staff to ensure application completeness. Please refer to the regulations on the exact language of each requirement.

Key: Y=Yes P =Pending W=Waiver Request NA=Not Applicable (please explain)

- | | <u>Y</u> | <u>P</u> | <u>W</u> | <u>NA</u> | |
|-----|-------------------------------------|--------------------------|--------------------------|-------------------------------------|---|
| 30. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - The location of all building setback lines as required by Chapter 334, Zoning, and setback lines as required by § 276-11.1.B.(12). |
| 31. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - The location size and character of all signs or a note* stating "All signs are subject to approval by the Hudson Zoning Administrator prior to installation thereof." [§ 276-11.1.B.(13)]
*The discrepancy on the note language is correct – reference to the Planning Board in the regulations is outdated. |
| 32. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - The location, detail and character of all exterior lighting or a note stating: "There will be no exterior lighting." [§ 276-11.1.B.(14)] |
| 33. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Required open space, including the calculation showing the requirement is met [§ 276-11.1.B.(24)] |
| 34. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Parking space calculation showing and a statement stating the required parking spaces are provided [§ 275-8.C.(2) & (3)] |
| 35. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Required dimensions for parking space [§ 275-8.C.(4)] |
| 36. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Required dimensions for aisle/access drive [§ 275-8.C.(5)] |
| 37. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Required off-street loading spaces [§ 275-8.C.(6)] |
| 38. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Required landscaping for the parking lot, including calculation shown the planting requirement is met [§ 275-8.C.(7)] |
| 39. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | - Required screening for visual separation of incompatible uses [§ 275-8.C.(8)] |
| 40. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Handicap accessibility provided in accordance with the latest ADA Regulations [§ 275-8.C.(11)] |
| 41. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Stormwater Management Plan [§ 275-9.A] |
| 42. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Traffic Study, if required [§ 275-9.B] |
| 43. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | - Noise Study, if required [§ 275-9.C] |

Notes

(Continue next page)

TOWN OF HUDSON
SITE PLAN REVIEW CHECKLIST

This checklist is intended to help the applicant and staff to ensure application completeness. Please refer to the regulations on the exact language of each requirement.

Key: Y=Yes P =Pending W=Waiver Request NA=Not Applicable (please explain)

- | | <u>Y</u> | <u>P</u> | <u>W</u> | <u>NA</u> | |
|-----|--------------------------|--------------------------|--------------------------|-------------------------------------|---|
| 44. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | - Fiscal Impact Study, if required [§ 275-9.D] |
| 45. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | - Utility Study [§ 275-9.E] |
| 46. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | - Copies of any proposed or existing easements, covenants, deed restrictions or any other similar document pertinent to the Site Plan [§ 275-9.F] |
| 47. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | - A copy of all applicable Town, state, county or federal approvals or applications [§ 275-9.G] |
| 48. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | - Environmental Impact Study, if required [§ 275-9.I] |

Notes

(End of checklist)



*Town of Hudson
12 School Street
Hudson, NH 03501*

CONDITIONAL USE PERMIT APPLICATION:
WETLAND CONSERVATION OVERLAY DISTRICT

Revised November 2025

Applications must be received at least 21 days prior to the Planning Board and Conservation Commission meetings at which the application will be heard. *The following information must be filed to each board.*

CONSERVATION COMMISSION:

1. Ten (10) copies of the completed application, including the project narrative that demonstrates that the proposal meets the conditions of Article IX of the Zoning Ordinance.
2. Ten (10) reduced size plan sets *folded* (sheet size: 11" X 17"). Plans require the stamp of a licensed land surveyor and a certified wetlands scientist. At a minimum, plans must show topography and any wetland within fifty (50) feet of the proposed project for residential lots, and seventy-five (75) feet for commercial lots.

***Complete Application material should be delivered to the Engineering Department (603)886-6008.**

PLANNING BOARD:

1. One (1) copy of the completed application, including the project narrative that demonstrates that the proposal meets the conditions of Article IX of the Zoning Ordinance.
2. One (1) full size plan set *folded* (sheet size: 22" x 34") and fifteen (15) reduced size plan sets *folded* (sheet size: 11" X 17"). Plans require the stamp of a licensed land surveyor and a certified wetlands scientist. At a minimum, plans must show topography and any wetland within fifty (50) feet of the proposed project for residential lots, and seventy-five (75) feet for commercial lots.
3. A list of direct abutters and indirect abutters, and two (2) sets of mailing labels for abutter notifications.
4. All of the above application materials, including plans, shall also be submitted in electronic form as a PDF.
5. Check should be made payable to the *Town of Hudson*, and submitted to the Planning Department.

***Complete Application material & check should be delivered to the Planning Department (603)886-6008.**

Revised plans and other application materials must be filed with the Planning Department *no later than 10:00A.M., Tuesday ONE WEEK prior to the scheduled meeting, as applicable. The purpose of these materials is hardcopy distribution to Planning Board members, not review.*

Any plan revisions that require staff review must be submitted no later than 10:00A.M., Tuesday TWO WEEKS prior to the scheduled Planning meeting. Depending on the complexity of changes, more time may be required for review. Please contact the Town Planner if you have any questions on this matter.

Note: Prior to filing an application, it is recommended to schedule an appointment with the Town Planner and Town Engineer.

CONDITIONAL USE PERMIT APPLICATION

Date of Application: 01/23/26 Tax Map #: 243 Lot #: 34

Site Address: 273 Lowell Road

Name of Project: Proposed Restaurant Depot

Zoning District: GENERAL ONE ZONE (G-1) & WETLAND CONSERVATION DISTRICT General CUP#: _____
(For Town Use Only)

Z.B.A. Action: _____

PROPERTY OWNER:

Name: IQ EQ Trustee, Thomas Friel Admin Trust
c/u Thomas Friel 2021 Rev Trust
Address: 3 Executive Park Drive, Suite 302
Bedford, NH 03110 &
Philip J Friel III
Address: 94 Chritian Hill Rd
Amherst NH 03031
Telephone # 617.897.5674
Email: kburgener@sheehan.com

DEVELOPER:

LARRY COHEN - RESTAURANT DEPOT, LLC
17-10 WHITESTONE EXPRESSWAY
WHITESTONE, NY 11357
718-559-4290
lcohen@jetrord.com

PROJECT ENGINEER or SURVEYOR:

Name: KEITH CURRAN, P.E. - BOHLER, LLC
Address: 3 EXECUTIVE PARK, SUITE 202
Address: BEDFORD, NH 03110
Telephone # 603.441.2900
Email: kcurran@bohlereng.com

CERTIFIED WETLANDS SCIENTIST:

KEACH-NORDSTROM ASSOCIATES, LLC
10 COMMERCE PARK NORTH, SUITE 3B
BEDFORD, NH 03110
603.627.2881
chickey@keachnordstrom.com

PURPOSE OF PLAN:

Please refer to attached cover letter.

(For Town Use Only)

Routing Date: _____ Deadline Date: _____ Meeting Date: _____

_____ I have no comments _____ I have comments (attach to form)

_____ Title: _____ Date: _____
(Initials)

Department: _____

Zoning: _____ Engineering: _____ Assessor: _____ Police: _____ Fire: _____ DPW: _____ Consultant: _____

SITE DATA SHEET

PLAN NAME: Site Development Plans for Restaurant Depot, LLC

PLAN TYPE: (Site Plan, Subdivision, or other) Site Plan

LEGAL DESCRIPTION: MAP 243 LOT 34

DATE: 01/23/2026

Location by Street: 273 Lowell Road

Zoning: G-1 & Wetland Conservation District

Proposed Land Use: Commercial

Existing Use: Vacant Land

Total Site Area: S.F.: 457,281 Acres: 10.5

Total Wetland Area (SF): One (1) Lot

Permanent Wetland Impact Area (SF): 0

Permanent Wetland Buffer Impact Area (SF): 1,651±

Temporary Wetland Impact Area (SF): 0

Temporary Wetland Buffer Impact Area (SF): 9,014±

Flood Zone Reference: Zone X

Proposed Mitigation:

We are not proposing to disturb the wetland, we are proposing to place a portion of an aboveground infiltration basin within the 75 foot buffer.

(For Town Use Only)

Data Sheets Checked By: _____ Date: _____

WETLAND CONDITIONAL USE PERMIT CHECKLIST

Yes	No	NA	<u>QUESTIONS/INFORMATION NEEDED</u>	HCC Comments
NARRATIVE REPORT				
Existing Conditions				
<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	Has a DES Dredge and Fill Permit been issued for any part of this site? If yes, provide number, date, and description.	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Is there evidence of altered wetlands or surface waters on site?	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	All prime and other wetlands in the vicinity, plus any wetlands/watersheds past the immediate vicinity affected by this project	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	• Description of each wetland and associated values	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Wetland mapping results – Including the flagging date and technique plus the name, company and qualifications of the wetland scientist	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Was property surveyed? If yes, the date of survey. (Please attach the survey plan)	
National Wetland Inventory				
<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	• Vegetative cover types	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	• Existence of vernal pools and associated habitat	
<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	• Unique geological and cultural features	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	NH Natural Heritage inventory – For list of rare and endangered species, contact the • NH Division of Forests and Lands (603)271-3623	
<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	• Wildlife and fauna species, including estimated number and locations (large projects)	
<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	• Public or private wells located within the vicinity	
<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	• Monitoring well(s) located on site	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	• Current land use and zoning district	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Photos of existing area (please use color photos)	
Proposed Project Description				
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Entire project and associated activities	
<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	Time table of project and anticipated phasing	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Land use	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Grading plan	
Impact to Wetlands and/or Buffers				
<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	• Depending on size and proposed impacts, a report from a biologist may be appropriate	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	Removing, filling, dredging, or altering (Area square ft. and locations)	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	Intercepting or diverging of ground or surface water (Locations and size)	
<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	• Change in run-off characteristics	
<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Delineation of drainage area contributing to each discharge point	

Attachment "A"

Yes	No	NA	Questions/Information Needed	HCC COMMENTS
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Estimated water quality characteristics of runoff at each point of discharge for both pre- and post-development	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Erosion control practices	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> If using rip-rap, attach documentation explaining why other erosion control methods are not feasible 	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> How storm water runoff will be handled 	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If backyards or lots include a buffer area, buffer restriction wording shall be included in each deed (A physical marker may be requested to designate buffer boundaries at site)	

Mitigation

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Square footage of mitigation – wetland and upland areas	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wetland or upland plants identified to replace any losses	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> Restoration plan for planting and vegetation 	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Conservation easements, including location and aesthetic, wildlife and vegetative values	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> If easement is on or added to the site(s), a copy of the legal document shall be given to the HCC (HCC conservation easement markers may also be required along the easement) 	

CONCEPTUAL SITE PLAN/DRAWING

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Locus map depicting project site and vicinity within approximately ½ mile and also on a larger scale	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All prime and other wetlands in the vicinity	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wetland(s) impacted (identified as prime or other) and the wetland boundaries with 50', buffer areas highlighted in color	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Assessor's sheet(s), lot(s), and property account number(s)	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Existing and proposed structures	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Square footage listed for temporary and permanent impact	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Erosion control plan (Suggested: Biodegradable silt fences so area won't be disturbed again and no hay to avoid invasive species)	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topographical map with contours	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Storm water treatment swales and basins highlighted in color if in buffer area	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conservation and utility easements	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grading plan	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Culvert, arch, bridge - sizes, material, etc.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetative cover types	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vernal pools	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Existing and proposed stone walls, tree lines, and unusually large, rare or beautiful trees, and other notable site features	


QUESTIONS TO CONSIDER BEFORE SUBMITTING

- Will the increased discharge cause erosion and channelization?
- Is there potential for off-site flooding?
- Does the decreased infiltration in the drainage area cause vegetation stress due to reduced or increased ground water or surface water discharge into wetland?
- Will the nutrients in the runoff increase eutrophication potential in downstream water bodies?
- Do you own any adjacent parcels or easements for roadways across adjacent parcels which could be used for access to avoid a wetland crossing
- Does a wetland crossing occur where it will result in the least amount of alteration to a wetland?
- Is preservation of upland areas adjacent to the impacted wetland a priority?
- Can using an alternative crossing design such as a bridge, retaining wall, etc. decrease the width or area of wetland alteration?
- Does a proposed road crossing of a wetland exceed the minimum width acceptable to the Planning Board and can this be negotiated downwards?
- Have you established that no reasonable alternative access from a public way to an upland is possible?
- Can the parking lot spaces be decreased?
- Is the roadway designed in such a way that does not restrict the flow of water?
- Is additional information needed to assess water quality impacts due to runoff?
- Is there an increase in other pollutants (e.g., heavy metals, turbidity, coli form) from streets and parking lots?
- Is there a need to restrict or prohibit the use of pesticides and fertilizers?
- Is there a need to restrict the use of roadway salting?

CONDITIONAL USE PERMIT APPLICATION AUTHORIZATION

I hereby apply for *Conditional Use Permit* and acknowledge I will comply with all of the Ordinances of the Town of Hudson, New Hampshire State Laws, as well as any stipulations of the Planning Board, in development and construction of this project. I understand that if any of the items listed under the *Conditional Use Permit* specifications or application form are incomplete, the application will be considered rejected.

Pursuant to RSA 674:1-IV, the owner(s) by the filing of this application as indicated above, hereby given permission for any member of the Hudson Planning Board, the Hudson Conservation Commission, the Town Planner, the Town Engineer, and such agents or employees of the Town or other persons as the Planning Board may authorize, to enter upon the property which is the subject of this application at all reasonable times for the purpose of such examinations, surveys, tests and inspections as may be appropriate. The owner(s) release(s) any claim to or right he/she (they) may now or hereafter possess against any of the above individuals as a result of any examinations, surveys, tests and/or inspections conducted on his/her (their) property in connection with this applications.

Signature of Owner:  Date: 1/20/2026

Thomas Hart, Trust Officer IQ EQ - Tee of Administrative Trust c/u Thomas Friel

Print Name of Owner: 2021 Revocable Trust

- ❖ If other than an individual, indicate name of organization and its principal owner, partners, or corporate officers.

Signature of Developer:  Date: 1/15/26

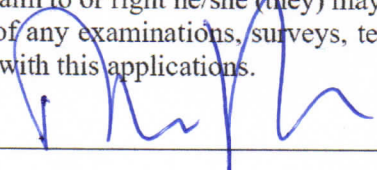
Print Name of Developer: Larry Cohen

- ❖ The developer/individual in charge must have control over all project work and be available to the Code Enforcement Officer/Building Inspector during the construction phase of the project. The individual in charge of the project must notify the Code Enforcement Officer/Building Inspector within two (2) working days of any change.

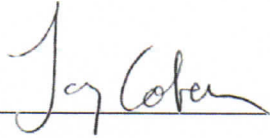
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Signature of Owner:  Date: 1/20/26
Print Name of Owner: PHILIP J FRIEL, III

❖ If other than an individual, indicate name of organization and its principal owner, partners, or corporate officers.

Signature of Developer:  Date: 1/15/26
Print Name of Developer: Larry Cohen

❖ The developer/individual in charge must have control over all project work and be available to the Code Enforcement Officer/Building Inspector during the construction phase of the project. The individual in charge of the project must notify the Code Enforcement Officer/Building Inspector within two (2) working days of any change.

SCHEDULE OF FEES

(Fee covers both Conservation Commission & Planning Board)

A. REVIEW FEES:

1. Conditional Use Permit
\$100 Flat Fee \$ 100.00

LEGAL FEE:

The applicant shall be charged attorney costs billed to the Town for the Town’s attorney review of any application plan set documents.

B. POSTAGE:

<u>11</u>	Direct Abutters Applicant, Professionals, etc. as required by RSA 676:4.1.d @\$6.08 (or Current Certified Mail Rate)	\$ <u>66.88</u>
<u>2</u>	Indirect Abutters (property owners within 200 feet) @\$0.78 (or Current First-Class Rate)	\$ <u>1.56</u>
TOTAL		\$ <u>168.44</u>

(For Town Use)	
AMOUNT RECEIVED: \$ _____	DATE RECEIVED: _____
RECEIPT NO.: _____	RECEIVED BY: _____



Attachment "A"

3 Executive Park Drive
Bedford, NH 03110
603.441.2900

Abutters List

Direct/Indirect	Parcel_ID	Address	Owner
Indirect	234-036-000	274 LOWELL RD	MACTHOMPSON REALTY, INC.
Indirect	228-054-000	272 LOWELL RD	NEW LIFE CHRISTIAN CHURCH
Indirect	228-052-000	268 LOWELL RD	DEXTER, KAREN
Direct	234-034-000	273 LOWELL RD	FRIEL, THOMAS P., TR.
Direct	234-033-000	277 LOWELL RD	277 LOWELL RD LLC
Indirect	234-032-000	279 LOWELL RD	KOMMA HOLDING, LLC
Indirect	234-017-000	9 LINDA ST	LIAKOS, ARTHUR
Direct	234-014-000	18 LINDA ST	WONG, DON R.
Direct	234-013-000	16 LINDA ST	CARROLL, ROY
Direct	234-012-000	12 LINDA ST	TEMPESTA, MARK
Direct	234-011-000	10 LINDA ST	STEVENS, SEAN P.
Indirect	234-031-000	281 LOWELL RD	ROBINSON, MICHELLE J.
Indirect	234-037-000	280 LOWELL RD	MACTHOMPSON REALTY INC.

SCHEDULE OF FEES

(Fee covers both Conservation Commission & Planning Board)

A. REVIEW FEES:

1. Conditional Use Permit
\$100 Flat Fee \$ 100.00

LEGAL FEE:

The applicant shall be charged attorney costs billed to the Town for the Town’s attorney review of any application plan set documents.

B. POSTAGE:

<u>11</u>	Direct Abutters Applicant, Professionals, etc. as required by RSA 676:4.1.d @\$6.08 (or Current Certified Mail Rate)	\$ <u>66.88</u>
<u>2</u>	Indirect Abutters (property owners within 200 feet) @\$0.78 (or Current First-Class Rate)	\$ <u>1.56</u>
TOTAL		\$ <u>168.44</u>

(For Town Use)	
AMOUNT RECEIVED: \$ _____	DATE RECEIVED: _____
RECEIPT NO.: _____	RECEIVED BY: _____

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: Proposed Restaurant Depot

Street Address: 273 Lowell Road

I Keith Curran, P.E. hereby request that the Planning Board waive the requirements of item HR 275-8.C.(2) & Zoning Ordinance (ZO) 334-15.A of the Subdivision/Site Plan Checklist in reference to a plan presented by Keach-Nordstrom Associates, Inc & Bohler, LLC (name of surveyor and engineer) dated 01/23/26 rev 03/24/26 for property tax map(s) 234 and lot(s) 34 in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

Three horizontal lines for providing hardship reasons and documentation.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

See next page: followed by three horizontal lines for providing reasons and documentation.

Signed: [Handwritten Signature] Keith Curran, P.E.

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted

Waiver Not Granted

Attachment "A"

Restaurant Depot ("RD") does not readily fall into a type of use classified within Hudson's Zoning Ordinance, which the nearest being retail or industrial/warehouse. RD is a distributor/seller of approximately 6,000 different items. Their product range extends from dry groceries, perishables (produce, meat, fish), fresh and frozen foods, paper and plastics, to equipment and supplies but in much larger packages than a grocery store or club store. RD does not do any cooking, cutting, fabricating, processing, or preparation of food. All of their product is sold in its original form. This location will be open to the general public and will be open 7 days a week. As January 1st, 2026, RD operates 164 locations in 35 states and has understanding of the parking they need to fulfill their operations.

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: Proposed Restaurant Depot

Street Address: 273 Lowell Road

I Keith Curran, P.E. hereby request that the Planning Board waive the requirements of item HR 275-8.C.(6)(a) of the Subdivision/Site Plan Checklist in reference to a plan presented by Keach-Nordstrom Associates, Inc & Bohler, LLC (name of surveyor and engineer) dated 01/23/26 rev 03/24/26 for property tax map(s) 234 and lot(s) 34 in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

Three horizontal lines for providing hardship reasons or documentation.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

Restaurant Depot is providing the necessary amount of loading docks to support their operations.

Two horizontal lines for providing reasons for granting the waiver.

Signed: [Signature] Keith Curran, P.E.

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted

Waiver Not Granted

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: Proposed Restaurant Depot

Street Address: 273 Lowell Road

I Restaurant Depot, LLC hereby request that the Planning Board waive the requirements of item HR 275-17.D.6 of the Subdivision/Site Plan Checklist in reference to a plan presented by Keach-Nordstrom, Associates, LLC and Bohler, LLC (name of surveyor and engineer) dated 05/12/2026 for property tax map(s) 243 and lot(s) 34 in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

Three horizontal lines for providing hardship reasons and documentation.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

Off-site lighting is proposed to facilitate lighting along the driveway into the site as some of the driveway is not on the property.

Two horizontal lines for providing reasons for granting the waiver.

Signed:
Applicant or Authorized Agent

Planning Board Action:
Waiver Granted
Waiver Not Granted

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: Proposed Restaurant Depot

Street Address: 273 Lowell Road

I Restaurant Depot, LLC hereby request that the Planning Board waive the requirements of item 275-8.C.(7).(d) of the Subdivision/Site Plan Checklist in reference to a plan presented by Keach-Nordstrom, Associates, LLC and Bohler, LLC (name of surveyor and engineer) dated 05/12/2026 for property tax map(s) 243 and lot(s) 34 in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

The proposed landscape plan provides a substantial quantity of shrubs and satisfies the town's landscape objectives. While the site is deficient by 32 shrubs, accommodating the additional shrubs within the remaining landscape areas would result in excessive planting density and overcrowding at maturity, compromising the intended visual quality of the design. Increased shrub density may also create sight-line obstructions within the parking lot.

Signed:

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted _____

Waiver Not Granted _____

June 9, 2026

Via hand and electronic mail delivery

Planning Department
12 School Street
Hudson, NH 03051

Attn: Brooke Dubowik, Town Planner

**Re: Site Plan Review Application
Proposed Restaurant Depot
273 Lowell Road
Hudson, NH**

Dear Ms. Dubowik:

On behalf of the Applicant, Restaurant Depot, LLC, Bohler is submitting this package for a Site Plan Review Application and supporting materials for the proposed Restaurant Depot at the above referenced site. In this revision we have addressed requests made by the third-party reviewer, Fuss & O'Neill, please see supporting materials enclosed for further information.

In support of this application, please find the following enclosed:

- One (1) Waiver Request Form - HR 275-8.C.(7).(d).
- One (1) Copy of Fuss & O'Neill comment response letter dated June 9, 2026.
- Fifteen (15) Copies of plan set folded (sheet size: 11"x17") of Site Development Plans prepared by our office dated 01/23/2026, revised 06/09/2026.
- One (1) Copy of Stormwater Management Report Operation and Maintenance Plan (sheet size 11"x17") prepared by our office dated 01/23/2026, revised 06/09/2026.
- All of the above application materials, including plans, shall also be submitted in electronic form as a PDF.

We trust the above is sufficient for your review of the project. Should you have any questions or require additional information, please do not hesitate to contact us at (603) 441-2900.

Sincerely,

Bohler, LLC



Keith Curran, Senior Project Manager, P.E.

Planning Board Sign-off

Project Name		Map/Lot:	
Site Address:		Zone:	
		Due by:	

Project Status		Ready for Approval	Awaiting Revisions	Approval with Stipulations
DEPARTMENT	INITIAL			
FUSS & O'NEILL:				
ZONING:				
ASSESSING:				
ENGINEERING:				
PUBLIC WORKS:				
FIRE:				
POLICE:				

Comments:

Planning Board Sign-off

Project Name		Map/Lot:	
Site Address:		Zone:	
		Due by:	

Extended Comments:

Dubowik, Brooke

From: Gradert Benjamin
Sent: Tuesday, June 16, 2026 2:24 PM
To: Keith Curran; Dhima, Elvis
Cc: Dubowik, Brooke; 'nha250020.01@nf.bohlereng.com'; Mike Ward; Kirkland, Donald
Subject: RE: Restaurant Depot - Peer Review Comment Response Letter

Keith,

No waiver will be needed on our end since ENG is good with it, you're meeting the intent of the reg by hitting the 2 f/s. The only new waiver for this round is the shrubs one you submitted earlier in the month.

Thank you,



TOWN OF HUDSON NH

Ben Withham-Gradert – Associate Planner
12 School Street
Hudson, NH 03051
(603) 886-6008

From: Keith Curran <kcurran@bohlereng.com>
Sent: Monday, June 15, 2026 3:03 PM
To: Dhima, Elvis <edhima@hudsonnh.gov>
Cc: Dubowik, Brooke <bdubowik@hudsonnh.gov>; 'nha250020.01@nf.bohlereng.com' <nha250020.01@nf.bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Mike Ward <mward@bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Kirkland, Donald <dkirkland@hudsonnh.gov>
Subject: RE: Restaurant Depot - Peer Review Comment Response Letter

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Thank you!

From: Dhima, Elvis <edhima@hudsonnh.gov>
Sent: Monday, June 15, 2026 3:03 PM
To: Keith Curran <kcurran@bohlereng.com>
Cc: Dubowik, Brooke <bdubowik@hudsonnh.gov>; 'nha250020.01@nf.bohlereng.com' <nha250020.01@nf.bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Mike Ward <mward@bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Kirkland, Donald <dkirkland@hudsonnh.gov>
Subject: RE: Restaurant Depot - Peer Review Comment Response Letter

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All set on the velocity as well ,

ENG is all set

E



TOWN OF HUDSON NH

Elvis Dhima, P.E. – Development Services Director
12 School Street
Hudson, NH 03051
(603) 886-6008

From: Keith Curran <kcurran@bohlereng.com>
Sent: Monday, June 15, 2026 2:16 PM
To: Dhima, Elvis <edhima@hudsonnh.gov>
Cc: Dubowik, Brooke <bdubowik@hudsonnh.gov>; 'nha250020.01@nf.bohlereng.com' <nha250020.01@nf.bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Mike Ward <mward@bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Kirkland, Donald <dkirkland@hudsonnh.gov>
Subject: RE: Restaurant Depot - Peer Review Comment Response Letter

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Elvis,

Please see the attached showing the velocities for the 2-year storm and the 5-year storm. All pipes are greater than 2.0 ft/s for both storms.

Brooke / Ben – Can you please let me know if we need to request the additional waivers.

Thank you,

Keith Curran, P.E.

Sr. Project Manager, Land Development

3 Executive Park Drive, Suite 202

Bedford, NH 03110

o 603-441-2900 / c 239-227-9071 / kcurran@bohlereng.com

www.BohlerEngineering.com

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From: Dhima, Elvis <edhima@hudsonnh.gov>
Sent: Thursday, June 11, 2026 12:36 PM
To: Keith Curran <kcurran@bohlereng.com>
Cc: Dubowik, Brooke <bdubowik@hudsonnh.gov>; 'nha250020.01@nf.bohlereng.com' <nha250020.01@nf.bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Mike Ward <mward@bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Kirkland, Donald <dkirkland@hudsonnh.gov>
Subject: RE: Restaurant Depot - Peer Review Comment Response Letter

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Keith ,

All set with the cover requirement,

As far as the 2ft/s , what do you have for the 2 year storm or 5 year storm? Your client should not have to wait 25 years to have these pipe, self-clean , lol

Thanks

E



TOWN OF HUDSON NH

Elvis Dhima, P.E. – Development Services Director
12 School Street
Hudson, NH 03051
(603) 886-6008

From: Keith Curran <kcurran@bohlereng.com>
Sent: Thursday, June 11, 2026 11:49 AM
To: Dhima, Elvis <edhima@hudsonnh.gov>
Cc: Dubowik, Brooke <bdubowik@hudsonnh.gov>; 'nha250020.01@nf.bohlereng.com' <nha250020.01@nf.bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Mike Ward <mward@bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Kirkland, Donald <dkirkland@hudsonnh.gov>
Subject: RE: Restaurant Depot - Peer Review Comment Response Letter

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Elvis,

Thank you for the quick response. There is only one location where we have less than 2 feet of cover. Please see the attached showing the highlighted location. We have at least 1.5 feet of cover. See the attached information from the manufacturer confirming the required minimum cover is achieved. Also attached are the calculations showing the pipe flow velocities are all greater than 2 ft/sec.

Thank you,

Keith Curran, P.E.

Sr. Project Manager, Land Development

3 Executive Park Drive, Suite 202

Bedford, NH 03110

o 603-441-2900 / c 239-227-9071 / kcurran@bohlereng.com

www.BohlerEngineering.com

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From: Dhima, Elvis <edhima@hudsonnh.gov>

Sent: Thursday, June 11, 2026 8:20 AM

To: Keith Curran <kcurran@bohlereng.com>

Cc: Dubowik, Brooke <bdubowik@hudsonnh.gov>; 'nha250020.01@nf.bohlereng.com'

<nha250020.01@nf.bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Mike Ward

<mward@bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Kirkland, Donald <dkirkland@hudsonnh.gov>

Subject: RE: Restaurant Depot - Peer Review Comment Response Letter

EXTERNAL: Use caution with attachments and links.

Keith

HDPE cover by manufactures standards is 2 feet min , can you confirm you have at least two foot cover

The slope 0.5% vs 2.0% , you need to show that this pipe has at least 2 ft/s so it can self-clean, even though its private.

Brooke, Ben ,

Please confirm that they don't need a waiver for this, previous applicants have in the past , even for private facilities

Everything else looks good

E



TOWN OF HUDSON NH

Elvis Dhima, P.E. – Development Services Director
12 School Street
Hudson, NH 03051
(603) 886-6008

From: Keith Curran <kcurran@bohlereng.com>
Sent: Wednesday, June 10, 2026 3:04 PM
To: Dhima, Elvis <edhima@hudsonnh.gov>
Cc: Dubowik, Brooke <bdubowik@hudsonnh.gov>; 'nha250020.01@nf.bohlereng.com' <nha250020.01@nf.bohlereng.com>; Gradert Benjamin <bgradert@hudsonnh.gov>; Mike Ward <mward@bohlereng.com>
Subject: Restaurant Depot - Peer Review Comment Response Letter

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Elvis,

Please see our attached comment response letter for the latest letter from Fuss and O'Neil dated June 4, 2026 regarding the proposed Restaurant Depot. If possible, I would like to discuss a few of the comments and our responses with you. Do you have time to discuss the beginning of next week? Please just let me know your availability and I can set up a call.

Thank you,

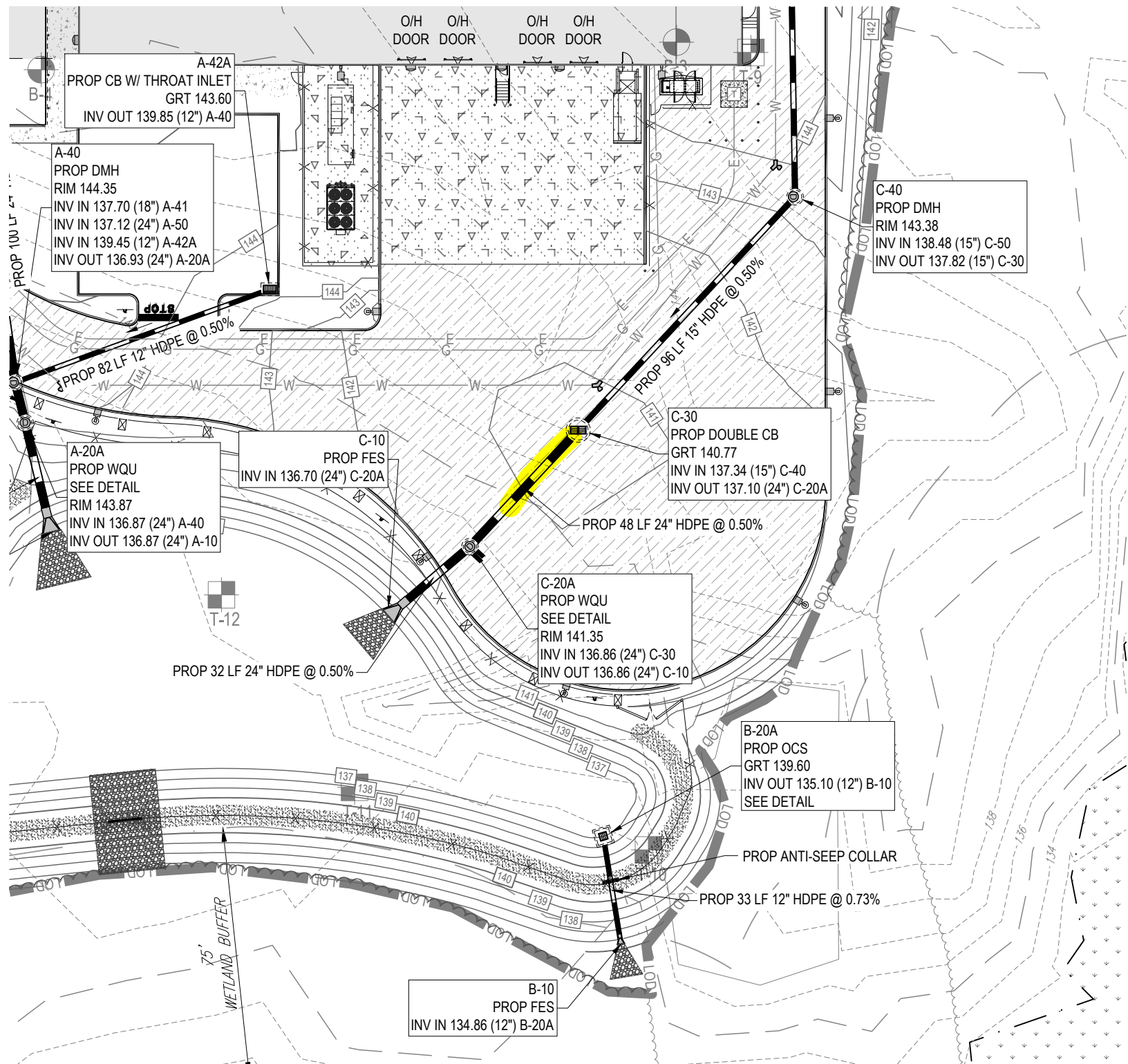
Keith Curran, P.E.

Sr. Project Manager, Land Development
3 Executive Park Drive, Suite 202
Bedford, NH 03110
o 603-441-2900 / c 239-227-9071 / kcurran@bohlereng.com
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1.5 FT OF COVER PIPE C-30 - C-20A



Technical Note

TN 2.01 Minimum and Maximum Burial Depth for Corrugated HDPE Pipe (per AASHTO)

Introduction

The information in this document is designed to provide answers to general cover height questions; the data provided is not intended to be used for project design. The design procedure described in the Structures section (Section 2) of the Drainage Handbook provides detailed information for analyzing most common installation conditions. This procedure should be utilized for project specific designs.

The two common cover height concerns are minimum cover in areas exposed to vehicular traffic and maximum cover heights. Either may be considered “worst case” scenario from a loading perspective, depending on the project conditions.

The minimum and maximum cover heights in this technical note are not applicable to retention/detention systems, where unique configurations of fittings may require different minimum and maximum cover height limits. Please reference ADS Standard Detail 702 “Retention-Detention System (Cross-Section)” for cover height recommendations.

Minimum Cover in Traffic Applications

Pipe diameters from 4” - 48” (100 - 1200 mm) installed in traffic areas (AASHTO H-20, H-25, or HL-93 loads) must have at least 1’ (0.3 m) of cover over the pipe crown, while 54” - 60” (1350 - 1500 mm) pipes must have at least 24” (600 mm) of cover. The backfill envelope must be constructed in accordance with the Installation section (Section 5) of the Drainage Handbook and the requirements of ASTM D2321. The backfill envelope must be of the type and compaction listed in Appendix A-5, Table A-5-2 of the Drainage Handbook. In Table 1 below, this condition is represented by a Class III material compacted to 95% standard Proctor density or a Class II material compacted to 90% standard proctor density, although other material can provide similar strength at slightly lower levels of compaction. Structural backfill material should extend to the crown of the pipe; the remaining cover should be appropriate for the installation and as specified by the design engineer. If settlement or rutting is a concern, it may be appropriate to extend the structural backfill to grade. Where pavement is involved, sub-base material can be considered in the minimum burial depth. While rigid pavements can be included in the minimum cover, the thickness of flexible pavements should not be included in the minimum cover.

Additional information that may affect the cover requirements is included in the Installation section (Section 5) of the Drainage Handbook. Some examples of what may need to be considered are temporary heavy equipment, construction loading, paving equipment and similar loads that are less than the design load, the potential of pipe flotation, and the type of surface treatment which will be installed over the pipe zone.

Table 1 Minimum Cover Requirements for ADS N-12®, N-12 ST, and N-12 WT (per AASHTO) with AASHTO H-20, H-25, or HL-93 Load

Inside Diameter, ID, in (mm)	Minimum Cover ft (m)	Inside Diameter, ID, in (mm)	Minimum Cover ft (m)
4 (100)	1 (0.3)	24 (600)	1 (0.3)
6 (150)	1 (0.3)	30 (750)	1 (0.3)
8 (200)	1 (0.3)	36 (900)	1 (0.3)
10 (250)	1 (0.3)	42 (1050)	1 (0.3)
12 (300)	1 (0.3)	48 (1200)	1 (0.3)
15 (375)	1 (0.3)	54 (1350)	2 (0.6)
18 (450)	1 (0.3)	60 (1500)	2 (0.6)

Notes for Table 1:

- 1. Minimum covers presented here were calculated assuming Class III backfill material to 95% standard Proctor density or Class II backfill material to 90% standard Proctor density around the pipe and structural backfill to the crown of the pipe, as recommended in Section 5 of the Drainage Handbook, with an additional layer of compacted traffic lane sub-base for a total cover as required. In shallow traffic installations, especially where pavement is involved, a good quality compacted material to grade is required to prevent surface rutting. Material must be adequately “knifed” into haunch and in between corrugations. Compaction and backfill material is assumed uniform throughout entire backfill zone.*
- 2. The minimum covers specified do not include pavement thickness. A pavement section of 0.4’ (0.1 m) is typical.*
- 3. Backfill materials and compaction levels not shown in the table may also be acceptable. Contact ADS for further detail.*
- 4. Calculations assume no hydrostatic pressure and native soils that are as strong as the specified minimum backfill recommendations.*

Maximum Cover

Wall thrust generally governs the maximum cover a pipe can withstand and conservative maximum cover heights will result when using the information presented in the *Structures* section (Section 2) of the Drainage Handbook.

The maximum burial depth is highly influenced by the type of backfill and level of compaction around the pipe. General maximum cover limits for ADS N-12, N-12 ST, N-12 WT pipe, (ASTM F2306 and AASTHO M252/M294 Type S pipes) are shown in Table 3 for a variety of backfill conditions.

Table 3 was developed assuming pipe is installed in accordance with ASTM D2321 and the *Installation* section (Section 5) of the Drainage Handbook. Additionally, the calculations assume zero hydrostatic load, incorporate the maximum safety factors represented in Structures section of the Drainage Handbook, use material properties consistent with the expected performance characteristics for N-12 (per ASTM F2306) materials as shown in Table 2 below, and assume the native soil is of adequate strength and is suitable for installation. For applications requiring fill heights greater than those shown in Table 3 or where hydrostatic pressure due to groundwater is present, contact an ADS engineering representative.

Figure 1 ADS N-12⁻, N-12 ST, and N-12 WT (per AASHTO) Trench Detail Under Pavement

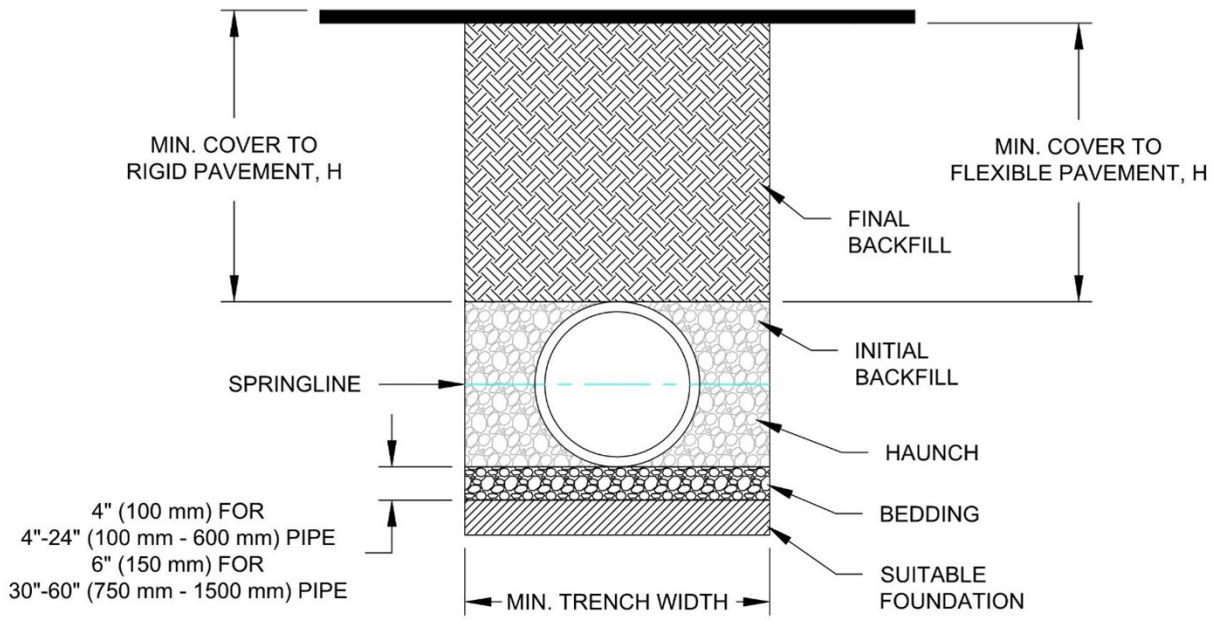


Table 2 ADS N-12 (per AASHTO) Mechanical Properties

Cell Class	Factored Compressive Strain (%)	Tension Strain (%)	Initial		75-Year	
			Fu (psi)	E (psi)	Fu (psi)	E (psi)
ASTM D3350 435400C	4.1	5.0	3,000	110,000	900	21,000

Table 3 Maximum Cover for ADS N-12, N-12 ST, and N-12 WT Pipe (per AASHTO)

Diameter in. (mm)	Class 1		Class 2			Class 3	
	Compacted ft (m)	Dumped ft (m)	95% ft (m)	90% ft (m)	85% ³ ft (m)	95% ft (m)	90% ³ ft (m)
4 (100)	37 (11.3)	18 (5.5)	25 (7.6)	18 (5.5)	12 (3.7)	18 (5.5)	13 (4.0)
6 (150)	44 (13.4)	20 (6.1)	29 (8.8)	20 (6.1)	14 (4.3)	21 (6.4)	15 (4.6)
8 (200)	32 (9.8)	15 (4.6)	22 (6.7)	15 (4.6)	10 (3.0)	16 (4.9)	11 (3.4)
10 (250)	38 (11.6)	18 (5.5)	26 (7.9)	18 (5.5)	12 (3.7)	18 (5.5)	13 (4.0)
12 (300)	35 (10.7)	17 (5.2)	24 (7.3)	17 (5.2)	8 (2.4)	17 (5.2)	11 (3.4)
15 (375)	38 (11.6)	17 (5.2)	25 (7.6)	17 (5.2)	8 (2.4)	18 (5.5)	11 (3.4)
18 (450)	36 (11.0)	17 (5.2)	24 (7.3)	17 (5.2)	8 (2.4)	17 (5.2)	11 (3.4)
24 (600)	28 (8.5)	13 (4.0)	20 (6.1)	13 (4.0)	7 (2.1)	14 (4.3)	10 (3.0)
30 (750)	28 (8.5)	13 (4.0)	20 (6.1)	13 (4.0)	7 (2.1)	14 (4.3)	9 (2.7)
36 (900)	26 (7.9)	12 (3.7)	18 (5.5)	12 (3.7)	7 (2.1)	13 (4.0)	9 (2.7)
42 (1050)	23 (7.0)	11 (3.4)	16 (4.9)	11 (3.4)	7 (2.1)	11 (3.4)	7 (2.1)
48 (1200)	25 (7.6)	11 (3.4)	17 (5.2)	11 (3.4)	7 (2.1)	12 (3.7)	7 (2.1)
54 (1350)	22 (6.7)	10 (3.0)	16 (4.9)	10 (3.0)	6 (1.8)	11 (3.4)	7 (2.1)
60 (1500)	25 (7.6)	11 (3.4)	17 (5.2)	11 (3.4)	6 (1.8)	12 (3.7)	7 (2.1)

Notes:

1. Results based on calculations shown in the Structures section of the ADS Drainage Handbook (v20.7). Calculations assume no hydrostatic pressure and a density of 120 pcf (1926 kg/m³) for overburden material.
2. Installation assumed to be in accordance with ASTM D2321 and the Installation section of the Drainage Handbook.
3. For installations using lower quality backfill materials or lower compaction efforts, pipe deflection may exceed the 5% design limit; however controlled deflection may not be a structurally limiting factor for the pipe. For installations where deflection is critical, pipe placement techniques or periodic deflection measurements may be required to ensure satisfactory pipe installation.
4. Backfill materials and compaction levels not shown in the table may also be acceptable. Contact ADS for further detail.
5. Material must be adequately “knifed” into haunch and in between corrugations. Compaction and backfill material is assumed uniform throughout entire backfill zone.
6. Compaction levels shown are for standard Proctor density.
7. For projects where cover exceeds the maximum values listed above, contact ADS for specific design considerations.
8. Calculations assume no hydrostatic pressure. Hydrostatic pressure will result in a reduction in allowable fill height. Reduction in allowable fill height must be assessed by the design engineer for the specific field conditions.
9. Fill height for dumped Class I material incorporate an additional degree of conservatism that is difficult to assess due to the large degree of variation in the consolidation of this material as it is dumped. There is limited analytical data on its performance. For this reason, values as shown are estimated to be conservatively equivalent to Class 2, 90% SPD.



adspipe.com
800-821-6710

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	33.927	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	17.34	17.34	5.52	24	0.50	136.70	136.87	139.32	139.49	138.95	144.56	A-10toA-20A_X2
2	1	12.537	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	16.95	16.95	5.40	24	0.48	136.87	136.93	139.56	139.62	144.56	144.42	A-20AtoA-40_X1
3	2	99.872	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	17.34	17.34	5.52	24	0.50	137.12	137.62	140.07	140.57	144.42	145.65	A-40toA-50_X42
4	3	31.990	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	8.05	8.05	4.55	18	0.50	137.62	137.78	140.65	140.82	145.65	145.62	A-50toA-60_X35
5	4	42.000	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	8.04	8.04	4.55	18	0.50	137.78	137.99	140.86	141.07	145.62	145.48	A-60toA-70_X38
6	5	42.000	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	8.04	8.04	4.55	18	0.50	137.99	138.20	141.12	141.33	145.48	145.36	A-70toA-80_X37
7	6	31.065	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	7.91	7.91	4.47	18	0.48	138.20	138.35	141.38	141.53	145.36	145.52	A-80toA-90_X34
8	7	12.935	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	8.37	8.37	4.74	18	0.54	138.35	138.42	141.58	141.65	145.52	145.61	A-90toA-100_X36
9	8	44.000	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	4.95	4.95	4.03	15	0.50	138.42	138.64	141.70	141.92	145.61	145.56	A-100toA-110_X3
10	9	50.778	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	4.91	4.91	4.00	15	0.49	138.64	138.89	141.96	142.21	145.56	145.59	A-110toA-120_X1
11	10	78.350	0.43	0.00	0.47	0.20	0.00	5.0	0.0	0.0	2.76	2.76	3.51	12	0.51	140.62	141.02	142.46	142.86	145.59	145.13	A-120toA-130_X1
12	11	99.000	0.59	0.00	0.41	0.24	0.00	5.0	0.0	0.0	2.71	2.71	3.46	12	0.49	141.02	141.51	142.95	143.44	145.13	145.13	A-130toA-140_X1
13	10	99.883	0.98	0.00	0.46	0.45	0.00	5.0	0.0	0.0	2.73	2.73	3.48	12	0.50	139.89	140.39	142.46	142.96	145.59	144.02	A-120toA-120A_X
14	2	81.731	0.11	0.00	0.80	0.09	0.00	5.0	0.0	0.0	2.70	2.70	3.92	12	0.49	139.45	139.85	140.27	140.67	144.42	143.61	A-40toA-42A_X25
15	14	30.999	0.04	0.00	0.90	0.04	0.00	5.0	0.0	0.0	6.72	6.72	8.59	12	3.03	139.85	140.79	140.90	141.76	143.61	144.38	A-42AtoA-42B_X3
16	2	158.166	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	8.04	8.04	4.55	18	0.50	137.70	138.49	140.07	140.86	144.42	143.85	A-40toA-41_X15
17	16	107.746	0.82	0.00	0.75	0.62	0.00	5.0	0.0	0.0	4.95	4.95	4.04	15	0.50	139.27	139.81	141.13	141.67	143.85	143.68	A-41toA-41A_X14
18	16	94.949	0.15	0.00	0.82	0.12	0.00	5.0	0.0	0.0	2.74	2.74	3.49	12	0.51	138.76	139.24	141.13	141.61	143.85	142.86	A-41toA-41B_X13
19	End	32.240	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	17.26	17.26	5.50	24	0.50	136.70	136.86	139.32	139.48	138.95	141.32	C-10toC-20A_X4
20	19	47.931	0.76	0.00	0.82	0.62	0.00	5.0	0.0	0.0	17.34	17.34	5.52	24	0.50	136.86	137.10	139.55	139.79	141.32	140.73	C-20AtoC-30_X3
21	20	96.014	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	4.95	4.95	4.03	15	0.50	137.34	137.82	140.03	140.51	140.73	143.55	C-30toC-40_X40
22	21	102.178	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	4.94	4.94	4.03	15	0.50	138.48	138.99	140.69	141.20	143.55	143.79	C-40toC-50_X39

Project File: Storm System-rev1.stm

Number of lines: 25

Run Date: 6/11/2026

NOTES: Intensity = 36.67 / (Inlet time + 6.70) ^ 0.70; Return period = Yrs. 25 ; Total flows limited to full flow capacities ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	8.981	0.09	0.00	0.73	0.07	0.00	5.0	0.0	0.0	2.88	2.88	3.67	12	0.56	139.94	139.99	141.45	141.50	143.79	143.61	C-50toC-50A_X26
24	22	125.001	0.00	0.00	0.90	0.00	0.00	5.0	0.0	0.0	4.93	4.93	4.02	15	0.50	138.99	139.61	141.45	142.08	143.79	143.91	C-50toC-60_X5
25	24	14.574	0.27	0.00	0.43	0.12	0.00	5.0	0.0	0.0	2.86	2.86	3.64	12	0.55	139.91	139.99	142.33	142.41	143.91	143.61	C-60toC-70_X4

Project File: Storm System-rev1.stm

Number of lines: 25

Run Date: 6/11/2026

NOTES: Intensity = $36.67 / (\text{Inlet time} + 6.70)^{0.70}$; Return period = Yrs. 25 ; Total flows limited to full flow capacities ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	33.927	0.00	3.08	0.90	0.00	1.72	5.0	7.4	3.5	9.63	17.34	5.27	24	0.50	136.70	136.87	137.85	137.98	138.95	144.56	A-10toA-20A_X2
2	1	12.537	0.00	3.08	0.90	0.00	1.72	5.0	7.3	3.5	9.64	16.95	5.39	24	0.48	136.87	136.93	137.98	138.04	144.56	144.42	A-20AtoA-40_X1
3	2	99.872	0.00	2.00	0.90	0.00	0.89	5.0	7.0	3.6	6.78	17.34	4.80	24	0.50	137.12	137.62	138.04	138.54	144.42	145.65	A-40toA-50_X42
4	3	31.990	0.00	2.00	0.90	0.00	0.89	5.0	6.9	3.6	6.66	8.05	5.09	18	0.50	137.62	137.78	138.66	138.82	145.65	145.62	A-50toA-60_X35
5	4	42.000	0.00	2.00	0.90	0.00	0.89	5.0	6.7	3.6	5.69	8.04	4.42	18	0.50	137.78	137.99	138.88	138.95	145.62	145.48	A-60toA-70_X38
6	5	42.000	0.00	2.00	0.90	0.00	0.89	5.0	6.6	3.7	4.73	8.04	4.20	18	0.50	137.99	138.20	139.01	139.04	145.48	145.36	A-70toA-80_X37
7	6	31.065	0.00	2.00	0.90	0.00	0.89	5.0	6.5	3.7	4.61	7.91	4.60	18	0.48	138.20	138.35	139.04	139.17	145.36	145.52	A-80toA-90_X34
8	7	12.935	0.00	2.00	0.90	0.00	0.89	5.0	6.4	3.7	3.77	8.37	4.06	18	0.54	138.35	138.42	139.17	139.16	145.52	145.61	A-90toA-100_X36
9	8	44.000	0.00	2.00	0.90	0.00	0.89	5.0	6.2	3.7	3.63	4.95	4.40	15	0.50	138.42	138.64	139.22	139.44	145.61	145.56	A-100toA-110_X3
10	9	50.778	0.00	2.00	0.90	0.00	0.89	5.0	6.0	3.8	3.38	4.91	4.14	15	0.49	138.64	138.89	139.48	139.63	145.56	145.59	A-110toA-120_X1
11	10	78.350	0.43	1.02	0.47	0.20	0.44	5.0	5.7	3.8	1.71	2.76	3.69	12	0.51	140.62	141.02	141.19	141.59	145.59	145.13	A-120toA-130_X1
12	11	99.000	0.59	0.59	0.41	0.24	0.24	5.0	5.0	4.0	0.97	2.71	2.42	12	0.49	141.02	141.51	141.70	141.92	145.13	145.13	A-130toA-140_X1
13	10	99.883	0.98	0.98	0.46	0.45	0.45	5.0	5.0	4.0	1.80	2.73	3.71	12	0.50	139.89	140.39	140.48	140.98	145.59	144.02	A-120toA-120A_X
14	2	82.000	0.11	0.11	0.80	0.09	0.09	5.0	5.0	4.0	0.35	2.71	2.37	12	0.49	139.45	139.85	139.69	140.09	144.42	143.61	A-40toA-42A_X25
15	2	158.166	0.00	0.97	0.90	0.00	0.74	5.0	5.7	3.8	2.83	8.04	4.05	18	0.50	137.70	138.49	138.32	139.13	144.42	143.85	A-40toA-41_X15
16	15	107.746	0.82	0.82	0.75	0.62	0.62	5.0	5.0	4.0	2.46	4.95	4.01	15	0.50	139.27	139.81	139.89	140.44	143.85	143.68	A-41toA-41A_X14
17	15	94.949	0.15	0.15	0.82	0.12	0.12	5.0	5.0	4.0	0.49	2.74	2.23	12	0.51	138.76	139.24	139.13	139.53	143.85	142.86	A-41toA-41B_X13
18	End	32.240	0.00	1.12	0.90	0.00	0.81	5.0	6.9	3.6	6.30	17.26	4.02	24	0.50	136.70	136.86	137.85	137.75	138.95	141.32	C-10toC-20A_X4
19	18	47.931	0.76	1.12	0.82	0.62	0.81	5.0	6.8	3.6	6.32	17.34	4.69	24	0.50	136.86	137.10	137.75	137.99	141.32	140.73	C-20AtoC-30_X3
20	19	96.014	0.00	0.36	0.90	0.00	0.18	5.0	6.4	3.7	4.07	4.95	4.50	15	0.50	137.34	137.82	138.20	138.68	140.73	143.55	C-30toC-40_X40
21	20	102.178	0.00	0.36	0.90	0.00	0.18	5.0	6.0	3.8	3.24	4.94	4.30	15	0.50	138.48	138.99	139.22	139.73	143.55	143.79	C-40toC-50_X39
22	21	8.981	0.09	0.09	0.73	0.07	0.07	5.0	5.0	4.0	0.26	2.88	2.23	12	0.56	139.94	139.99	140.14	140.20	143.79	143.61	C-50toC-50A_X26

Project File: Storm System-rev1.stm

Number of lines: 24

Run Date: 6/15/2026

NOTES: Intensity = 42.86 / (Inlet time + 10.30) ^ 0.87; Return period = Yrs. 2 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	21	125.001	0.00	0.27	0.90	0.00	0.12	5.0	5.1	4.0	1.31	4.93	2.25	15	0.50	138.99	139.61	140.01	140.06	143.79	143.91	C-50toC-60_X5
24	23	14.574	0.27	0.27	0.43	0.12	0.12	5.0	5.0	4.0	0.46	2.86	2.61	12	0.55	139.91	139.99	140.18	140.27	143.91	143.61	C-60toC-70_X4

Project File: Storm System-rev1.stm

Number of lines: 24

Run Date: 6/15/2026

NOTES: Intensity = $42.86 / (\text{Inlet time} + 10.30)^{0.87}$; Return period = Yrs. 2 ; c = cir e = ellip b = box



TOWN OF HUDSON
Conservation Commission



Carl Murphy, Chairman (Vacant), Selectmen Liaison

12 School Street • Hudson, New Hampshire 03051 • Tel: 603-886-6008 • Fax: 603-816-1291

Motion to Recommend/Not Recommend approval by the Planning Board of the Wetland Buffer Conditional Use Permit Application related to the subject Commercial Site Plan Application

Date:

April 13, 2026

Case:

Restaurant Depot, LLC – Commercial Site Plan and Conditional Use Permit Application
273 Lowell Rd, Hudson, NH; Map 243, Lot 34
Zone: General (G-1) & Wetland Conservation Overlay District

Description of work to be performed:

The project proposes construction of a 50,000 square-foot (SF) commercial-use building with 173 spaces for parking, The lot is accessed by an existing Driveway, sign and utility easement from Mercury Drive. The site is undeveloped and there are wetlands located to the southwest side of the property. A portion of the above-ground infiltration basin and driveway are within the 75-foot wetland buffer. The site plan if constructed as shown will have a permanent wetland buffer impact of 1,651 +/- SF and a temporary wetland buffer impact of 9,014 +/- SF.

Members Present:

Chair, Mr. Murphy E, Vice-Chair, Mr. Dickinson X, Clerk, Mr. Cameron X, Mr. Walter X, Ms. Griswold X.

Conservation Members Stepping Down: None

Alternates Seated: None

Motion to "Not Recommend":

_____ moved to not recommend a favorable acceptance by the Hudson Planning Board of the Conditional Use Permit application filed for Tax Map 243, Lot 34, by

representatives of Restaurant Depot, LLC, dated April 13, 2026. Motion seconded by:

_____.

Motion to "Recommend":

Mr. Walter moved to recommend a favorable acceptance by the Hudson Planning Board of the Conditional Use Permit application filed by representatives of Restaurant Depot, LLC, reference Tax Map 243, Lot 34, dated January 23, 2026, revised N.A. After application review, the Hudson Conservation Commission finds that the uses presented by the applicant, along with the associated grading and retaining wall, comply with Town of Hudson Zoning Ordinance 334, Article IX- Wetland Conservation Overlay District, paragraphs 334-36(C) 2 through 4, and 334-37. This favorable acceptance is contingent upon Planning Board approval of the proposed site plan along with the recommendations and stipulations listed below:

General recommendations by the Hudson Conservation Commission to the Planning Board:

1. It is recommended to increase the 3 to 1 slope to a 2 to 1 slope wherever possible along the southwesterly portion of the driveway. This will help reduce the wetland buffer impact.
2. A stipulation and/or note should be added to the plan(s) that states: "During construction and restoration erosion control barriers shall be installed and maintained, to the satisfaction of the Town Engineer, along the limits of disturbance within, and/or adjacent to, any wetland(s) and/or wetland buffer(s)."
3. A stipulation and/or note should be added to the plan(s) that states: "Construction vehicles (non-refueling vehicles) shall not be parked within twenty-five (25) feet of any wetland or wetland buffer boundaries overnight".
4. A stipulation and/or note should be added to the plan(s) that states: "Refueling vehicles shall not be parked overnight or left unattended within seventy-five (75) feet of any wetland or wetland buffer boundaries".
5. A stipulation and/or note should be added to the plan(s) that states: "Stockpiling of construction materials is not allowed within the wetland or wetland buffer areas of the site or in areas designated for permanent conservation".
6. It is recommended that the applicant install approved "Do Not Cut/Do Not Disturb" town conservation markers along the conservation districts boundaries (75-foot wetland buffer).
7. A stipulation and/or note should be added to the plan(s) that states: "Any vegetation associated with post-construction BMPs and slope restoration including storm water management area shall be suitably established to withstand erosion and shall be inspected by the Town Engineer and the property owner shall be required to provide a suitable replacement for any vegetation not suitably established during the relevant monitoring period."

Attachment "D"

8. A stipulation and/or note should be added to the plan(s) that states: "Fertilizers utilized for landscaping and lawn care shall be slow release, low-nitrogen types (<5%), and shall not be used within seventy-five (75) feet of wetland resource areas. Pesticides and herbicides shall not be used within seventy-five (75) feet of a wetland resource area."
9. It is recommended to reduce the driveway width from thirty (30) feet to a minimum functional width required for safe and efficient operations, shifting the edge of pavement and the corresponding slope grading and associated work away from the wetland and wetland buffer, thereby reducing wetland buffer impacts and helping preserve the function of the wetland buffer by maintaining existing groundcover and mature vegetation.
10. It is recommended to specify native shrub plantings along proposed slopes facing the wetlands. Species to be selected shall be salt-tolerant and appropriate for the respective slopes.

*This motion is based on the plan(s) submitted by the applicant. It is recommended that if changes are made to the plan(s) that result in additional impacts to the wetland and/or wetland buffer area(s), the plan(s) be resubmitted to the Conservation Commission for further review.

Motion seconded by:

Mr. Cameron

Motion X carried or ___ failed (check one). Vote count: 4 / 0 / 0 (yea/nay/abstain).

Respectfully submitted,



Christopher Cameron
HCC Clerk

May 11, 2026

Town of Hudson
Planning Board
12 School Street
Hudson, NH 03051

**Re: Restaurant Depot, LLC
Commercial Site Plan and
Conditional Use Permit Application
273 Lowell Rd, Hudson, NH; Map 243, Lot 34
Zone: General (G-1) & Wetland Conservation Overlay District**

Dear Member of the Board:

Bohler Engineering is in receipt of a comment letter from Town of Hudson, Conservation Commission, dated April 13, 2026. On behalf of Applicant Restaurant Depot, LLC, Bohler offers the following responses. For clarity, the original comments are in *italics*, while our responses are directly below in **bold** type.

General Recommendations by the Hudson Conservation Commission to the Planning Board:

Comment 1. It is recommended to increase the 3 to 1 slope to a 2 to 1 slope wherever possible along the southwesterly portion of the driveway. This will help reduce the wetland buffer impact.

Response: The slopes along the driveway have been revised to 2:1 to mitigate the impact to the wetland buffer.

Comment 2. A stipulation and/or note should be added to the plan(s) that states: "During construction and restoration erosion control barriers shall be installed and maintained, to the satisfaction of the Town Engineer, along the limits of disturbance within, and/or adjacent to, any wetland(s) and/or wetland buffer(s)."

Response: A note has been provided on the jurisdictional notes sheet.

Comment 3. A stipulation and/or note should be added to the plan(s) that states: "Construction vehicles (non-refueling vehicles) shall not be parked within twenty-five (25) feet of any wetland or wetland buffer boundaries overnight".

Response: A note has been provided on the jurisdictional notes sheet.

Comment 4. A stipulation and/or note should be added to the plan(s) that states: "Refueling vehicles shall not be parked overnight or left unattended within seventy-five (75) feet of any wetland or wetland buffer boundaries".

Response: A note has been provided on the jurisdictional notes sheet.

Comment 5. A stipulation and/or note should be added to the plan(s) that states: "Stockpiling of construction materials is not allowed within the wetland or wetland buffer areas of the site or in areas designated for permanent conservation".

Response: A note has been provided on the jurisdictional notes sheet.

Comment 6. It is recommended that the applicant install approved "Do Not Cut/Do Not Disturb" town conservation markers along the conservation districts boundaries (75-foot wetland buffer).

Response: Signs indicating the Conservation Markers "Do Not Cut/Do Not Disturb" have been added to the site plan.

Comment 7. A stipulation and/or note should be added to the plan(s) that states: "Any vegetation associated with post-construction BMPs and slope restoration including storm water management area shall be suitably established to withstand erosion and shall be inspected by the Town Engineer and the property owner shall be required to provide a suitable replacement for any vegetation not suitably established during the relevant monitoring period."

Response: A note has been provided on the jurisdictional notes sheet.

Comments 8. A stipulation and/or note should be added to the plan(s) that states: "Fertilizers utilized for landscaping and lawn care shall be slow release, low-nitrogen types (<5%), and shall not be used within seventy-five (75) feet of wetland resource areas. Pesticides and herbicides shall not be used within seventy-five (75) feet of a wetland resource area."

Response: A note has been provided on the jurisdictional notes sheet.

Comment 9. It is recommended to reduce the driveway width from thirty (30) feet to a minimum functional width required for safe and efficient operations, shifting the edge of pavement and the corresponding slope grading and associated work away from the wetland and wetland buffer, thereby reducing wetland buffer impacts and helping preserve the function of the wetland buffer by maintaining existing groundcover and mature vegetation.

Response: The width of the driveway has been revised to 26 ft.

Comment 10. It is recommended to specify native shrub plantings along proposed slopes facing the wetlands. Species to be selected shall be salt-tolerant and appropriate for the respective slopes.

Response: The slopes along the driveway have been revised to indicate some native shrub plantings as well as conservation mix.

We trust the above as well as the attached information are sufficient for your continued review of the project. Should you have any questions or require additional information, please do not hesitate to contact me at (508) 480-9900.

Sincerely,

Bohler



Keith Curran, P.E.



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June 4, 2026

Ms. Brooke Dubowik
Town Planner
Town of Hudson
12 School Street
Hudson, NH 03051

Re: Town of Hudson Planning Board Review
Restaurant Depot Site Plan, 273 Lowell Road
Tax Map 243 Lot 34; Acct. #1350-734
Reference No. 20030249.261

Dear Ms. Dubowik:

Fuss & O'Neill (F&O) has reviewed the second submission of materials received between March 24 and May 21, 2026, related to the above-referenced project. Authorization to proceed was received on May 14, 2026. A list of items reviewed is enclosed. The scope of our review is based on the Site Plan Review Codes, Stormwater Codes, Driveway Review Codes, Sewer Use Ordinance 77, Zoning Regulations, and criteria outlined in the CLD Consulting Engineers Proposal approved September 16, 2003, revised September 20, 2004, June 4, 2007, September 3, 2008, and October 2015.

The project consist of constructing a 50,000 square foot commercial restaurant supply building on a previously undeveloped lot. Proposed improvements to the site include the construction of parking areas, drainage, utilities, landscaping and lighting. The site is to be serviced by public water and a private onsite subsurface disposal system.

The following items have outstanding issues:

2. Administrative Review Codes (HR 276)

- c. **Former/Current Fuss & O'Neill Comment:** HR 276-11.1.B.(16). The applicant has not provided locations of driveways and parking areas within 200 feet of the site.

5. Utility Design/Conflicts

- a. **Former/Current Fuss & O'Neill Comment:** HR 275-9.E & 276-13. The applicant should review with the Town to confirm the availability of sufficient water flow to accommodate the site.
- c. **Former/Current Fuss & O'Neill Comment:** HR 275-9.E & 276-13.G. The applicant has not provided a typical design for the individual sewage disposal system as required by the Regulations. The applicant has shown the proposed location on the plan and referenced septic plans that were not provided as part of the review.

6. Drainage Design/Stormwater Management (HR 275-9.A./Chapter 290)

- a. **Former/Current Fuss & O'Neill Comment:** HR 290-5.A.(12). The applicant should provide a more detailed I&M Maintenance Log, noting all individual items/practices. This will ensure all proposed drainage features are properly maintained, including but not limited to; individual catch basins and DMHs, subsurface chamber systems, rip rap outlets, closed drainage networks, etc.
- b. **Former/Current Fuss & O'Neill Comment:** HR 290-5.A.(12). The applicant should provide project specific information in the I&M document, such as the responsible parties and their contact information.

- c. **Former/Current Fuss & O'Neill Comment:** HR 290-5.A.(12). To ensure effective winter maintenance, the applicant should clearly identify designated snow storage areas on the Inspection & Maintenance (I&M) plan, as the maintenance crew does not routinely reference full site plans.
- f. *Former Fuss & O'Neill Comment: HR 290-7.B.(16). The applicant should provide locations upon the plan set for proposed snow storage areas. We note snow storage is not allowed within the treatment bays of stormwater basins, prior to pre-treatment. The applicant should review the need for signage and possibly fencing to prevent untreated snow and snow melt from entering the treatment bay.*

Current Fuss & O'Neill Comment: The applicant has added snow storage areas on the plan and has added a "Do not plow snow against fence" detail on plan sheet C-902. The applicant should depict locations of the proposed signage upon the site plan. The applicant should also coordinate proposed snow storage areas with the landscape plans to be sure that landscaping won't be impacted/damaged by snow storage.

- h. **Former/Current Fuss & O'Neill Comment:** HR 275-10.A. The applicant should keep the Town informed of all communication with NHDES in relation to the required Alteration of Terrain Permit being requested to ensure NHDES comments/requirements do not alter the drainage design/calculations.
- j. *Former Fuss & O'Neill Comment: HR 275-10.A. The applicant should provide additional information on the outlet structure detail on Plan Sheet C-903 including the following:*
 - i. *The applicant should provide additional information for a trash rack on the 6" orifice.*
 - ii. *We note the detail illustrates a shut off valve. The applicant should provide additional information on the purpose and management of the valve, and review with both NHDES and the Town Engineer on the approval of a valve such as this.*

Current Fuss & O'Neill Comment: The applicant should submit additional information/details regarding the proposed 6-inch orifice depicted on the Outlet Control Structure on Plan Sheet C-903, as it is not modeled in the HydroCAD calculations. If the 6" outlet is intended solely for maintenance or emergency use as a secondary drainage method for the basin, this should be clearly indicated in the plan details.

- k. *Former Fuss & O'Neill Comment: ETGTD Detail D-3. The applicant should ensure that the detail on Plan Sheet C-904 states the 4.0 foot minimum cover requirement. We note there are several proposed drain lines within paved areas where there is less than 4.0 feet of cover.*

Current Fuss & O'Neill Comment: We continue to note that a portion of the proposed structure/pipes have less than the 4.0' minimum cover. The applicant should review with the Town Engineer if a waiver is required for the reduced cover. The applicant should also ensure that the HDPE Storm Pipe Trench detail on Plan Sheet C-904 states the decided minimum cover for the project.

- p. **New Fuss & O'Neill Comment:** The Infiltration Basin Detail on Plan Sheet C-902 states a soil amendment due to the infiltration rate greater than 10 inches per hour, to meet Env-Wq 1508.07.a.2. The applicant should coordinate with the Town to submit acceptable documentation verifying revised soil testing prior to placing the infiltration basin into service.
- q. **New Fuss & O'Neill Comment:** ETGTD Section 930.3. The applicant should provide additional information on the proposed locations of the Nyloplast Drain Basin depicted on Plan Sheet C-902.
- r. **New Fuss & O'Neill Comment:** ETGTD Section 930.4. We note that all proposed stormwater pipes have a slope of approximately 0.5%, where the Town requires a minimum slope of 2.0%. The applicant should review with the Town Engineer if a waiver is required for the reduced slope, being a private site, and these slopes represent typical engineering standard for self-cleaning velocity.
- s. **New Fuss & O'Neill Comment:** ETGTD Section 930.15. The applicant should review with the Town Engineer if the DMH rims need to meet Town Standard East Jordan Iron Works rim requirement, being a private site, or if a waiver is required.

9. Landscaping (HR 275-8.C.(7) & 276-11.1.B.(20)) and Lighting (HR 276-11.1.B.(14))

- a. *Former Fuss & O'Neill Comment: HR 275-8.C.(7). The applicant should provide landscaping calculations on the plan showing that the requirements of the Regulation are met.*

Current Fuss & O'Neill Comment: The applicant has provided calculations showing that the shrub requirements has not been met. The applicant as noted that 280 shrubs are required and 248 are provided. The applicant should review the need for a waiver from 275-8.C.(7).(d).

10. State and Local Permits (HR 275-9.G.)

- a. **Former/Current Fuss & O'Neill Comment:** HR 275-9.G. The applicant should list the required permits and their status on the plan set.

The following items require Town evaluation or input:

1. Site Plan Review Codes (HR 275)

- d. *Former Fuss & O'Neill Comment: HR 275-8.C.(2) and Zoning Ordinance (ZO) 334-15.A. The applicant has provided parking calculations on the plan set for both retail and warehouse uses, showing that the site would require 250 spaces as a retail use and 84 spaces as a warehouse use. The applicant has proposed 173 spaces and noted on Site Plan sheet C-301 that the parking criteria varies depending on how Zoning classifies the use. Additional information related to that use classification was not included in the submission documents. The applicant should coordinate with the Town for the use classification and review the need for a possible waiver from parking requirements.*

Current Fuss & O'Neill Comment: The applicant has reduced the number of parking spaces proposed to 166. The applicant has requested a waiver from this requirement.

- e. **Former/Current Fuss & O'Neill Comment:** HR 275-8.C.(4) The applicant has proposed a mix of 9 foot wide by 18 foot long and standard 10 foot by 20 foot parking spaces. The Planning Board will need to vote for approval to deviate from the standard parking space dimensions, which the applicant has noted on Site Plan sheet C-301.

- f. *Former Fuss & O'Neill Comment: HR 275-8.C.(6)(b). The applicant has shown a loading dock on the side of the building. It appears that the area will accommodate four loading spaces. We note that five loading spaces are required by the Regulation. The applicant should show and note loading space requirements on the plan set.*

Current Fuss & O'Neill Comment: The applicant has requested a waiver to allow only four loading dock spaces. The applicant has noted the waiver request on the Site Plan.

9. Landscaping (HR 275-8.C.(7) & 276-11.1.B.(20)) and Lighting (HR 276-11.1.B.(14))

- d. *Former Fuss & O'Neill Comment: HR 275-17.D.6. The applicant has shown light trespass onto the abutting lots around the driveway area and at the corner of lot 33. We also note that not all of the lot boundaries are shown on the lighting plan so light trespass at some abutting lot areas could not be verified.*

Current Fuss & O'Neill Comment: The applicant has requested a waiver from this requirement and noted it on the plan set.

The following items are resolved or have no further Fuss & O'Neill input:

1. Site Plan Review Codes (HR 275)

- a. *Former Fuss & O'Neill Comment: Hudson Regulation (HR) 275-6.C & T.(1)(b) The applicant has proposed site sidewalks to connect to the sidewalk along Green Meadow Drive.*

- b. *Former Fuss & O'Neill Comment: HR 275-6.I. The scope of this review does not include the adequacy of any fire protection provisions for the site. The applicant has shown a proposed eight-inch water line with a fire service connection to the building with one hydrant proposed onsite.*

Current Fuss & O'Neill Comment: The applicant has updated the plan to show two hydrant locations and also provided a fire truck turning plan. No further Fuss & O'Neill comment.

- c. *Former Fuss & O'Neill Comment: HR 275-6.T. The applicant is proposing limited off-site improvements that include utility connections and driveway installations within the private Green Meadow Drive roadway. The applicant has shown an existing Driveway Access Sign & Utility Easement on the plan.*
- g. *Former Fuss & O'Neill Comment: HR 275-8.C.(11). The applicant has provided six handicap accessible parking spaces for the site which meets the minimum requirement.*
- h. *Former Fuss & O'Neill Comment: HR 275-9.F. The applicant did not provide copies of any easement or deeds as part of the package received for review.*

Current Fuss & O'Neill Comment: The applicant has provided a copy of the amended easement agreement. No further Fuss & O'Neill comment.

2. Administrative Review Codes (HR 276)

- a. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(12)(c). The applicant has shown and met the 100-foot setback required on the southeast side of the site where there are abutting residential uses.*

- b. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(13). The applicant should add the required sign note to the plan.*

Current Fuss & O'Neill Comment: The applicant has added the required note to the plan. No further Fuss & O'Neill comment.

- d. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(24). The applicant should provide the open space requirement on the plan. We note the required lot coverage number says N/S.*

Current Fuss & O'Neill Comment: The applicant has added the requested information to the plan. No further Fuss & O'Neill comment.

- e. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(25). The applicant has requested a waiver for parking spaces within the side lot line and the setback line.*

Current Fuss & O'Neill Comment: The applicant has removed the parking within the setback. No further Fuss & O'Neill comment.

3. Driveway Review Codes (HR 275-6.B/Chapter 193)

- a. *Former Fuss & O'Neill Comment: HR 193.10.E. The applicant should show driveway sight distance information on the plan.*

Current Fuss & O'Neill Comment: The applicant has provided sight distance information showing that over 300 feet is available to the west and over 400 feet to the east. No further Fuss & O'Neill comment.

4. Traffic (HR 275-9.B)

- a. *Former Fuss & O'Neill Comment: Fuss & O'Neill, Inc. has reviewed the Traffic Impact and Access Study prepared by Chappell Engineering Associates, LLC. (CEA) dated January 15, 2026, for the proposed Restaurant Depot development at 273 Lowell Road in Hudson, New Hampshire (Tax Map 234, Block 34, Lots 0). The project proposes the development of a 50,000 square foot (sf) Restaurant Depot store. Access to and egress from the site will be provided via a proposed driveway on the northwest side of the project site onto Green Meadow Drive.*

Current Fuss & O'Neill Comment: Fuss & O'Neill, Inc. has reviewed the comment responses provided by Chappell Engineering Associates, LLC. (CEA) regarding the Traffic Impact and Access Study for the proposed restaurant depot development at 273 Lowell Road in Hudson, New Hampshire (Tax Map 234, Block 34, Lots 0). Fuss & O'Neill has no further comments and concurs with CEA's responses and conclusion that project-related traffic increases are expected to have a minimal impact to area traffic operations.

- b. *Former Fuss & O'Neill Comment: The report notes the speed limit along Lowell Road in the vicinity of the project site is 30 mph, increasing to 35 mph further north on Lowell Road. It is our understanding that the speed limit on Lowell Road throughout the project area is 35 mph. The applicant should confirm the speed limit and revise the report and capacity analysis model accordingly as needed.*

Current Fuss & O'Neill Comment: The applicant has revised the report based on the confirmed speed limit of 35 mph. No further Fuss & O'Neill comment.

- c. *Former Fuss & O'Neill Comment: The applicant should confirm that the 2019 count data utilized from the Langan traffic impact study was already seasonally adjusted. The 2019 Existing Peak Hour Traffic Volumes figure provided in the appendix notes that the volumes are "based on traffic volumes observed on 10/08/2019 by Accurate Counts", which suggests the data may reflect raw counts rather than seasonally adjusted values.*

Current Fuss & O'Neill Comment: The applicant has confirmed that the counts were seasonally adjusted. No further Fuss & O'Neill comment.

- d. *Former Fuss & O'Neill Comment: Covid adjustments are typically calculated using data from the nearest continuous (permanent) count station. NHDOT Count Station 82229049 is not a continuous count station. The applicant should confirm whether a Covid adjustment is warranted.*

Current Fuss & O'Neill Comment: The applicant has confirmed that the counts are from 2019 and do not require Covid adjustments. No further Fuss & O'Neill comment.

- e. *Former Fuss & O'Neill Comment: Although NHDOT typically prefers count data taken within the last 3 years, the use of the 2019 traffic count data from the Langan study appears reasonable in this case given that the 2025 counts don't reflect typical conditions.*
- f. *Former Fuss & O'Neill Comment: The applicant should confirm if 2025 counts were collected at the Lowell Road/Dracut Road/Steele Road intersection. If so, how do they compare to the 2019 counts used in the Langan study? Only new counts from the Lowell Road at Rena Avenue intersection were provided.*

Current Fuss & O'Neill Comment: The applicant has provided additional information to justify the methodology. No further Fuss & O'Neill comment.

- g. *Former Fuss & O'Neill Comment: While we agree with the methodology used for trip generation - specifically the use of empirical data from comparable Restaurant Depot sites rather than ITE rates, the applicant should confirm if this analysis accounts for the potential influence of the New Hampshire location. Sites in this border area often experience higher demand due to Massachusetts customers seeking to avoid sales tax, which may affect trip generation.*

Current Fuss & O'Neill Comment: The applicant provided additional information showing that a border location does not appear to require any adjustment. No further Fuss & O'Neill comment.

- h. *Former Fuss & O'Neill Comment: The empirical trip generation data used from other Restaurant Depot sites appears reasonable. However, the source data is from 2018 and therefore predates both COVID related disruptions and recent industry recovery. The applicant should confirm that these older datasets still reflect current operating conditions for comparable Restaurant Depot locations.*

Current Fuss & O'Neill Comment: The applicant has provided the additional explanation requested. No further Fuss & O'Neill comment.

- i. *Former Fuss & O'Neill Comment: Restaurant Depot appears to primarily serve restaurants and other food service businesses rather than general retail customers. Given this, is a Saturday peak hour analysis warranted for this land use? If empirical data from comparable sites indicates that weekend activity is minimal or similar to weekday peak hours, it would be helpful for the applicant to note this information.*
Current Fuss & O'Neill Comment: The applicant has provided additional information regarding Saturday sales. No further Fuss & O'Neill comment.
- j. *Former Fuss & O'Neill Comment: The report description and Synchro lane configuration for the Steele Road intersection approach appears to be miscoded. Pavement markings indicate a shared left turn/thru lane and an exclusive right turn lane, not an exclusive left turn lane and a shared thru/right lane. The applicant should confirm and revise the analysis accordingly.*
Current Fuss & O'Neill Comment: The applicant has provided additional information as requested. No further Fuss & O'Neill comment.
- k. *Former Fuss & O'Neill Comment: The applicant should confirm whether heavy vehicle percentages were calculated from the count data and incorporated into the Synchro models.*
Current Fuss & O'Neill Comment: The applicant has noted that the heavy vehicle percentages utilized are based on the approved heavy vehicle percentages included in the capacity analysis worksheets in the Langan traffic study. No further Fuss & O'Neill comment.
- l. *Former Fuss & O'Neill Comment: The Existing Conditions Synchro model for the Lowell Road at Green Meadow Drive and Rena Avenue intersection appears to omit a southbound through lane, showing only an exclusive left turn lane and a shared through/right turn lane. The applicant should verify the lane configuration and update the model as necessary.*
Current Fuss & O'Neill Comment: The applicant has corrected the analysis to reflect a three-lane approach on Lowell Road southbound. No further Fuss & O'Neill comment.
- m. *Former Fuss & O'Neill Comment: The No-Build and Build Conditions Synchro model for the southbound Lowell Road approach at Dracut Road and Steele Road shows two southbound left turn lanes and a shared through/right turn lane. The applicant should review if there should be an additional thru lane in the model or confirm that corridor improvement projects are converting the existing middle thru lane to a left turn lane.*
Current Fuss & O'Neill Comment: The applicant has confirmed the conceptual improvement plan and provided it as an attachment. No further Fuss & O'Neill comment.
- n. *Former Fuss & O'Neill Comment: Peak hour factor values appear to be set to 0.92 (the default setting) for the Lowell Road at Green Meadow Drive and Rena Avenue intersection in the Synchro model for all conditions. The applicant should clarify how these values were calculated and applied. If PHF data is not available or cannot be calculated, NHDOT Synchro guidelines recommend using a value of 0.90.*
Current Fuss & O'Neill Comment: The applicant has addressed this comment and adjusted the PHF values where warranted. No further Fuss & O'Neill comment.
- o. *Former Fuss & O'Neill Comment: NHDOT guidance allows for peak hour factors of approaches with peak hour factors under 0.90 to be increased to 0.90 for Future Year conditions. The applicant should update the Synchro model to reflect this.*
Current Fuss & O'Neill Comment: The applicant has adjusted the factors to 0.90 where warranted. No further Fuss & O'Neill comment.
- p. *Former Fuss & O'Neill Comment: The westbound Rena Avenue approach is posted No Turn on Red. Please confirm that this restriction is reflected in the Synchro model.*
Current Fuss & O'Neill Comment: The applicant has incorporated the right turn restriction into the capacity analysis as requested. No further Fuss & O'Neill comment.
- q. *Former Fuss & O'Neill Comment: The storage lane taper lengths appear to be inaccurately modeled in Synchro. The applicant should verify and update the geometric inputs if needed.*
Current Fuss & O'Neill Comment: The applicant has adjusted the lane lengths. No further Fuss & O'Neill comment.

- r. *Former Fuss & O'Neill Comment: The applicant should clarify how Davenport Road is treated in the Steele Road intersection phasing. Is it served under a split phase? What level of activity does this approach generate? We note that there is no mention of this approach in the report.*
Current Fuss & O'Neill Comment: The applicant has provided additional information to address this comment. No further Fuss & O'Neill comment.
- s. *Former Fuss & O'Neill Comment: The detector settings in the Synchro model appear to retain default detection lengths and placements, while recall and extension settings were updated. The physical detection zones should also reflect field conditions or approved signal plans. The applicant should verify and update the detector lengths and locations as needed.*
Current Fuss & O'Neill Comment: The applicant has provided additional information to address this comment. No further Fuss & O'Neill comment.
- t. *Former Fuss & O'Neill Comment: For signalized intersections, NHDOT's preferred Synchro report format is the HCM 2000 report. The applicant should provide HCM 2000 reports for all signalized intersections instead of HCM 2010 reports. The applicant should also provide Lanes, Volumes and Timings reports for each signalized intersection for all scenarios.*
Current Fuss & O'Neill Comment: The applicant has provided the requested calculations. No further Fuss & O'Neill comment.
- u. *Former Fuss & O'Neill Comment: Signal timings for the Green Meadow intersection were not included in the Synchro output. The applicant should provide the timing sheets or include the timing report with the Synchro reports.*
Current Fuss & O'Neill Comment: The applicant has provided signal timing sheets as requested. No further Fuss & O'Neill comment.
- v. *Former Fuss & O'Neill Comment: The applicant should confirm whether the signal timings/phasing used for both intersections were coordinated with the Town and/or NHDOT and identify or provide the source of the timing plans.*
Current Fuss & O'Neill Comment: The applicant has provided the requested timing information. No further Fuss & O'Neill comment.
- w. *Former Fuss & O'Neill Comment: The analysis shows timing changes only during the PM peak under the new adaptive system. The AM peak signal timings appear unchanged across all scenarios in the Synchro model. The applicant should confirm whether any AM peak timing adjustments are anticipated and update Synchro model to reflect if needed.*
Current Fuss & O'Neill Comment: The applicant noted that the future condition timing plan was not modified between conditions in order to allow for a comparison of project impacts between No-Build and Build conditions. No further Fuss & O'Neill comment.
- x. *Former Fuss & O'Neill Comment: The Lost Time Adjust values appear to be set to 0 seconds. NHDOT Synchro guidance calculates this as 4 seconds – (yellow time + red time). While the impact is likely minor, we recommend the applicant update this parameter for consistency with NHDOT modeling practices.*
Current Fuss & O'Neill Comment: The applicant has updated the lost time adjustment to 4 seconds under all analysis scenarios. No further Fuss & O'Neill comment.
- y. *Former Fuss & O'Neill Comment: The report notes in several places that the project includes 176 proposed parking spaces. The actual parking space count on the site plans is 173.*
Current Fuss & O'Neill Comment: The applicant has revised the plan to decrease the parking space count to 173 to match the report. No further Fuss & O'Neill comment.

5. Utility Design/Conflicts

- b. *Former Fuss & O'Neill Comment: HR 275-9.E & Hudson Engineering Technical Guidelines & Typical Details (ETGTD) Detail W-2. There are several locations with drain lines crossing the proposed water service main where invert elevations show the drain would conflict or have minimal separation from the water main if the water main is installed with five feet of cover. The applicant should review proposed drain and water pipe grading and make adjustments as needed. The applicant should also provide a water/drain crossing detail in the plans.*

Current Fuss & O'Neill Comment: The applicant has added a detail of the water and drainage pipe crossing to the plan. No further Fuss & O'Neill comment.

6. Drainage Design/Stormwater Management (HR 275-9.A./Chapter 290)

- d. *Former Fuss & O'Neill Comment: HR 290-6.A.(8). The applicant should ensure the plans note a pre-construction meeting is required with the Town Engineer.*

Current Fuss & O'Neill Comment: The applicant has noted this requirement on the plan. No further Fuss & O'Neill comment.

- e. *Former Fuss & O'Neill Comment: HR 290-6.A.(9). The applicant should add the required disturbed area note to the plan set. We note AOT Erosion Control Note #7 on Plan Sheet C1-103 calls for 45 days, rather than the Town required 30 days.*

Current Fuss & O'Neill Comment: The applicant has added the required note to the plan. No further Fuss & O'Neill comment.

- g. *Former Fuss & O'Neill Comment: HR 275-8.A.(4). and (5). The applicant should ensure a note is upon the plan set stating the requirement to coordinate the need for a Bond or Escrow with the Town Engineer.*

Current Fuss & O'Neill Comment: The applicant has added the recommended note to the plan set. No further Fuss & O'Neill comment.

- i. *Former Fuss & O'Neill Comment: HR 275-10.A. We note the applicant has provided stormwater calculations with the Town approved NRCS Soils. We note that the NHDES AoT permit requires Site Specific Soils to be utilized.*

Current Fuss & O'Neill Comment: The applicant has provided the recommended information. No further Fuss & O'Neill comment.

- l. *Former Fuss & O'Neill Comment: The Infiltration Basin (Landscape Bottom) detail does not identify the estimated seasonal high groundwater elevation (ESHGW).*

Current Fuss & O'Neill Comment: The applicant has added the requested information to the plan. No further Fuss & O'Neill comment.

- m. *Former Fuss & O'Neill Comment: The Infiltration Basin (Landscape Bottom) detail says to 'See Details' for the Basin Berm With Impervious Core. The plans show the proposed berm being 6 feet wide, while the Basin Emergency Spillway shows the top of the dike beyond the spillway as 10 feet wide. The applicant should coordinate the plan and details and provide additional detail for the construction of the basin berm.*

Current Fuss & O'Neill Comment: The applicant has added the recommended information to the plan. No further Fuss & O'Neill comment.

- n. *Former Fuss & O'Neill Comment: The applicant will be required to comply with all provisions of the Town of Hudson's MS4 permit, including but not limited to annual reporting requirements, construction site stormwater runoff control, and record keeping requirements. The applicant has noted that the project has been designed to meet MS4 requirements.*

- o. *Former Fuss & O'Neill Comment: Please note that this review was carried out in accordance with applicable regulations and standards in place in New Hampshire at this time. Note that conditions at the site, including average weather conditions, patterns and trends, and design storm characteristics, may change in the future. In addition, future changes in federal, state or local laws, rules or regulations, or in generally accepted scientific or industry information*

concerning environmental, atmospheric and geotechnical conditions and developments may affect the information and conclusions set forth in this review. In no way shall Fuss & O'Neill be liable for any of these changed conditions that may impact this review, regardless of the source of or reason for such changed conditions. Other than as described herein, no other investigation or analysis has been requested by the Client or performed by Fuss & O'Neill in preparing this review.

7. Zoning (ZO 334)

- a. *Former Fuss & O'Neill Comment: ZO 334-17 & 334-21. The subject parcel is located within the General One (G-1) zoning district and the applicant has noted this on the plans. The proposed uses of warehouse and retail business are both allowed within the district.*
- b. *Former Fuss & O'Neill Comment: ZO 334-35. The applicant has noted that a Conditional Use Permit is required for the Wetlands Buffer impacts of a driveway and stormwater treatment.*
- c. *Former Fuss & O'Neill Comment: ZO 334-58. The applicant has shown a proposed freestanding sign location on the plans but has not included any detailed information for that sign.*
Current Fuss & O'Neill Comment: The applicant has provided a separate detail for the proposed freestanding sign. We note that a permit from the Building Inspector is required for the sign. No further Fuss & O'Neill comment.
- d. *Former Fuss & O'Neill Comment: ZO 334-83 and HR 218-4.E. The applicant has noted that the site is not located within a Food Hazard Area.*

8. Erosion Control/Wetland Impacts

- a. *Former Fuss & O'Neill Comment: The applicant should note that the Town of Hudson reserves the right to require any additional erosion control measures as needed.*

9. Landscaping (HR 275-8.C.(7) & 276-11.1.B.(20)) and Lighting (HR 276-11.1.B.(14))

- b. *Former Fuss & O'Neill Comment: HR 275-8.C.(8). The applicant has proposed to leave existing vegetation around the perimeter of the site and provided screening for the loading area from the parking lot.*
- c. *Former Fuss & O'Neill Comment: HR 275-17.D.2. The applicant should note the hours of operation for the site and the relationship of those hours to the site lighting, including if any timers or motion detectors are proposed to reduce light levels after operating hours.*
Current Fuss & O'Neill Comment: The applicant has added the recommended information to the plan set on sheet L-201. No further Fuss & O'Neill comment.
- e. *Former Fuss & O'Neill Comment: HR 275-17.E.1. The applicant should revise their light pole base detail to match the Regulation.*
Current Fuss & O'Neill Comment: The applicant has updated the light pole foundation detail to add the base requirements. No further Fuss & O'Neill comment.

10. State and Local Permits (HR 275-9.G.)

- b. *Former Fuss & O'Neill Comment: HR 275-9.G. The applicant should provide copies of any applicable Town, State or Federal approvals or permits.*
- c. *Former Fuss & O'Neill Comment: Additional local and state permitting may be required.*

11. Other

- a. *Former Fuss & O'Neill Comment: ETGTD Section 565.1.1. The applicant is reminded of Town of Hudson requirements for the importing of off-site fill materials for use in constructing this project. We could not locate a note regarding this requirement on the plans, and it is recommended that these requirements be stated on the plans for the Contractors attention.*

Current Fuss & O'Neill Comment: The applicant has added the recommended information to plan sheet C-103. No further Fuss & O'Neill comment.

- b. *Former Fuss & O'Neill Comment: The applicant has included a detail for sidewalk curb ramps at handicap parking spaces but has not shown their proposed locations on the plans.*

Current Fuss & O'Neill Comment: The applicant has shown the ramp locations on the plan. No further Fuss & O'Neill comment.

Please feel free to call if you have any questions.

Very truly yours,



Steven W. Reichert, P.E.

SWR:

Enclosure

cc: Town of Hudson Engineering Division – File
Bohler, LLC – kcurran@bohlereng.com

June 9, 2026

Town Planner
Town of Hudson
12 School Street
Hudson, NH 03051

Att: Ms. Brooke Dubowik

**Re: Town of Hudson Planning Board Review
Restaurant Depot Site Plan, 273 Lowell Road
Tax Map 243 Lot 34; Acct. #1350-734
Reference No. 20030249.261**

Dear Ms. Dubowik:

Bohler, LLC is in receipt of a comment letter from Fuss & O'Neill dated June 4, 2026. On behalf of Applicant Restaurant Depot, LLC, Bohler offers the following responses. For clarity, the original comments are in *italics*, while our responses are directly below in **bold** type.

Comment #2 Administrative Review Codes (HR 276)

c. HR 276-11.1.B.(16). The applicant has not provided locations of driveways and parking areas within 200 feet of the site.

Response: The Location Map has been revised on C-101 to 200 ft scale showing the driveway and parking area locations within 200 ft of the site in accordance with 276-11.1.B.(16).

Comment #5 Utility Design/Conflicts

a. HR 275-9.E & 276-13. The applicant should review with the Town to confirm the availability of sufficient water flow to accommodate the site.

Response: This has been reviewed with the Town and there is sufficient pressure and volume to accommodate the site.

c. HR 275-9.E & 276-13.G. The applicant has not provided a typical design for the individual sewage disposal system as required by the Regulations. The applicant has shown the proposed location on the plan and referenced septic plans that were not provided as part of the review.

Response: The septic plan has been pre-approved by the Town Engineer and is currently pending state approval.

Comment #6 Drainage Design/Stormwater Management (HR 275-9.A./Chapter 290)

a. HR 290-5.A.(12). The applicant should provide a more detailed I&M Maintenance Log, noting all individual items/practices. This will ensure all proposed drainage features are

properly maintained, including but not limited to; individual catch basins and DMHs, subsurface chamber systems, rip rap outlets, closed drainage networks, etc.

Response: The checklist has separated the practices into the following: Parking lot, Catch basins, yard drains, trench drains, manholes and piping, Discharge Points/ Flared End Sections / Rip Rap, infiltration basin, and water quality unit (proprietary separator).

b. *HR 290-5.A.(12). The applicant should provide project specific information in the I&M document, such as the responsible parties and their contact information.*

Response: This will be infilled once known.

c. *HR 290-5.A.(12). To ensure effective winter maintenance, the applicant should clearly identify designated snow storage areas on the Inspection & Maintenance (I&M) plan, as the maintenance crew does not routinely reference full site plans.*

Response: Snow storage has been added to the Operation and Maintenance plan and has been revised on Sheet C-301.

f. *HR 290-7.B.(16). The applicant should provide locations upon the plan set for proposed snow storage areas. We note snow storage is not allowed within the treatment bays of stormwater basins, prior to pre-treatment. The applicant should review the need for signage and possibly fencing to prevent untreated snow and snow melt from entering the treatment bay.*

The applicant has added snow storage areas on the plan and has added a "Do not plow against fence" detail on plan sheet C-902. The applicant should depict locations of the proposed signage upon the site plan. The applicant should also coordinate proposed snow storage areas with the landscape plans to be sure that landscaping won't be impacted/damaged by snow storage.

Response: Signage was added to Sheet C-301 depicting areas not allowed for snow storage along the fence shown on the site plan. The snow storage locations have been revised as indicated in above comment.

h. *HR 275-10.A. The applicant should keep the Town informed of all communication with NHDES in relation to the required Alteration of Terrain Permit being requested to ensure NHDES comments/requirements do not alter the drainage design/calculations.*

Response: Acknowledged.

j. *HR 275-10.A. The applicant should provide additional information on the outlet structure detail on Plan Sheet C-903 including the following:*

i. *The applicant should provide additional information for a trash rack on the 6" orifice.*

ii. *We note the detail illustrates a shut off valve. The applicant should provide additional information on the purpose and management of the valve, and review with both NHDES and the Town Engineer on the approval of a valve such as this.*

The applicant should submit additional information/details regarding the proposed 6-inch orifice depicted on the Outlet Control Structure on Plan Sheet C-903, as it is not modeled in the HydroCAD calculations. If the 6" outlet is intended solely for maintenance or emergency use as a secondary drainage method for the basin, this should be clearly indicated in the plan details.

Response: A trash rack has been added to the outlet control structure detail and a detail for the rack is added to sheet C-906.

The orifice with valve at the basin bottom is strictly for basin drawdown during maintenance activities only. This will be coordinated with NHDES during the AoT permitting review.

k. *ETGTD Detail D-3. The applicant should ensure that the detail on Plan Sheet C-904 states the 4.0 foot minimum cover requirement. We note there are several proposed drain lines within paved areas where there is less than 4.0 feet of cover.*

We continue to note that a portion of the proposed structure/pipes have less than the 4.0' minimum cover. The applicant should review with the Town Engineer if a waiver is required for the reduced cover. The applicant should also ensure that the HDPE Storm Pipe Trench detail on Plan Sheet C-904 states the decided minimum cover for the project.

Response: The guidance document referenced applies to public facilities, as the proposed use/parcel is private, the 4.0 foot minimum cover requirement does not apply.

p. *The Infiltration Basin Detail on Plan Sheet C-902 states a soil amendment due to the infiltration rate greater than 10 inches per hour, to meet Env-Wq 1508.07.a.2. The applicant should coordinate with the Town to submit acceptable documentation verifying revised soil testing prior to placing the infiltration basin into service.*

Response: The infiltration basin detail and notes have been revised to indicate that a submittal of the testing data be submitted to the EOR as well as the Town of Hudson.

q. *ETGTD Section 930.3. The applicant should provide additional information on the proposed locations of the Nyloplast Drain Basin depicted on Plan Sheet C-902.*

Response: The detail has been removed from the plan set.

r. *ETGTD Section 930.4. We note that all proposed stormwater pipes have a slope of approximately 0.5%, where the Town requires a minimum slope of 2.0%. The applicant should review with the Town Engineer if a waiver is required for the reduced slope, being a private site, and these slopes represent typical engineering standard for self-clearing velocity.*

Response: The guidance document referenced applies to public facilities, as the proposed use/parcel is private, the regulation is not applicable.

s. *ETGTD Section 930.15. The applicant should review with the Town Engineer if the DMH rims need to meet Town Standard East Jordan Iron Works rim requirement, being a private site, or if a waiver is required.*

Response: The guidance document referenced applies to public facilities, as the proposed use/parcel is private, the regulation is not applicable.

Comment #9 Landscaping (HR 275-8.C.(7) & 276-11.1.B.(20)) and Lighting (HR 276-11.1.B.(14))

a. *HR 275-8.C.(7). The applicant should provide landscaping calculations on the plan showing that the requirements of the Regulation are met.*

The applicant has provided calculations showing that the shrub requirements has not been met. The applicant as noted that 280 shrubs are required and 248 are provided. The applicant should review the need for a waiver from 275-8. C. (7). (d).

Response: A waiver request has been made for 275-8.C.(7).(d) and has been indicated on the site plan layout.

Comment #10 State and Local Permits (HR 275-9.G.)

- a. *HR 275-9.G. The applicant should list the required permits and their status on the plan set.*

Response: The required permits and their status have been indicated on the cover sheet.

The Following items require Town evaluation or input:

Comment #1: Site Plan Review Codes (HR 275)

- d. *Former Fuss & O'Neill Comment: HR 275-8.C.(2). And Zoning Ordinance (ZO) 334-15A.A. The applicant has provided parking calculations on the plan set for both retail and warehouse uses, showing that the site would require 250 spaces as a retail use and 84 spaces as a retail use and 84 spaces as a warehouse use. The applicant has proposed 173 spaces and notes on Site Plan sheet C-301 that the parking criteria varies depending on how Zoning classifies the use. Additional information related to that use classification was not included in the submission documents. The applicant should coordinate with the Town for the use classification and review the need for a possible waiver from parking requirements.*

The applicant has reduced the number of parking spaces proposed to 166. The applicant has requested a waiver from this requirement.

Response: Acknowledged.

- e. *HR 275-8.C.(4). The applicant has proposed a mix of 9 foot wide by 18 foot long and standard 10 foot by 20 foot parking spaces. The Planning Board will need to vote for approval to deviate from the standard parking space dimensions, which the applicant has noted on Site Plan sheet C-301.*

Response: Acknowledged.

- f. *HR 275-8.C.(6).(b). The applicant has shown a loading dock on the side of the building. It appears that the area will accommodate four loading spaces. We note that five loading spaces are required by the Regulation. The applicant should show and note loading space requirements on the plan set.*

The applicant has requested a waiver to allow only four loading dock spaces. The applicant has noted the waiver request on the Site Plan.

Response: Acknowledged.

Comment #9. Landscaping (HR 275-8.C.(7) & 276-11.1.B.(20)) and Lighting (HR 276-11.1.B.(14))

- d. *Former Fuss & O'Neill Comment: HR 275-17.D.6. The applicant has shown light trespass onto the abutting lots around the driveway area and at the corner of lot 33. We also note that not all of the lot boundaries are shown on the lighting plan so light trespass at some abutting lot areas could not be verified.*

The applicant has requested a waiver from this requirement and noted it on the plan set.

Response: Acknowledged.

We trust the above as well as the attached information are sufficient for your continued review of the project. Should you have any questions or require additional information, please do not hesitate to contact me at (508) 480-9900.

Sincerely,

Bohler

A handwritten signature in blue ink, appearing to read "Keith Curran", with a long horizontal flourish extending to the right.

Keith Curran, P.E.



TOWN OF HUDSON

Planning Department



12 School Street · Hudson, New Hampshire 03051 · Tel: 603-886-6008 · Fax: 603-594-1142

CAP FEE WORKSHEET - 2026

Date: 30/03/26 Zone # 1 Map/Lot: 234-034-000
273 Lowell Road

Project Name: Restaurant Depot Site Plan

Proposed ITE Use #1: Shopping Center

Proposed Building Area (square footage): 50,000 sq. ft.

CAP FEES: (ONE CHECK NEEDED)

1.	(Account)	(\$4.14 x 9,500 sq. ft.)	
	2070-701	Traffic Improvement (Zone 1)	\$ <u>207,000.00</u>
		Total CAP Fee	\$ <u>207,000.00</u>

*** This CAP Fee amount is based on the 2025 CAP FEE ASSESSMENT ***

CAP FEE to be paid prior to Certificate of Occupancy application.

Check should be made payable to the Town of Hudson

Thank you,

Brooke Dubowik

Planning Administrative Aide II

Dear Members of the Planning Board:

Chestnut Realty Management, LLC, as manager of 267 Lowell Road, LLC, is writing regarding the proposed Restaurant Depot development at 273 Lowell Road. While we understand the property is commercially zoned and still in the early stages of review, we believe several items warrant careful evaluation as part of the Planning Board process.

Based on the materials submitted to date, we have concerns regarding the potential cumulative traffic and operational impacts associated with the project, particularly given the existing and anticipated truck activity generated by nearby logistics, warehouse, and industrial uses in the area, including the Target distribution facility and neighboring industrial users.

In particular, we believe further review should be conducted regarding:

- Truck circulation and turning movements within the site and at site access points
- Potential traffic stacking and congestion impacts along Lowell Road and surrounding signalized intersections
- Potential conflicts between passenger vehicle traffic and existing truck traffic patterns in the corridor
- The adequacy of access arrangements and impacts to neighboring commercial and industrial properties
- Compatibility of the proposed use relative to nearby industrial and employment-oriented operations
- Emergency vehicle access and maneuverability
- The proposed septic infrastructure and long-term servicing capacity associated with the contemplated use
- Wetlands and buffer impacts identified in the conceptual materials
- Whether the proposed parking, trip generation, and operational assumptions appropriately reflect the intensity of the contemplated use, including peak-hour truck activity

We respectfully request that the Planning Board require a thorough traffic and operational analysis, including independent peer review where appropriate, prior to advancing the application further in the approval process.

We appreciate the Board's consideration and look forward to remaining engaged as the proposal continues to evolve.

Thank you--

Christian Brannelly
Managing Director
Chestnut Realty Management, LLC
Manager of 267 Lowell Road, LLC



Ref.: 25103

March 6, 2026

Ms. Brooke Dubowik
Town Planner
Town of Hudson
12 School Street
Hudson, NH 03051

Reg.: Response to Transportation Peer Review Comments
Proposed Restaurant Depot
273 Lowell Road, Hudson, NH

Dear Ms. Dubowik:

Chappell Engineering Associates (CEA) has prepared this letter in response to transportation peer review comments issued by the Town of Hudson's transportation peer review consultant, Fuss & O'Neill, as outlined in their February 10, 2026, letter to the Town of Hudson Planning Department. The letter included comments specific to the initial Traffic Impact and Access Study¹ and site plans prepared for the above-referenced project. Comments related to this plan are provided under separate cover.

As documented in this response letter, based on the results of supplemental analyses requested by Fuss & O'Neill, the findings of the initial traffic study remain unchanged. Project-related traffic increases are expected to result in only minimal impacts to area traffic operations, with overall delays expected to increase by less than 1 second as compared to future No-Build conditions.

To facilitate your review of this document, responses are provided to each individual comment issued in the peer review letter. Responses to comments on the site plan are provided under separate cover.

¹ *Traffic Impact and Access Study, Restaurant Depot, 273 Lowell Road, Hudson, New Hampshire; Chappell Engineering Associates, January 15, 2026.*

Attachment "J"

Comment a: “Fuss & O’Neill, Inc. has reviewed the Traffic Impact and Access Study prepared by Chappell Engineering Associates, LLC. (CEA) dated January 15, 2026, for the proposed Restaurant Depot development at 273 Lowell Road in Hudson, New Hampshire (Tax Map 234, Block 34, Lots 0). The project proposes the development of a 50,000 square foot (sf) Restaurant Depot store. Access to and egress from the site will be provided via a proposed driveway on the northwest side of the project site onto Green Meadow Drive.”

Response: Comment noted.

Comment b: “The report notes the speed limit along Lowell Road in the vicinity of the project site is 30 mph, increasing to 35 mph further north on Lowell Road. It is our understanding that the speed limit on Lowell Road throughout the project area is 35 mph. The applicant should confirm the speed limit and revise the report and capacity analysis model accordingly as needed.”

Response: CEA has confirmed that the speed limit on Lowell Road within the entirety of the study area is 35 mph and only decreases to 30 mph north of the study area, at Executive Drive. The capacity analyses have been revised to reflect this higher 35 mph speed limit as requested.

Comment c: “The applicant should confirm that the 2019 count data utilized from the Langan traffic impact study was already seasonally adjusted. The 2019 Existing Peak Hour Traffic Volumes figure provided in the appendix notes that the volumes are “based on traffic volumes observed on 10/08/2019 by Accurate Counts”, which suggests the data may reflect raw counts rather than seasonally adjusted values.”

Response: In accordance with New Hampshire Department of Transportation (NHDOT) guidelines for preparation of traffic impact studies, the October 2019 traffic volumes collected by Langan were seasonally adjusted to represent peak month conditions. It is noted that the Langan traffic study was reviewed and approved by both the NHDOT and the Town of Hudson, and serves as the basis for the off-site roadway improvements currently under construction along the Lowell Street corridor.

Comment d: “Covid adjustments are typically calculated using data from the nearest continuous (permanent) count station. NHDOT Count Station 82229049 is not a continuous count station. The applicant should confirm whether a Covid adjustment is warranted.”

Response: The 2019 traffic count data were collected prior to the impact of COVID-19 on area traffic volumes and therefore do not require a COVID adjustment. It is

again noted that these volumes, which were seasonally adjusted to peak month conditions were reviewed and approved by both the NHDOT and Town of Hudson, and represent the basis for the for the off-site roadway improvements currently under construction along the Lowell Street corridor.

Comment e: “Although NHDOT typically prefers count data taken within the last 3 years, the use of the 2019 traffic count data from the Langan study appears reasonable in this case given that the 2025 counts don’t reflect typical conditions.”

Response: CEA concurs with F&O that typically traffic count data less than 3 years old is preferred. However, as noted in the traffic study, a review of current traffic counts reveals that baseline volumes from 2019 represent a higher more conservative baseline conditions, and therefore were utilized for analysis purposes.

Comment f: “The applicant should confirm if 2025 counts were collected at the Lowell Road/Dracut Road/Steele Road intersection. If so, how do they compare to the 2019 counts used in the Langan study? Only new counts from the Lowell Road at Rena Avenue intersection were provided.”

Response: Traffic counts conducted in 2025 were conducted at the intersection of Lowell Road with Rena Avenue. Based on a review of the collected data these volumes were lower than the 2019 baseline condition utilized in the Langan study for the HLC project. Traffic counts were not conducted in 2025 at the intersection of Lowell Road with Dracut Road and Steele Road, as almost every vehicle that travels through this intersection also travels through the intersection of Lowell Road with Rena Avenue, and as such would also represent a less conservative assessment than the prior 2019 Langan data. Specifically, based on a review of the 2019 existing Langan traffic volume networks, during the weekday AM peak hour, of the 1,990 vehicles that pass through the intersection of Lowell Road with Dracut Road and Steele Road, 1,987 vehicles (99.8%) either arrive from or depart to the intersection of Lowell Road with Rena Avenue. Similarly, during the weekday PM peak hour, of the 2,426 vehicles that pass through this intersection, 2,416 (99.6%) either arrive from or depart to the intersection of Lowell Road with Rena Avenue.

Comment g: “While we agree with the methodology used for trip generation - specifically the use of empirical data from comparable Restaurant Depot sites rather than ITE rates, the applicant should confirm if this analysis accounts for the potential influence of the New Hampshire location. Sites in this border area often experience higher demand due to Massachusetts customers seeking to avoid sales tax, which may affect trip generation.”

Attachment "J"

- Response:** Based on consultation with Restaurant Depot, it is expected that the proposed Hudson facility will be one of their slower stores, given that the other stores monitored to develop the trip generation data serve larger markets. It is also noted that food is not subject to sales tax in Massachusetts, and as such there is no financial incentive to travel to the site to avoid sales tax.
- Comment h:** “The empirical trip generation data used from other Restaurant Depot sites appears reasonable. However, the source data is from 2018 and therefore predates both COVID related disruptions and recent industry recovery. The applicant should confirm that these older datasets still reflect current operating conditions for comparable Restaurant Depot locations.”
- Response:** Based on consultation with Restaurant Depot, there has been no notable change in site specific sales since pre-COVID conditions. It is again noted that their expectation is the Hudson facility will represent a slower store than the sites included in the trip generation assessment as those stores serve larger market areas.
- Comment i:** “Restaurant Depot appears to primarily serve restaurants and other food service businesses rather than general retail customers. Given this, is a Saturday peak hour analysis warranted for this land use? If empirical data from comparable sites indicates that weekend activity is minimal or similar to weekday peak hours, it would be helpful for the applicant to note this information.”
- Response:** Based on consultation with Restaurant Depot, the majority of their sales occur during weekday conditions, as restaurants typically stock up for their heavier sales periods which occur during the weekend. It is also noted that area traffic volumes are generally much lower during Saturday conditions than during corresponding weekday conditions. Based on traffic count data published by the NHDOT for Count Station 82229049, located on Route 3, south of Rena Avenue, weekday daily traffic was determined to be approximately 12 percent higher than the corresponding Saturday traffic, with weekday PM traffic nearly 200 vehicles per hour higher than the corresponding Saturday midday peak. As such, the weekday PM peak hour represents the critical time period for project impacts. It is noted that a Saturday analysis was not required by the NHDOT or Town of Hudson for the larger HCL project.
- Comment j:** “The report description and Synchro lane configuration for the Steele Road intersection approach appears to be miscoded. Pavement markings indicate a shared left turn/thru lane and an exclusive right turn lane, not an exclusive left turn lane and a shared thru/right lane. The applicant should confirm and revise the analysis accordingly.”

Attachment "J"

- Response:** Consistent with the NHDOT approved Langan traffic study, Steele Road has been modeled as an exclusive left turn lane (vehicles turning to Lowell Road northbound) and an exclusive right turn lane (vehicles turning onto Dracut Road or River Road).
- Comment k:** “The applicant should confirm whether heavy vehicle percentages were calculated from the count data and incorporated into the Synchro models.”
- Response:** The heavy vehicle percentages utilized in the analyses provided in this response document are based on the approved heavy vehicle percentages included in the capacity analysis worksheets from the Langan traffic study.
- Comment l:** “The Existing Conditions Synchro model for the Lowell Road at Green Meadow Drive and Rena Avenue intersection appears to omit a southbound through lane, showing only an exclusive left turn lane and a shared thru/right turn lane. The applicant should verify the lane configuration and update the model as necessary.”
- Response:** As requested by Fuss & O’Neill, the existing conditions capacity analyses have been corrected to reflect a three lane approach on Lowell Road southbound at Rena Avenue, including an exclusive left-turn lane, a through lane and a shared through/right-turn lane.
- Comment m:** “The No-Build and Build Conditions Synchro model for the southbound Lowell Road approach at Dracut Road and Steele Road shows two southbound left turn lanes and a shared thru/right turn lane. The applicant should review if there should be an additional thru lane in the model, or confirm that corridor improvement projects are converting the existing middle thru lane to a left turn lane.”
- Response:** CEA has confirmed that the proposed improvements at the intersection of Lowell Road with Dracut Road and River Road include the conversion of the middle through lane to a second exclusive left-turn lane onto Dracut Road, with only a single through lane provided for southbound traffic from Lowell Road to River Road. The conceptual improvement plan depicting these improvements is provided as an attachment to this letter.
- Comment n:** “Peak hour factor values appear to be set to 0.92 (the default setting) for the Lowell Road at Green Meadow Drive and Rena Avenue intersection in the Synchro model for all conditions. The applicant should clarify how these values were calculated and applied. If PHF data is not available or cannot be calculated, NHDOT Synchro guidelines recommend using a value of 0.90.”

Response: As requested by Fuss & O'Neill, the peak hour factors utilized in the analyses provided in this response document are based on the approved peak hour factors included in the capacity analysis worksheets from the Langan traffic study. The peak hour factors at the intersection of Lowell Road with Rena Avenue that were below 0.90 under existing conditions have been increased to 0.90 under future conditions, consistent with NHDOT recommended practice.

Comment o: "NHDOT guidance allows for peak hour factors of approaches with peak hour factors under 0.90 to be increased to 0.90 for Future Year conditions. The applicant should update the Synchro model to reflect this."

Response: As requested by Fuss & O'Neill, the future condition peak hour factors have been adjusted to 0.90 where warranted.

Comment p: "The westbound Rena Avenue approach is posted No Turn on Red. Please confirm that this restriction is reflected in the Synchro model."

Response: As requested by Fuss & O'Neill, the right turn restriction on Rena Avenue has been incorporated into the capacity analyses.

Comment q: "The storage lane taper lengths appear to be inaccurately modeled in Synchro. The applicant should verify and update the geometric inputs if needed."

Response: As requested by Fuss & O'Neill, storage lane lengths, where necessary, have been adjusted.

Comment r: "The applicant should clarify how Davenport Road is treated in the Steele Road intersection phasing. Is it served under a split phase? What level of activity does this approach generate? We note that there is no mention of this approach in the report."

Response: The signal phasing utilized for the intersection of Lowell Road with Dracut Road and River Road was obtained from the mitigated capacity analysis worksheets for this location, as provided in the NHDOT approved Langan traffic study for the HLC project. This proposed phasing did not include Davenport Road in the mitigated signal analysis, nor are traffic volumes for this approach included in either the existing or proposed traffic volumes as outlined in that report.

It is noted that based on aerial imagery, this small private dead end roadway, that is signed 'Do Not Enter' to public traffic, appears to provide access to only two residential properties, with a number of used vehicles stored in the rear of the last lot. As such, it is likely that the total volume either entering or exiting this corridor during peak hours amounts to 1 or 2 vehicles, or less. This level of

Attachment "J"

traffic, even if called on an exclusive phase once or twice per hour, would result in no notable impact to the overall traffic operations at this location during peak hours.

Comment s: “The detector settings in the Synchro model appear to retain default detection lengths and placements, while recall and extension settings were updated. The physical detection zones should also reflect field conditions or approved signal plans. The applicant should verify and update the detector lengths and locations as needed.”

Response: The Synchro model reflects the timing and phasing plan as included in the Langhan study for the HCL. It is noted that both intersections will operate under adaptive signal control, and as such will operate under optimized operations under future No-Build and Build conditions. As the conceptual improvement plans provided in the HCL report did not identify the detector lengths and locations, default Synchro values were utilized. It is noted that modifications to these inputs result in no perceptible change to either the vehicle delay or queuing results as presented in the TIAS or this updated response letter.

Comment t: “For signalized intersections, NHDOT’s preferred Synchro report format is the HCM 2000 report. The applicant should provide HCM 2000 reports for all signalized intersections instead of HCM 2010 reports. The applicant should also provide Lanes, Volumes and Timings reports for each signalized intersection for all scenarios.”

Response: As requested by Fuss & O’Neill, capacity analyses were run utilizing the HCM 2000 methodology, with the Lanes, Volumes and Timings reports also provided for each location under each analysis scenario. The revised capacity analysis worksheets and summary table are provided in the appendix of this document.

Comment u: “Signal timings for the Green Meadow intersection were not included in the Synchro output. The applicant should provide the timing sheets or include the timing report with the Synchro reports.”

Response: As requested by Fuss & O’Neill, signal timing sheets are included with the updated Synchro reports.

Comment v: “The applicant should confirm whether the signal timings/phasing used for both intersections were coordinated with the Town and/or NHDOT, and identify or provide the source of the timing plans.”

Response: The timing and phasing plans for the signalized locations were obtained from the Langhan traffic study that was provided by the Town and has been approved

by both NHDOT and the Town of Hudson. As previously noted, both study area locations will operate under adaptive signal control and as such will operate under optimized signal operations.

Comment w: “The analysis shows timing changes only during the PM peak under the new adaptive system. The AM peak signal timings appear unchanged across all scenarios in the Synchro model. The applicant should confirm whether any AM peak timing adjustments are anticipated and update Synchro model to reflect if needed.”

Response: In order to allow for a comparison of project impacts between No-Build and Build conditions, the future condition timing plan was not modified between these conditions.

Comment x: “The Lost Time Adjust values appear to be set to 0 seconds. NHDOT Synchro guidance calculates this as 4 seconds – (yellow time + red time). While the impact is likely minor, we recommend the applicant update this parameter for consistency with NHDOT modeling practices.”

Response: As requested by Fuss & O’Neill, the lost time has been adjusted to 4 seconds – (yellow time + red time) under all analysis scenarios.

Comment y: “The report notes in several places that the project includes 176 proposed parking spaces. The actual parking space count on the site plans is 173.”

Response: CEA notes that the current parking space count on the site plan is 173 spaces.

As summarized in this response letter, based on the results of the supplemental analysis provided in response to the peer review comments, the findings of the initial TIAS remain unchanged, that project-related traffic increases are expected to result in no notable impact to area traffic operations. Proposed improvements currently under construction to accommodate the HCL project provide ample reserve capacity to accommodate project-related traffic increases, with project-related traffic expected to result in only minor increases to overall delays, of approximately 1 second per vehicle, or less.

We trust the enclosed information adequately addresses the peer review comments issued on the project. Please feel free to contact me directly should you have any questions.

Sincerely,

Chappell Engineering Associates



Shaun P. Kelly
Senior Project Manager

Attachments

APPENDIX

Traffic Count Data
Conceptual Improvement Plans
Capacity Analysis Worksheets

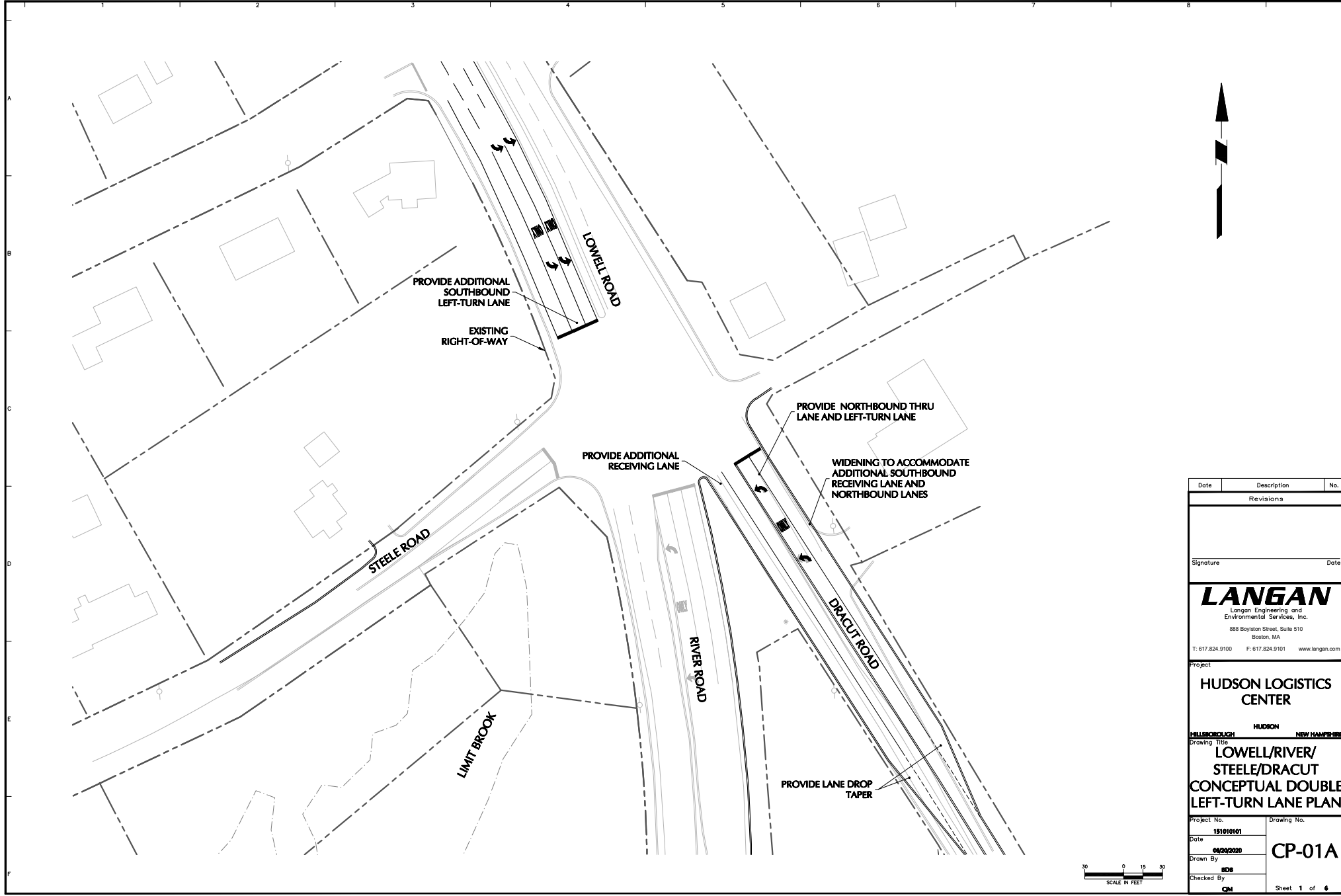
Traffic Count Data

Traffic Count Data Comparison - Route 3, Hudson, New Hampshire

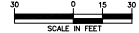
Source: NHDOT Count Station 82229049

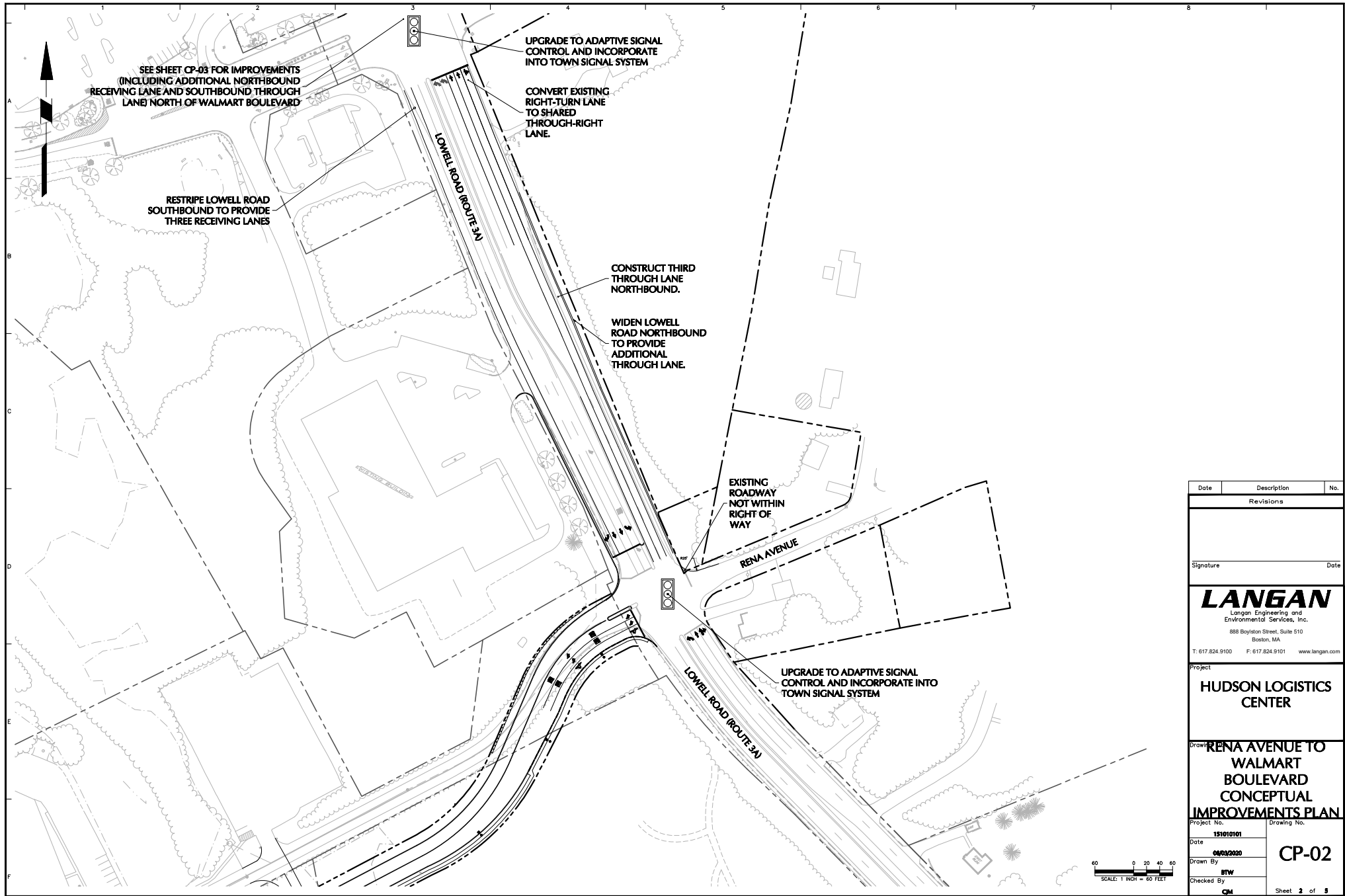
Date	Daily Traffic	Peak Hour
Tuesday, August 11, 2020	23376	1984
Wednesday, August 12, 2020	24046	2029
Thursday, August 13, 2020	24885	2183
Friday, August 14, 2020	25484	2122
Weekday Average	24448	2080
Saturday, August 15, 2020	21739	1909

Conceptual Improvement Plans

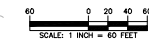


Date	Description	No.
Revisions		
Signature		Date
LANGAN		
<small>Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com</small>		
Project		
HUDSON LOGISTICS CENTER		
<small>HELLSBOROUGH HUDSON NEW HAMPSHIRE</small>		
Drawing Title		
LOWELL/RIVER/STEELE/DRACUT CONCEPTUAL DOUBLE LEFT-TURN LANE PLAN		
Project No.		Drawing No.
151010101		CP-01A
Date		
04/20/2020		
Drawn By		
RDB		
Checked By		
CM		
Sheet 1 of 6		





Date	Description	No.
Revisions		
Signature		Date
 Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
HUDSON LOGISTICS CENTER		
Drawn		
RENA AVENUE TO WALMART BOULEVARD CONCEPTUAL IMPROVEMENTS PLAN		
Project No.		Drawing No.
151010101		CP-02
Date	04/23/2020	
Drawn By	BTW	
Checked By	CM	
Sheet		2 of 5



Capacity Analysis Worksheets

Table 3
Level-of-Service Analysis Summary

Location/Peak Hour Movement	2025 Existing				2027 No-Build				2027 Build				2037 No-Build				2037 Build			
	v/c ^a	Delay ^b	LOS ^c	Max Q ^d	v/c	Delay	LOS	Max Q	v/c	Delay	LOS	Max Q	v/c	Delay	LOS	Max Q	v/c	Delay	LOS	Max Q
Lowell Road at Green Meadow Drive and Rena Avenue																				
<i>Weekday AM Peak</i>																				
EB LT/TH	0.02	26.0	C	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EB RT	0.01	0.0	A	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EB LT	--	--	--	--	0.53	41.4	D	4	0.63	46.7	D	4	0.53	41.4	D	4	0.63	46.7	D	4
EB TH/RT	--	--	--	--	0.06	0.2	A	0	0.07	0.3	A	0	0.06	0.2	A	0	0.07	0.3	A	0
WB ALL	0.18	27.4	C	2	0.27	39.1	D	2	0.27	39.5	D	2	0.27	39.1	D	2	0.27	39.5	D	2
NB LT	0.10	29.1	C	1	0.24	35.5	D	2	0.29	35.9	D	3	0.24	35.5	D	2	0.29	35.9	D	3
NB TH/RT	0.41	4.1	A	9	0.52	8.0	A	11	0.52	7.9	A	11	0.58	8.7	A	13	0.58	8.6	A	13
SB LT	0.04	29.6	C	1	0.05	35.3	D	1	0.05	35.6	D	1	0.06	35.4	D	1	0.06	35.6	D	1
SB TH/RT	0.35	3.8	A	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB TH	--	--	--	--	0.48	10.9	B	10	0.48	11.1	B	10	0.53	11.5	B	11	0.53	11.8	B	11
SB RT	--	--	--	--	0.23	2.1	A	1	0.27	2.2	A	1	0.23	2.1	A	1	0.27	2.2	A	1
Intersection	--	4.6	A	--	--	11.4	B	--	--	12.0	B	--	--	11.8	B	--	--	12.4	B	--
<i>Weekday PM Peak</i>																				
EB LT/TH	0.32	38.0	D	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EB RT	0.07	0.5	A	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EB LT	--	--	--	--	0.59	42.8	D	6	0.62	43.6	D	6	0.59	42.8	D	6	0.62	43.6	D	6
EB TH/RT	--	--	--	--	0.10	0.4	A	0	0.11	0.4	A	0	0.10	0.4	A	0	0.11	0.4	A	0
WB ALL	0.09	33.5	C	1	0.15	48.3	D	1	0.15	48.8	D	1	0.16	48.4	D	2	0.16	48.9	D	2
NB LT	0.01	39.5	D	0	0.24	46.7	D	2	0.27	47.3	D	3	0.24	46.7	D	2	0.27	47.3	D	3
NB TH/RT	0.48	7.1	A	11	0.57	12.1	B	18	0.57	12.3	B	17	0.65	14.6	B	21	0.66	14.9	B	21
SB LT	0.16	39.3	D	2	0.18	46.6	D	2	0.18	47.1	D	2	0.19	46.6	D	2	0.19	47.0	D	2
SB TH/RT	0.47	5.4	A	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB TH	--	--	--	--	0.60	13.9	B	18	0.61	14.4	B	18	0.66	15.1	B	21	0.67	15.7	B	22
SB RT	--	--	--	--	0.25	3.3	A	2	0.27	3.4	A	2	0.25	3.9	A	2	0.27	4.0	A	2
Intersection	--	7.4	A	--	--	15.5	B	--	--	16.0	B	--	--	16.9	B	--	--	17.5	B	--

EB= eastbound; WB = westbound; NB = northbound; SB = southbound; LT = left-turn; TH = through; RT = right-turn

^a Volume-to-capacity ratio.

^b Average control delay (sec./vehicle).

^c Level of service.

^d 95th percentile queue in vehicles, assuming 25 feet/vehicle.

Table 3
Level-of-Service Analysis Summary

Location/Peak Hour	2025 Existing				2027 No-Build				2027 Build				2037 No-Build				2037 Build				
	<u>Movement</u>	<u>v/c^a</u>	<u>Delay^b</u>	<u>LOS^c</u>	<u>Max Q^d</u>	<u>v/c</u>	<u>Delay</u>	<u>LOS</u>	<u>Max Q</u>	<u>v/c</u>	<u>Delay</u>	<u>LOS</u>	<u>Max Q</u>	<u>v/c</u>	<u>Delay</u>	<u>LOS</u>	<u>Max Q</u>	<u>v/c</u>	<u>Delay</u>	<u>LOS</u>	<u>Max Q</u>
Lowell Road at Dracut Road and Steele Road																					
<i>Weekday AM Peak</i>																					
EB LT	0.02	33.0	C	0	0.01	37.5	D	0	0.01	37.5	D	0	0.01	37.5	D	0	0.01	37.5	D	0	
EB TH/RT	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0	
NWB LT/TH	0.00	30.0	C	0	0.00	34.0	C	0	0.00	34.0	C	0	0.00	34.0	C	0	0.00	34.0	C	0	
NWB RT	0.81	12.7	B	10	0.87	17.8	B	18	0.87	17.4	B	19	0.86	15.5	B	31	0.86	16.0	B	32	
NB LT	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0	
NB TH/RT	0.38	26.7	C	4	0.28	27.5	C	5	0.30	28.3	C	5	0.53	37.1	D	5	0.54	37.2	D	5	
SB LT	0.70	24.2	C	13	0.39	19.4	B	6	0.38	18.8	B	6	0.32	13.5	B	6	0.33	13.5	B	6	
SB TH/RT	0.22	4.7	A	3	0.41	5.7	A	9	0.41	5.8	A	9	0.45	6.2	A	10	0.45	6.2	A	10	
Intersection	--	15.2	B	--	--	16.5	B	--	--	16.5	B	--	--	15.6	B	--	--	15.8	B	--	
<i>Weekday PM Peak</i>																					
EB LT	0.27	52.1	D	2	0.26	55.0	E	3	0.26	55.0	E	3	0.29	55.3	E	3	0.29	55.3	E	3	
EB TH/RT	0.02	0.2	A	0	0.01	0.0	A	0	0.01	0.0	A	0	0.01	0.0	A	0	0.01	0.0	A	0	
NWB LT/TH	0.06	49.0	D	1	0.06	54.0	D	1	0.06	54.0	D	1	0.08	54.8	D	1	0.08	54.8	D	1	
NWB RT	0.69	13.6	B	11	0.77	14.9	B	10	0.78	15.1	B	10	0.82	18.2	B	13	0.82	17.9	B	12	
NB LT	0.01	50.0	D	0	0.01	53.0	D	0	0.01	53.0	D	0	0.01	53.0	D	0	0.01	53.0	D	0	
NB TH/RT	0.67	42.4	D	12	0.52	35.3	D	13	0.52	35.5	D	13	0.65	41.3	D	18	0.64	41.1	D	18	
SB LT	1.20	134.9	F	45	0.76	36.4	D	15	0.76	36.4	D	15	0.76	33.6	C	15	0.76	33.6	C	15	
SB TH/RT	0.17	7.3	A	4	0.33	7.5	A	9	0.33	7.5	A	10	0.37	8.0	A	11	0.37	8.0	A	11	
Intersection	--	61.5	E	--	--	26.4	C	--	--	26.5	C	--	--	27.7	C	--	--	27.7	C	--	

EB= eastbound; WB = westbound; NB = northbound; SB = southbound; LT = left-turn; TH = through; RT = right-turn

^a Volume-to-capacity ratio.

^b Average control delay (sec./vehicle).

^c Level of service.

^d 95th percentile queue in vehicles, assuming 25 feet/vehicle.

Table 4
Unsignalized Intersection Level-of-Service Analysis Summary

Location/Peak Hour/Movement	2025 Existing				2027 Build				2037 Build			
	<u>V/C</u> ^a	<u>Delay</u> ^b	<u>LOS</u> ^c	<u>Queue</u> ^d	<u>V/C</u>	<u>Delay</u>	<u>LOS</u>	<u>Queue</u>	<u>V/C</u>	<u>Delay</u>	<u>LOS</u>	<u>Queue</u>
Green Meadow Drive at Site Driveway												
<i>Weekday AM Peak Hour</i>												
WB LT/TH	--	--	--	--	0.03	0.9	A	0	0.03	0.9	A	0
NB LT/RT	--	--	--	--	0.02	8.9	A	0	0.02	8.9	A	0
<i>Weekday PM Peak Hour</i>												
WB LT/TH	--	--	--	--	0.02	0.6	A	0	0.02	0.6	A	0
NB LT/RT	--	--	--	--	0.03	9.5	A	0	0.03	9.5	A	0

WB = westbound; NB = northbound; LT = left-turn; TH = through; RT = right-turn

^a Volume-to-capacity ratio.

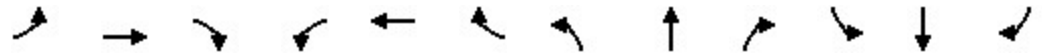
^b Average control delay in seconds per vehicle.

^c Level of service.

^d 95th percentile queue in feet, assuming 25 feet per vehicle.

Lanes, Volumes, Timings
3: Lowell Road & Green Meadow Drive/Rena Avenue

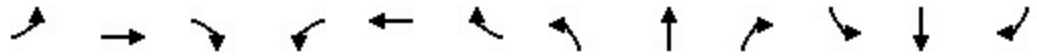
2025 AM EX
03/06/2026



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↗	↕↗		↗	↕↗	
Traffic Volume (vph)	3	0	2	1	1	32	15	1070	2	7	948	51
Future Volume (vph)	3	0	2	1	1	32	15	1070	2	7	948	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.872							0.992
Flt Protected		0.950			0.999		0.950			0.950		
Satd. Flow (prot)	0	1805	1214	0	1606	0	1805	3538	0	1570	3514	0
Flt Permitted		0.769			0.991		0.950			0.950		
Satd. Flow (perm)	0	1461	1214	0	1593	0	1805	3538	0	1570	3514	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)			91									8
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		742			828			938			1037	
Travel Time (s)		16.9			18.8			18.3			20.2	
Peak Hour Factor	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Adj. Flow (vph)	4	0	3	1	1	38	18	1259	2	7	998	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	3	0	40	0	18	1261	0	7	1052	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2		1	2		1	2	
Detector Template		Thru	Right		Thru		Left	Thru		Left	Thru	
Leading Detector (ft)		100	20		100		20	100		20	100	
Trailing Detector (ft)		0	0		0		0	0		0	0	
Detector 1 Position(ft)		0	0		0		0	0		0	0	
Detector 1 Size(ft)		6	20		6		20	6		20	6	
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94		94			94		94
Detector 2 Size(ft)		6			6		6			6		6
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex			Cl+Ex		Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0			0.0		0.0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings
3: Lowell Road & Green Meadow Drive/Rena Avenue

2025 AM EX
03/06/2026

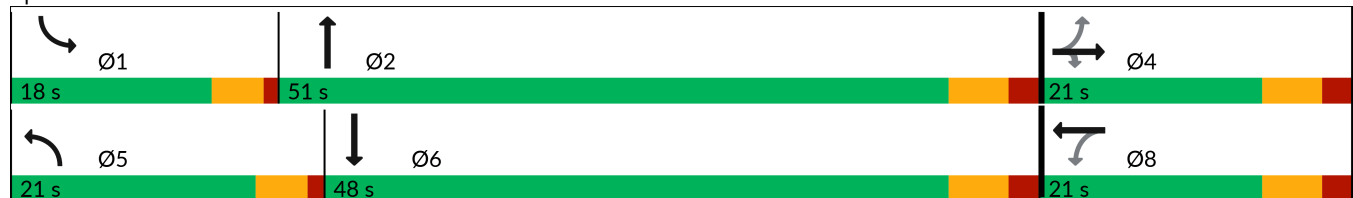


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0	21.0	21.0	21.0		21.0	51.0		18.0	48.0	
Total Split (%)	23.3%	23.3%	23.3%	23.3%	23.3%		23.3%	56.7%		20.0%	53.3%	
Maximum Green (s)	15.0	15.0	15.0	15.0	15.0		16.5	45.0		13.5	42.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	4.0		3.5	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-0.5	-2.0		-0.5	-2.0	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effect Green (s)		8.8	8.8		9.3		6.9	56.4		6.5	56.3	
Actuated g/C Ratio		0.13	0.13		0.14		0.11	0.87		0.10	0.86	
v/c Ratio		0.02	0.01		0.18		0.10	0.41		0.04	0.35	
Control Delay (s/veh)		26.0	0.0		27.4		29.1	4.1		29.6	3.8	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		26.0	0.0		27.4		29.1	4.1		29.6	3.8	
LOS		C	A		C		C	A		C	A	
Approach Delay (s/veh)		14.9			27.4			4.4			3.9	
Approach LOS		B			C			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	65.2
Natural Cycle:	45
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.41
Intersection Signal Delay (s/veh):	4.6
Intersection LOS:	A
Intersection Capacity Utilization:	46.2%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue

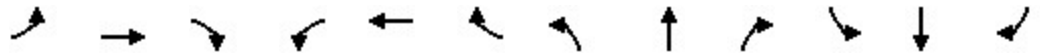


Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	4	3	40	18	1261	7	1052
v/c Ratio	0.02	0.01	0.18	0.10	0.41	0.04	0.35
Control Delay (s/veh)	26.0	0.0	27.4	29.1	4.1	29.6	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.0	0.0	27.4	29.1	4.1	29.6	3.8
Queue Length 50th (ft)	1	0	10	5	0	2	0
Queue Length 95th (ft)	9	0	42	25	214	15	186
Internal Link Dist (ft)	662		748		858		957
Turn Bay Length (ft)		50		300		350	
Base Capacity (vph)	388	389	423	479	3062	343	3035
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.09	0.04	0.41	0.02	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 3: Lowell Road & Green Meadow Drive/Rena Avenue

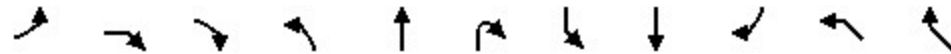
2025 AM EX
 03/06/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↗	↕↗		↗	↕↗	
Traffic Volume (vph)	3	0	2	1	1	32	15	1070	2	7	948	51
Future Volume (vph)	3	0	2	1	1	32	15	1070	2	7	948	51
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.87		1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1805	1214		1605		1805	3537		1570	3516	
Flt Permitted		0.77	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1462	1214		1592		1805	3537		1570	3516	
Peak-hour factor, PHF	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Adj. Flow (vph)	4	0	2	1	1	38	18	1259	2	7	998	54
RTOR Reduction (vph)	0	0	3	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	4	0	0	40	0	18	1261	0	7	1050	0
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		3.2	3.2		3.2		1.3	51.8		1.1	51.6	
Effective Green, g (s)		5.2	5.2		5.2		1.8	53.8		1.6	53.6	
Actuated g/C Ratio		0.07	0.07		0.07		0.02	0.74		0.02	0.74	
Clearance Time (s)		6.0	6.0		6.0		4.5	6.0		4.5	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		104	86		114		44	2621		34	2595	
v/s Ratio Prot							c0.01	c0.36		0.00	0.30	
v/s Ratio Perm		0.00	0.00		c0.03							
v/c Ratio		0.04	0.00		0.35		0.41	0.48		0.21	0.40	
Uniform Delay, d1		31.4	31.3		32.1		34.9	3.8		34.9	3.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2	0.0		1.9		6.1	0.6		3.0	0.5	
Delay (s)		31.5	31.3		34.0		41.0	4.4		37.9	4.0	
Level of Service		C	C		C		D	A		D	A	
Approach Delay (s/veh)		31.4			34.0			4.9			4.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			5.2				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			72.6				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			46.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	247	0	452	482	12	1	792
Future Volume (vph)	2	0	2	0	247	0	452	482	12	1	792
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		0	1		0	1	1
Taper Length (ft)	25			25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00
Frt		0.850						0.996			0.850
Flt Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1805	1214	0	1900	3574	0	1770	3561	0	1805	1583
Flt Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1805	1214	0	1900	3574	0	1770	3561	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		566						3			505
Link Speed (mph)	30				35			35		30	
Link Distance (ft)	1269				1792			1735		2109	
Travel Time (s)	28.8				34.9			33.8		47.9	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	3	0	3	0	309	0	491	524	13	1	921
Shared Lane Traffic (%)											
Lane Group Flow (vph)	3	3	0	0	309	0	491	537	0	1	921
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	12				12			12		12	
Link Offset(ft)	0				0			0		0	
Crosswalk Width(ft)	16				16			16		16	
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	9
Number of Detectors	1	1		1	2		1	2		1	1
Detector Template	Left	Right		Left	Thru		Left	Thru		Left	Right
Leading Detector (ft)	20	20		20	100		20	100		20	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0
Detector 1 Size(ft)	20	20		20	6		20	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 2 Position(ft)					94			94			
Detector 2 Size(ft)					6			6			
Detector 2 Type					Cl+Ex			Cl+Ex			
Detector 2 Channel											
Detector 2 Extend (s)					0.0			0.0			
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road

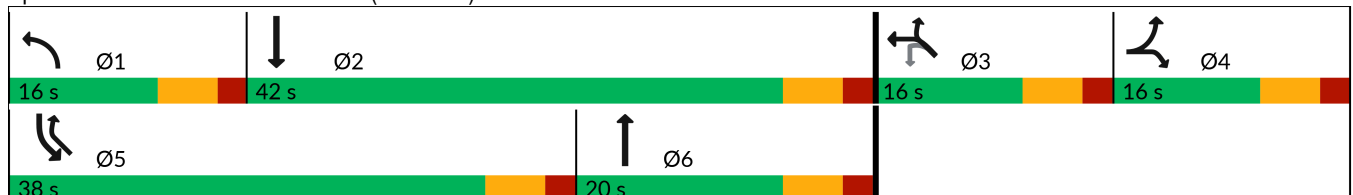


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Permitted Phases		4									
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	
Recall Mode	None	None		None	Max		None	Max		None	
Act Effect Green (s)	7.8	7.8			16.3		28.2	48.6		12.2	41.5
Actuated g/C Ratio	0.11	0.11			0.23		0.40	0.69		0.17	0.59
v/c Ratio	0.02	0.00			0.38		0.70	0.22		0.00	0.81
Control Delay (s/veh)	33.0	0.0			26.7		24.2	4.7		30.0	12.7
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay (s/veh)	33.0	0.0			26.7		24.2	4.7		30.0	12.7
LOS	C	A			C		C	A		C	B
Approach Delay (s/veh)	16.5				26.7			14.1		12.7	
Approach LOS	B				C			B		B	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	70.9
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.81
Intersection Signal Delay (s/veh):	15.2
Intersection LOS:	B
Intersection Capacity Utilization:	64.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	3	3	309	491	537	1	921
v/c Ratio	0.02	0.00	0.38	0.70	0.22	0.00	0.81
Control Delay (s/veh)	33.0	0.0	26.7	24.2	4.7	30.0	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	33.0	0.0	26.7	24.2	4.7	30.0	12.7
Queue Length 50th (ft)	1	0	60	160	32	0	89
Queue Length 95th (ft)	9	0	104	333	83	5	#252
Internal Link Dist (ft)	1189		1712		1655	2029	
Turn Bay Length (ft)		50		775		100	
Base Capacity (vph)	310	677	820	863	2439	310	1232
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.00	0.38	0.57	0.22	0.00	0.75

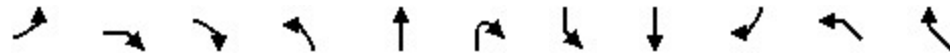
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

2025 AM EXISTING

03/06/2026

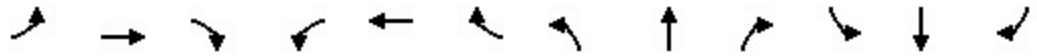


Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	247	0	452	482	12	1	792
Future Volume (vph)	2	0	2	0	247	0	452	482	12	1	792
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	6.0
Lane Util. Factor	1.00	1.00			0.95		1.00	0.95		1.00	1.00
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)	1805	1214			3574		1770	3562		1805	1583
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)	1805	1214			3574		1770	3562		1805	1583
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Adj. Flow (vph)	2	0	2	0	309	0	491	524	13	1	921
RTOR Reduction (vph)	0	3	0	0	0	0	0	1	0	0	262
Lane Group Flow (vph)	3	0	0	0	309	0	491	536	0	1	659
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases		4									
Actuated Green, G (s)	1.0	1.0			14.3		26.2	46.5		10.2	36.4
Effective Green, g (s)	3.0	3.0			16.3		28.2	48.5		12.2	36.4
Actuated g/C Ratio	0.04	0.04			0.22		0.37	0.64		0.16	0.48
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)	71	48			769		659	2282		290	761
v/s Ratio Prot	c0.00	0.00			c0.09		0.28	0.15		0.00	c0.42
v/s Ratio Perm											
v/c Ratio	0.04	0.00			0.40		0.75	0.23		0.00	0.87
Uniform Delay, d1	35.0	34.9			25.5		20.6	5.8		26.6	17.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.0			1.6		4.6	0.2		0.0	10.1
Delay (s)	35.2	34.9			27.1		25.2	6.0		26.7	27.6
Level of Service	D	C			C		C	A		C	C
Approach Delay (s/veh)	35.1				27.1			15.2		27.6	
Approach LOS	D				C			B		C	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	21.9	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.69	
Actuated Cycle Length (s)	75.7	Sum of lost time (s) 20.0
Intersection Capacity Utilization	64.2%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
3: Lowell Road & Green Meadow Drive/Rena Avenue

2025 PM EX
03/06/2026



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕↗		↖	↕↗	
Traffic Volume (vph)	50	0	17	1	0	15	2	1210	5	23	1190	6
Future Volume (vph)	50	0	17	1	0	15	2	1210	5	23	1190	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.872			0.999			0.999	
Flt Protected		0.950			0.998		0.950			0.950		
Satd. Flow (prot)	0	1787	1615	0	1653	0	1805	3606	0	1805	3605	0
Flt Permitted		0.744			0.985		0.950			0.950		
Satd. Flow (perm)	0	1400	1615	0	1632	0	1805	3606	0	1805	3605	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)			68									1
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		742			828			938			1037	
Travel Time (s)		16.9			18.8			18.3			20.2	
Peak Hour Factor	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Adj. Flow (vph)	60	0	20	1	0	19	2	1301	5	26	1322	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	20	0	20	0	2	1306	0	26	1329	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2		1	2		1	2	
Detector Template		Thru	Right		Thru		Left	Thru		Left	Thru	
Leading Detector (ft)		100	20		100		20	100		20	100	
Trailing Detector (ft)		0	0		0		0	0		0	0	
Detector 1 Position(ft)		0	0		0		0	0		0	0	
Detector 1 Size(ft)		6	20		6		20	6		20	6	
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94		94			94		94
Detector 2 Size(ft)		6			6		6			6		6
Detector 2 Type		Cl+Ex			Cl+Ex		Cl+Ex			Cl+Ex		Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0		0.0			0.0		0.0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8								
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0		27.0	61.0		27.0	61.0	
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%		22.5%	50.8%		22.5%	50.8%	
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		22.5	55.0		22.5	55.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	4.0		3.5	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-0.5	-2.0		-0.5	-2.0	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)		11.0	11.0		11.0		6.2	61.6		7.3	64.2	
Actuated g/C Ratio		0.13	0.13		0.13		0.08	0.75		0.09	0.78	
v/c Ratio		0.32	0.07		0.09		0.01	0.48		0.16	0.47	
Control Delay (s/veh)		38.0	0.5		33.5		39.5	7.1		39.3	5.4	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		38.0	0.5		33.5		39.5	7.1		39.3	5.4	
LOS		D	A		C		D	A		D	A	
Approach Delay (s/veh)		28.6			33.5			7.1			6.1	
Approach LOS		C			C			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	81.8
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.48
Intersection Signal Delay (s/veh):	7.4
Intersection LOS:	A
Intersection Capacity Utilization:	51.4%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	60	20	20	2	1306	26	1329
v/c Ratio	0.32	0.07	0.09	0.01	0.48	0.16	0.47
Control Delay (s/veh)	38.0	0.5	33.5	39.5	7.1	39.3	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	38.0	0.5	33.5	39.5	7.1	39.3	5.4
Queue Length 50th (ft)	26	0	8	1	97	12	101
Queue Length 95th (ft)	64	0	27	8	283	39	266
Internal Link Dist (ft)	662		748		858		957
Turn Bay Length (ft)		50		300		350	
Base Capacity (vph)	483	602	563	512	2716	512	2831
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.03	0.04	0.00	0.48	0.05	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 3: Lowell Road & Green Meadow Drive/Rena Avenue

2025 PM EX
 03/06/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕		↖	↕	
Traffic Volume (vph)	50	0	17	1	0	15	2	1210	5	23	1190	6
Future Volume (vph)	50	0	17	1	0	15	2	1210	5	23	1190	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.87		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1787	1615		1652		1805	3608		1805	3605	
Flt Permitted		0.74	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1400	1615		1631		1805	3608		1805	3605	
Peak-hour factor, PHF	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	60	0	20	1	0	19	2	1301	5	26	1322	7
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	60	2	0	20	0	2	1306	0	26	1329	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		7.8	7.8		7.8		1.1	59.5		2.9	61.3	
Effective Green, g (s)		9.8	9.8		9.8		1.6	61.5		3.4	63.3	
Actuated g/C Ratio		0.11	0.11		0.11		0.02	0.71		0.04	0.73	
Clearance Time (s)		6.0	6.0		6.0		4.5	6.0		4.5	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		158	182		184		33	2559		70	2632	
v/s Ratio Prot							0.00	0.36		c0.01	c0.37	
v/s Ratio Perm		c0.04	0.00		0.01							
v/c Ratio		0.38	0.01		0.11		0.06	0.51		0.37	0.50	
Uniform Delay, d1		35.6	34.2		34.5		41.8	5.7		40.6	5.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.5	0.0		0.3		0.8	0.7		3.3	0.7	
Delay (s)		37.2	34.2		34.8		42.6	6.5		43.9	5.7	
Level of Service		D	C		C		D	A		D	A	
Approach Delay (s/veh)		36.4			34.8			6.5			6.4	
Approach LOS		D			C			A			A	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	7.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.49	A
Actuated Cycle Length (s)	86.7	Sum of lost time (s)
Intersection Capacity Utilization	51.4%	12.0
Analysis Period (min)	15	ICU Level of Service
		A
c Critical Lane Group		

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	35	2	2	1	560	1	831	372	13	4	0	605
Future Volume (vph)	35	2	2	1	560	1	831	372	13	4	0	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		0	1		0		1	1
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.850						0.995				0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1787	1615	0	1805	3610	0	1805	3558	0	0	1805	1615
Flt Permitted	0.950			0.950			0.950				0.333	
Satd. Flow (perm)	1787	1615	0	1805	3610	0	1805	3558	0	0	633	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						4				288
Link Speed (mph)	30			35			35				30	
Link Distance (ft)	1269			1792			1735				2109	
Travel Time (s)	28.8			34.9			33.8				47.9	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	44	3	3	1	615	1	923	413	14	4	0	665
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	6	0	1	616	0	923	427	0	0	4	665
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12				12	
Link Offset(ft)	0			0			0				0	
Crosswalk Width(ft)	16			16			16				16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	15	9
Number of Detectors	1	1		1	2		1	2			1	1
Detector Template	Left	Right		Left	Thru		Left	Thru			Left	Right
Leading Detector (ft)	20	20		20	100		20	100			20	20
Trailing Detector (ft)	0	0		0	0		0	0			0	0
Detector 1 Position(ft)	0	0		0	0		0	0			0	0
Detector 1 Size(ft)	20	20		20	6		20	6			20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3.5

Lanes, Volumes, Timings

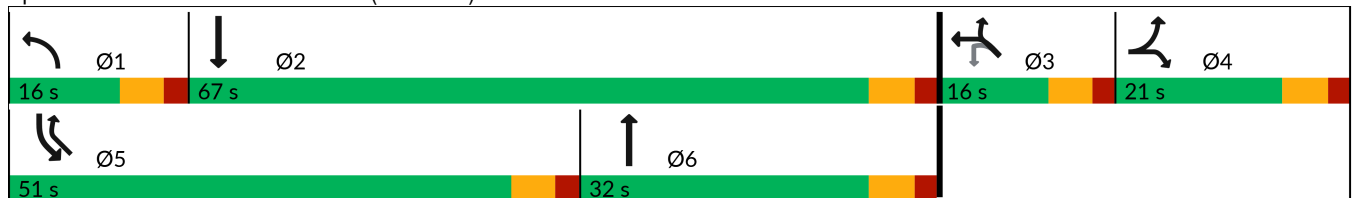
1: Lowell Road (Route 3A) & Dracut Road & Steele Road

Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Permitted Phases		4								3		
Detector Phase	4	4		1	6		5	2		3	3	3 5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	21.0	21.0		16.0	32.0		51.0	67.0		16.0	16.0	
Total Split (%)	17.5%	17.5%		13.3%	26.7%		42.5%	55.8%		13.3%	13.3%	
Maximum Green (s)	15.0	15.0		10.0	26.0		45.0	61.0		10.0	10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	Max		None	Max		None	None	
Act Effct Green (s)	10.2	10.2		7.7	28.1		47.2	77.0			12.0	56.5
Actuated g/C Ratio	0.09	0.09		0.07	0.25		0.43	0.69			0.11	0.51
v/c Ratio	0.27	0.02		0.01	0.67		1.20	0.17			0.06	0.69
Control Delay (s/veh)	52.1	0.2		50.0	42.4		134.9	7.3			49.0	13.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)	52.1	0.2		50.0	42.4		134.9	7.3			49.0	13.6
LOS	D	A		D	D		F	A			D	B
Approach Delay (s/veh)	45.8				42.5			94.5			13.8	
Approach LOS	D				D			F			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 111
 Natural Cycle: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.20
 Intersection Signal Delay (s/veh): 61.5
 Intersection LOS: E
 Intersection Capacity Utilization 83.2%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBL	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	44	6	1	616	923	427	4	665
v/c Ratio	0.27	0.02	0.01	0.67	1.20	0.17	0.06	0.69
Control Delay (s/veh)	52.1	0.2	50.0	42.4	134.9	7.3	49.0	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	52.1	0.2	50.0	42.4	134.9	7.3	49.0	13.6
Queue Length 50th (ft)	30	0	1	215	~832	49	3	122
Queue Length 95th (ft)	59	0	6	288	#1116	102	14	267
Internal Link Dist (ft)	1189			1712		1655	2029	
Turn Bay Length (ft)		50	200		775		100	
Base Capacity (vph)	274	409	195	913	767	2469	68	963
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.01	0.01	0.67	1.20	0.17	0.06	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

2025 PM EXISTING

03/06/2026

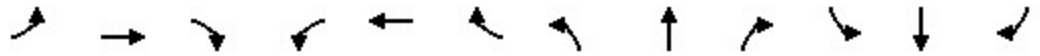


Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↖	↗		↖	↑↑		↖	↑↑			↗	↖
Traffic Volume (vph)	35	2	2	1	560	1	831	372	13	4	0	605
Future Volume (vph)	35	2	2	1	560	1	831	372	13	4	0	605
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	6.0
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	0.95			1.00	1.00
Frt	1.00	0.85		1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1787	1615		1805	3609		1805	3558			1805	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.33	1.00
Satd. Flow (perm)	1787	1615		1805	3609		1805	3558			633	1615
Peak-hour factor, PHF	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	44	2	2	1	615	1	923	413	14	4	0	665
RTOR Reduction (vph)	0	6	0	0	0	0	0	1	0	0	0	152
Lane Group Flow (vph)	44	0	0	1	616	0	923	426	0	0	4	513
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3.5
Permitted Phases		4								3		
Actuated Green, G (s)	7.0	7.0		1.1	31.0		45.1	75.0			10.0	55.1
Effective Green, g (s)	9.0	9.0		3.1	33.0		47.1	77.0			12.0	55.1
Actuated g/C Ratio	0.08	0.08		0.03	0.28		0.40	0.66			0.10	0.47
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	137	124		47	1017		726	2339			64	759
v/s Ratio Prot	c0.02	0.00		0.00	c0.17		c0.51	0.12				c0.32
v/s Ratio Perm											0.01	
v/c Ratio	0.32	0.00		0.02	0.61		1.27	0.18			0.06	0.68
Uniform Delay, d1	51.2	49.9		55.5	36.4		35.0	7.8			47.5	24.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.4	0.0		0.2	2.7		132.8	0.2			0.4	2.4
Delay (s)	52.5	49.9		55.7	39.1		167.8	8.0			47.9	26.4
Level of Service	D	D		E	D		F	A			D	C
Approach Delay (s/veh)	52.2				39.1			117.2			26.6	
Approach LOS	D				D			F			C	

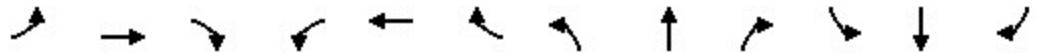
Intersection Summary		
HCM 2000 Control Delay (s/veh)	75.5	HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio	0.92	
Actuated Cycle Length (s)	117.1	Sum of lost time (s) 20.0
Intersection Capacity Utilization	83.2%	ICU Level of Service E
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
3: Lowell Road & Green Meadow Drive/Rena Avenue

2027 AM NB
03/06/2026



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	25	1	1	36	43	1140	2	7	998	241
Future Volume (vph)	156	0	25	1	1	36	43	1140	2	7	998	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.871							0.850
Flt Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	3502	1214	0	0	1604	0	1805	3538	0	1570	3539	1615
Flt Permitted	0.950				0.990		0.950			0.950		
Satd. Flow (perm)	3502	1214	0	0	1590	0	1805	3538	0	1570	3539	1615
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		341										254
Link Speed (mph)		30			30			35				35
Link Distance (ft)		742			828			938				1037
Travel Time (s)		16.9			18.8			18.3				20.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Adj. Flow (vph)	173	0	28	1	1	40	48	1267	2	7	1051	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	28	0	0	42	0	48	1269	0	7	1051	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2		1	2	1
Detector Template	Left	Thru			Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100			100		20	100		20	100	20
Trailing Detector (ft)	0	0			0		0	0		0	0	0
Detector 1 Position(ft)	0	0			0		0	0		0	0	0
Detector 1 Size(ft)	20	6			6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1		6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8								6
Detector Phase	7	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	10.0	21.0		11.0	11.0		22.0	49.0		20.0	47.0	47.0
Total Split (%)	11.1%	23.3%		12.2%	12.2%		24.4%	54.4%		22.2%	52.2%	52.2%
Maximum Green (s)	5.5	15.0		5.0	5.0		17.5	43.0		15.5	41.0	41.0
Yellow Time (s)	3.5	4.0		4.0	4.0		3.5	4.0		3.5	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-0.5	-2.0			-2.0		-0.5	-2.0		-0.5	-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Act Effect Green (s)	6.8	12.8			7.1		8.0	49.9		6.6	44.9	44.9
Actuated g/C Ratio	0.09	0.18			0.10		0.11	0.68		0.09	0.62	0.62
v/c Ratio	0.53	0.06			0.27		0.24	0.52		0.05	0.48	0.23
Control Delay (s/veh)	41.4	0.2			39.1		35.5	8.0		35.3	10.9	2.1
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	41.4	0.2			39.1		35.5	8.0		35.3	10.9	2.1
LOS	D	A			D		D	A		D	B	A
Approach Delay (s/veh)		35.6			39.1			9.0			9.3	
Approach LOS		D			D			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	72.9
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.53
Intersection Signal Delay (s/veh):	11.4
Intersection LOS:	B
Intersection Capacity Utilization:	53.5%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue



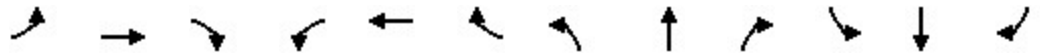
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	173	28	42	48	1269	7	1051	254
v/c Ratio	0.53	0.06	0.27	0.24	0.52	0.05	0.48	0.23
Control Delay (s/veh)	41.4	0.2	39.1	35.5	8.0	35.3	10.9	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	41.4	0.2	39.1	35.5	8.0	35.3	10.9	2.1
Queue Length 50th (ft)	44	0	20	23	137	3	169	0
Queue Length 95th (ft)	#88	0	52	54	286	16	240	33
Internal Link Dist (ft)		662	748		858		957	
Turn Bay Length (ft)				300		350		
Base Capacity (vph)	329	548	155	455	2423	352	2178	1091
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.05	0.27	0.11	0.52	0.02	0.48	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Lowell Road & Green Meadow Drive/Rena Avenue

2027 AM NB
03/06/2026

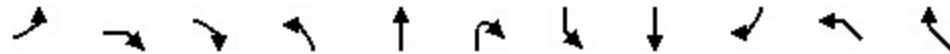


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔			↔↔		↔	↔↔		↔	↔↔	↔
Traffic Volume (vph)	156	0	25	1	1	36	43	1140	2	7	998	241
Future Volume (vph)	156	0	25	1	1	36	43	1140	2	7	998	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.85			0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	1214			1604		1805	3537		1570	3539	1615
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	1214			1591		1805	3537		1570	3539	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Adj. Flow (vph)	173	0	28	1	1	40	48	1267	2	7	1051	254
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	105
Lane Group Flow (vph)	173	5	0	0	42	0	48	1269	0	7	1051	149
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8								6
Actuated Green, G (s)	6.3	13.5			2.7		4.7	47.9		1.2	44.4	44.4
Effective Green, g (s)	6.8	15.5			4.7		5.2	49.9		1.7	46.4	46.4
Actuated g/C Ratio	0.09	0.20			0.06		0.07	0.63		0.02	0.59	0.59
Clearance Time (s)	4.5	6.0			6.0		4.5	6.0		4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	301	237			94		118	2231		33	2075	947
v/s Ratio Prot	c0.05	0.00					c0.03	c0.36		0.00	0.30	
v/s Ratio Perm					c0.03							0.09
v/c Ratio	0.57	0.02			0.45		0.41	0.57		0.21	0.51	0.16
Uniform Delay, d1	34.8	25.7			35.9		35.5	8.4		38.0	9.6	7.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.6	0.0			3.4		2.3	1.1		3.2	0.9	0.4
Delay (s)	37.4	25.7			39.3		37.8	9.5		41.2	10.5	7.8
Level of Service	D	C			D		D	A		D	B	A
Approach Delay (s/veh)		35.8			39.3			10.5			10.1	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	12.5	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.57	
Actuated Cycle Length (s)	79.1	Sum of lost time (s) 16.0
Intersection Capacity Utilization	53.5%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings

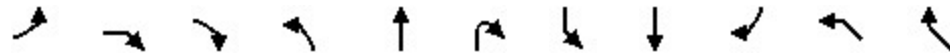
1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	277	0	492	515	12	1	858
Future Volume (vph)	2	0	2	0	277	0	492	515	12	1	858
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		0	2		0	1	1
Taper Length (ft)	25			25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00
Frt		0.850						0.997			0.850
Flt Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1805	1214	0	1900	3574	0	3433	1876	0	1805	1583
Flt Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1805	1214	0	1900	3574	0	3433	1876	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		552						2			510
Link Speed (mph)	30				35			35		30	
Link Distance (ft)	1269				1792			1735		2109	
Travel Time (s)	28.8				34.9			33.8		47.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	2	0	2	0	308	0	535	560	13	1	953
Shared Lane Traffic (%)											
Lane Group Flow (vph)	2	2	0	0	308	0	535	573	0	1	953
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	12				24			24		12	
Link Offset(ft)	0				0			0		0	
Crosswalk Width(ft)	16				16			16		16	
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	9
Number of Detectors	1	1		1	2		1	2		1	1
Detector Template	Left	Right		Left	Thru		Left	Thru		Left	Right
Leading Detector (ft)	20	20		20	100		20	100		20	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0
Detector 1 Size(ft)	20	20		20	6		20	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 2 Position(ft)					94			94			
Detector 2 Size(ft)					6			6			
Detector 2 Type					Cl+Ex			Cl+Ex			
Detector 2 Channel											
Detector 2 Extend (s)					0.0			0.0			
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road

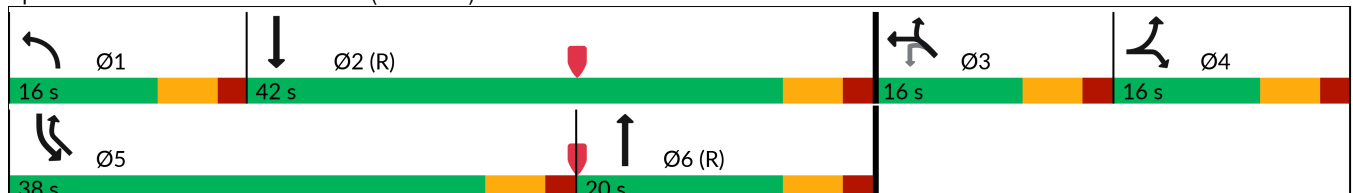


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Permitted Phases	4										
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	
Recall Mode	None	None		None	C-Max		None	C-Max		None	
Act Effct Green (s)	7.7	7.7			27.6		36.0	67.6		12.0	48.8
Actuated g/C Ratio	0.09	0.09			0.31		0.40	0.75		0.13	0.54
v/c Ratio	0.01	0.00			0.28		0.39	0.41		0.00	0.87
Control Delay (s/veh)	37.5	0.0			27.5		19.4	5.7		34.0	17.8
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay (s/veh)	37.5	0.0			27.5		19.4	5.7		34.0	17.8
LOS	D	A			C		B	A		C	B
Approach Delay (s/veh)	18.8				27.5			12.3		17.8	
Approach LOS	B				C			B		B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay (s/veh): 16.5 Intersection LOS: B
 Intersection Capacity Utilization 69.1% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	2	2	308	535	573	1	953
v/c Ratio	0.01	0.00	0.28	0.39	0.41	0.00	0.87
Control Delay (s/veh)	37.5	0.0	27.5	19.4	5.7	34.0	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.5	0.0	27.5	19.4	5.7	34.0	17.8
Queue Length 50th (ft)	1	0	69	103	80	1	192
Queue Length 95th (ft)	8	0	125	144	221	5	#449
Internal Link Dist (ft)	1189		1712		1655	2029	
Turn Bay Length (ft)		50		775		100	
Base Capacity (vph)	240	640	1094	1458	1409	240	1118
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.00	0.28	0.37	0.41	0.00	0.85

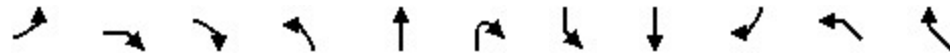
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

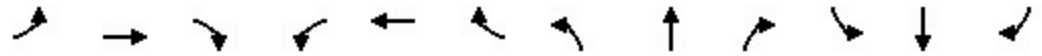
2027 AM NO-BUILD

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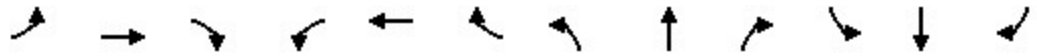


Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations	↖	↗		↖	↑↑		↖↗	↖		↗	↖
Traffic Volume (vph)	2	0	2	0	277	0	492	515	12	1	858
Future Volume (vph)	2	0	2	0	277	0	492	515	12	1	858
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	6.0
Lane Util. Factor	1.00	1.00			0.95		0.97	1.00		1.00	1.00
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)	1805	1214			3574		3433	1875		1805	1583
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)	1805	1214			3574		3433	1875		1805	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90
Adj. Flow (vph)	2	0	2	0	308	0	535	560	13	1	953
RTOR Reduction (vph)	0	2	0	0	0	0	0	1	0	0	261
Lane Group Flow (vph)	2	0	0	0	308	0	535	572	0	1	692
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases		4									
Actuated Green, G (s)	1.2	1.2			20.8		34.0	60.8		10.0	44.0
Effective Green, g (s)	3.2	3.2			22.8		36.0	62.8		12.0	44.0
Actuated g/C Ratio	0.04	0.04			0.25		0.40	0.70		0.13	0.49
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)	64	43			905		1373	1308		240	773
v/s Ratio Prot	c0.00	0.00			0.09		0.16	c0.31		0.00	c0.44
v/s Ratio Perm											
v/c Ratio	0.03	0.00			0.34		0.39	0.44		0.00	0.90
Uniform Delay, d1	41.9	41.9			27.5		19.2	5.9		33.8	20.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.0			1.0		0.2	1.1		0.0	12.9
Delay (s)	42.1	41.9			28.5		19.4	7.0		33.8	33.8
Level of Service	D	D			C		B	A		C	C
Approach Delay (s/veh)	42.0				28.5			13.0		33.8	
Approach LOS	D				C			B		C	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	23.4	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.72	
Actuated Cycle Length (s)	90.0	Sum of lost time (s) 20.0
Intersection Capacity Utilization	69.1%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	0	51	1	0	16	35	1277	5	24	1251	228
Future Volume (vph)	273	0	51	1	0	16	35	1277	5	24	1251	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.872			0.999				0.850
Flt Protected	0.950				0.997		0.950			0.950		
Satd. Flow (prot)	3467	1615	0	0	1652	0	1805	3606	0	1805	3610	1482
Flt Permitted	0.950				0.976		0.950			0.950		
Satd. Flow (perm)	3467	1615	0	0	1617	0	1805	3606	0	1805	3610	1482
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		331										217
Link Speed (mph)		30			30			35				35
Link Distance (ft)		742			828			938				1037
Travel Time (s)		16.9			18.8			18.3				20.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Adj. Flow (vph)	303	0	57	1	0	18	38	1373	5	27	1390	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	303	57	0	0	19	0	38	1378	0	27	1390	253
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2		1	2	1
Detector Template	Left	Thru			Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100			100		20	100		20	100	20
Trailing Detector (ft)	0	0			0		0	0		0	0	0
Detector 1 Position(ft)	0	0			0		0	0		0	0	0
Detector 1 Size(ft)	20	6			6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1		6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8						6		
Detector Phase	7	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	21.0	32.0		11.0	11.0		27.0	61.0		27.0	61.0	61.0
Total Split (%)	17.5%	26.7%		9.2%	9.2%		22.5%	50.8%		22.5%	50.8%	50.8%
Maximum Green (s)	16.5	26.0		5.0	5.0		22.5	55.0		22.5	55.0	55.0
Yellow Time (s)	3.5	4.0		4.0	4.0		3.5	4.0		3.5	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-0.5	-2.0			-2.0		-0.5	-2.0		-0.5	-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead			Lag			Lead			Lag		
Lead-Lag Optimize?	Yes			Yes			Yes			Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Act Effct Green (s)	13.5	17.2			7.2		8.0	61.0		7.5	58.4	58.4
Actuated g/C Ratio	0.15	0.19			0.08		0.09	0.67		0.08	0.64	0.64
v/c Ratio	0.59	0.10			0.15		0.24	0.57		0.18	0.60	0.25
Control Delay (s/veh)	42.8	0.4			48.3		46.7	12.1		46.6	13.9	3.3
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	42.8	0.4			48.3		46.7	12.1		46.6	13.9	3.3
LOS	D	A			D		D	B		D	B	A
Approach Delay (s/veh)	36.1			48.3			13.0			12.8		
Approach LOS	D			D			B			B		

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	90.9
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.60
Intersection Signal Delay (s/veh):	15.5
Intersection LOS:	B
Intersection Capacity Utilization:	56.6%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue

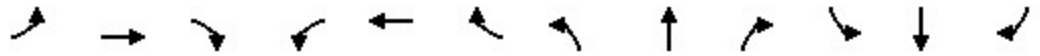


Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	303	57	19	38	1378	27	1390	253
v/c Ratio	0.59	0.10	0.15	0.24	0.57	0.18	0.60	0.25
Control Delay (s/veh)	42.8	0.4	48.3	46.7	12.1	46.6	13.9	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	42.8	0.4	48.3	46.7	12.1	46.6	13.9	3.3
Queue Length 50th (ft)	84	0	10	21	127	15	226	7
Queue Length 95th (ft)	145	0	37	58	437	45	453	51
Internal Link Dist (ft)		662	748		858		957	
Turn Bay Length (ft)				300		350		
Base Capacity (vph)	663	736	127	467	2421	467	2317	1029
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.08	0.15	0.08	0.57	0.06	0.60	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Lowell Road & Green Meadow Drive/Rena Avenue

2027 PM NB
03/06/2026























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	0	51	1	0	16	35	1277	5	24	1251	228
Future Volume (vph)	273	0	51	1	0	16	35	1277	5	24	1251	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.85			0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3467	1615			1653		1805	3608		1805	3610	1482
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3467	1615			1618		1805	3608		1805	3610	1482
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	303	0	57	1	0	18	38	1373	5	27	1390	253
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	0	0	0	85
Lane Group Flow (vph)	303	12	0	0	19	0	38	1378	0	27	1390	168
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8								6
Actuated Green, G (s)	13.0	19.2			1.7		4.7	59.0		2.9	57.2	57.2
Effective Green, g (s)	13.5	21.2			3.7		5.2	61.0		3.4	59.2	59.2
Actuated g/C Ratio	0.14	0.22			0.04		0.05	0.63		0.03	0.61	0.61
Clearance Time (s)	4.5	6.0			6.0		4.5	6.0		4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	479	350			61		96	2255		62	2189	898
v/s Ratio Prot	c0.09	0.01					c0.02	0.38		0.01	c0.39	
v/s Ratio Perm					c0.01							0.11
v/c Ratio	0.63	0.04			0.31		0.40	0.61		0.44	0.63	0.19
Uniform Delay, d1	39.7	30.1			45.7		44.7	11.1		46.2	12.3	8.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.7	0.0			2.9		2.7	1.2		4.8	1.4	0.5
Delay (s)	42.4	30.2			48.6		47.4	12.3		51.0	13.7	9.0
Level of Service	D	C			D		D	B		D	B	A
Approach Delay (s/veh)		40.5			48.6			13.3			13.6	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	16.5	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.60	
Actuated Cycle Length (s)	97.6	Sum of lost time (s) 16.0
Intersection Capacity Utilization	56.6%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road

												
Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	36	2	2	1	598	1	897	401	13	4	0	665
Future Volume (vph)	36	2	2	1	598	1	897	401	13	4	0	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		0	2		0		1	1
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850							0.995			0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1787	1615	0	1805	3610	0	3502	1872	0	0	1805	1615
Flt Permitted	0.950			0.950			0.950				0.444	
Satd. Flow (perm)	1787	1615	0	1805	3610	0	3502	1872	0	0	844	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						2				447
Link Speed (mph)	30				35			35				30
Link Distance (ft)	1269				1792			1735			2109	
Travel Time (s)	28.8				34.9			33.8			47.9	
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	40	2	2	1	657	1	997	446	14	4	0	731
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	4	0	1	658	0	997	460	0	0	4	731
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12				24			24				12
Link Offset(ft)	0				0			0				0
Crosswalk Width(ft)	16				16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	15	9
Number of Detectors	1	1		1	2		1	2			1	1
Detector Template	Left	Right		Left	Thru		Left	Thru			Left	Right
Leading Detector (ft)	20	20		20	100		20	100			20	20
Trailing Detector (ft)	0	0		0	0		0	0			0	0
Detector 1 Position(ft)	0	0		0	0		0	0			0	0
Detector 1 Size(ft)	20	20		20	6		20	6			20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3.5

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road

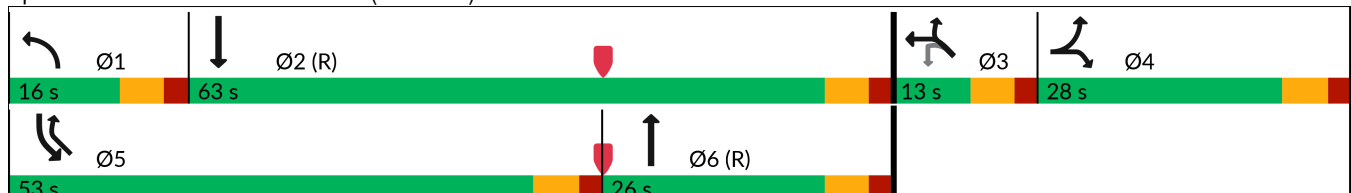


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Permitted Phases		4								3		
Detector Phase	4	4		1	6		5	2		3	3	3 5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	28.0	28.0		16.0	26.0		53.0	63.0		13.0	13.0	
Total Split (%)	23.3%	23.3%		13.3%	21.7%		44.2%	52.5%		10.8%	10.8%	
Maximum Green (s)	22.0	22.0		10.0	20.0		47.0	57.0		7.0	7.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	C-Max		None	C-Max		None	None	
Act Effct Green (s)	10.2	10.2		7.6	42.0		45.1	88.7			9.0	51.3
Actuated g/C Ratio	0.09	0.09		0.06	0.35		0.38	0.74			0.08	0.43
v/c Ratio	0.26	0.01		0.01	0.52		0.76	0.33			0.06	0.77
Control Delay (s/veh)	55.0	0.0		53.0	35.3		36.4	7.5			54.0	14.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)	55.0	0.0		53.0	35.3		36.4	7.5			54.0	14.9
LOS	E	A		D	D		D	A			D	B
Approach Delay (s/veh)	50.0				35.3			27.3			15.1	
Approach LOS	D				D			C			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay (s/veh): 26.4 Intersection LOS: C
 Intersection Capacity Utilization 66.1% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBL	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	40	4	1	658	997	460	4	731
v/c Ratio	0.26	0.01	0.01	0.52	0.76	0.33	0.06	0.77
Control Delay (s/veh)	55.0	0.0	53.0	35.3	36.4	7.5	54.0	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	55.0	0.0	53.0	35.3	36.4	7.5	54.0	14.9
Queue Length 50th (ft)	30	0	1	220	340	106	3	122
Queue Length 95th (ft)	64	0	7	317	377	237	15	251
Internal Link Dist (ft)	1189			1712		1655	2029	
Turn Bay Length (ft)		50	200		775		100	
Base Capacity (vph)	357	475	180	1264	1450	1385	63	991
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.01	0.01	0.52	0.69	0.33	0.06	0.74

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

2027 PM NO-BUILD

03/06/2026

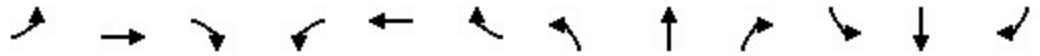


Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	36	2	2	1	598	1	897	401	13	4	0	665
Future Volume (vph)	36	2	2	1	598	1	897	401	13	4	0	665
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	6.0
Lane Util. Factor	1.00	1.00		1.00	0.95		0.97	1.00			1.00	1.00
Frt	1.00	0.85		1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1787	1615		1805	3609		3502	1873			1805	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.44	1.00
Satd. Flow (perm)	1787	1615		1805	3609		3502	1873			844	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	40	2	2	1	657	1	997	446	14	4	0	731
RTOR Reduction (vph)	0	4	0	0	0	0	0	1	0	0	0	260
Lane Group Flow (vph)	40	0	0	1	658	0	997	459	0	0	4	471
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3.5
Permitted Phases		4								3		
Actuated Green, G (s)	7.1	7.1		1.2	38.8		43.1	80.7			7.0	50.1
Effective Green, g (s)	9.1	9.1		3.2	40.8		45.1	82.7			9.0	50.1
Actuated g/C Ratio	0.08	0.08		0.03	0.34		0.38	0.69			0.08	0.42
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	135	122		48	1227		1316	1290			63	674
v/s Ratio Prot	c0.02	0.00		0.00	c0.18		c0.28	0.25				c0.29
v/s Ratio Perm											0.00	
v/c Ratio	0.30	0.00		0.02	0.54		0.76	0.36			0.06	0.70
Uniform Delay, d1	52.4	51.3		56.9	32.0		32.7	7.7			51.6	28.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.2	0.0		0.2	1.7		2.5	0.8			0.4	3.2
Delay (s)	53.7	51.3		57.0	33.6		35.2	8.5			52.0	31.9
Level of Service	D	D		E	C		D	A			D	C
Approach Delay (s/veh)	53.4				33.7			26.8			32.0	
Approach LOS	D				C			C			C	

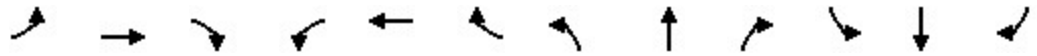
Intersection Summary		
HCM 2000 Control Delay (s/veh)	30.1	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.64	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 20.0
Intersection Capacity Utilization	66.1%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
3: Lowell Road & Green Meadow Drive/Rena Avenue

2027 AM BU
03/06/2026



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	0	31	1	1	36	53	1140	2	7	998	264
Future Volume (vph)	169	0	31	1	1	36	53	1140	2	7	998	264
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.871							0.850
Flt Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	3183	1214	0	0	1604	0	1805	3538	0	1570	3539	1524
Flt Permitted	0.950				0.990		0.950			0.950		
Satd. Flow (perm)	3183	1214	0	0	1590	0	1805	3538	0	1570	3539	1524
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		341										278
Link Speed (mph)		30			30			35				35
Link Distance (ft)		525			828			938				1037
Travel Time (s)		11.9			18.8			18.3				20.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	6%
Adj. Flow (vph)	188	0	34	1	1	40	59	1267	2	7	1051	278
Shared Lane Traffic (%)												
Lane Group Flow (vph)	188	34	0	0	42	0	59	1269	0	7	1051	278
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2		1	2	1
Detector Template	Left	Thru			Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100			100		20	100		20	100	20
Trailing Detector (ft)	0	0			0		0	0		0	0	0
Detector 1 Position(ft)	0	0			0		0	0		0	0	0
Detector 1 Size(ft)	20	6			6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1		6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases				8						6			
Detector Phase	7	4		8	8		5	2		1	6	6	
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0	
Minimum Split (s)	9.5	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0	
Total Split (s)	10.0	21.0		11.0	11.0		22.0	49.0		20.0	47.0	47.0	
Total Split (%)	11.1%	23.3%		12.2%	12.2%		24.4%	54.4%		22.2%	52.2%	52.2%	
Maximum Green (s)	5.5	15.0		5.0	5.0		17.5	43.0		15.5	41.0	41.0	
Yellow Time (s)	3.5	4.0		4.0	4.0		3.5	4.0		3.5	4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0	
Lost Time Adjust (s)	-0.5	-2.0			-2.0		-0.5	-2.0		-0.5	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0	
Lead/Lag	Lead			Lag		Lag		Lead		Lag		Lag	
Lead-Lag Optimize?	Yes			Yes		Yes		Yes		Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	Max	
Act Effect Green (s)	6.9	12.8			7.2		8.4	50.3		6.6	44.9	44.9	
Actuated g/C Ratio	0.09	0.17			0.10		0.11	0.69		0.09	0.61	0.61	
v/c Ratio	0.63	0.07			0.27		0.29	0.52		0.05	0.48	0.27	
Control Delay (s/veh)	46.7	0.3			39.5		35.9	7.9		35.6	11.1	2.2	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay (s/veh)	46.7	0.3			39.5		35.9	7.9		35.6	11.1	2.2	
LOS	D	A			D		D	A		D	B	A	
Approach Delay (s/veh)	39.6			39.5			9.2			9.4			
Approach LOS	D			D			A			A			

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	73.3
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay (s/veh):	12.0
Intersection LOS:	B
Intersection Capacity Utilization:	57.2%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue



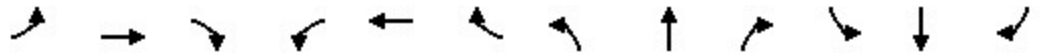
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	188	34	42	59	1269	7	1051	278
v/c Ratio	0.63	0.07	0.27	0.29	0.52	0.05	0.48	0.27
Control Delay (s/veh)	46.7	0.3	39.5	35.9	7.9	35.6	11.1	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	46.7	0.3	39.5	35.9	7.9	35.6	11.1	2.2
Queue Length 50th (ft)	48	0	20	28	137	3	172	0
Queue Length 95th (ft)	#106	0	53	63	285	16	246	35
Internal Link Dist (ft)		445	748		858		957	
Turn Bay Length (ft)				300		350		
Base Capacity (vph)	297	548	155	453	2429	350	2168	1041
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.06	0.27	0.13	0.52	0.02	0.48	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Lowell Road & Green Meadow Drive/Rena Avenue

2027 AM BU
03/06/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔			↔↔		↔	↔↔		↔	↔↔	↔
Traffic Volume (vph)	169	0	31	1	1	36	53	1140	2	7	998	264
Future Volume (vph)	169	0	31	1	1	36	53	1140	2	7	998	264
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.85			0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3183	1214			1604		1805	3537		1570	3539	1524
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3183	1214			1590		1805	3537		1570	3539	1524
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Adj. Flow (vph)	188	0	34	1	1	40	59	1267	2	7	1051	278
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	0	0	0	115
Lane Group Flow (vph)	188	7	0	0	42	0	59	1269	0	7	1051	163
Heavy Vehicles (%)	10%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	6%
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8								6
Actuated Green, G (s)	6.3	13.5			2.7		5.0	48.3		1.2	44.5	44.5
Effective Green, g (s)	6.8	15.5			4.7		5.5	50.3		1.7	46.5	46.5
Actuated g/C Ratio	0.09	0.19			0.06		0.07	0.63		0.02	0.58	0.58
Clearance Time (s)	4.5	6.0			6.0		4.5	6.0		4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	272	236			94		124	2237		33	2069	891
v/s Ratio Prot	c0.06	0.01					c0.03	c0.36		0.00	0.30	
v/s Ratio Perm					c0.03							0.11
v/c Ratio	0.69	0.03			0.45		0.48	0.57		0.21	0.51	0.18
Uniform Delay, d1	35.3	25.9			36.1		35.6	8.4		38.2	9.7	7.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.4	0.0			3.4		2.9	1.0		3.2	0.9	0.5
Delay (s)	42.7	26.0			39.5		38.5	9.4		41.4	10.6	8.1
Level of Service	D	C			D		D	A		D	B	A
Approach Delay (s/veh)		40.1			39.5			10.7			10.3	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	13.2	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.58	
Actuated Cycle Length (s)	79.5	Sum of lost time (s) 16.0
Intersection Capacity Utilization	57.2%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
6: Site Drive & Green Meadow Drive



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑		↑
Traffic Volume (vph)	181	0	33	258	0	19
Future Volume (vph)	181	0	33	258	0	19
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected				0.994		
Satd. Flow (prot)	3539	0	0	1852	0	1611
Flt Permitted				0.994		
Satd. Flow (perm)	3539	0	0	1852	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	217			525	202	
Travel Time (s)	4.9			11.9	4.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	201	0	37	287	0	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	201	0	0	324	0	21
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

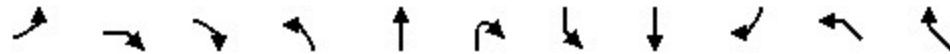
Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM 2010 TWSC

6: Site Drive & Green Meadow Drive

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑		↑
Traffic Vol, veh/h	181	0	33	258	0	19
Future Vol, veh/h	181	0	33	258	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	201	0	37	287	0	21
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	201	0	-	101
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.13	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.219	-	-	3.319
Pot Cap-1 Maneuver	-	-	1370	-	0	935
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1370	-	-	935
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Ctrl Dly, s/v	0	0.9	8.9			
HCM LOS				A		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	935	-	-	1370	-	
HCM Lane V/C Ratio	0.023	-	-	0.027	-	
HCM Ctrl Dly (s/v)	8.9	-	-	7.7	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	



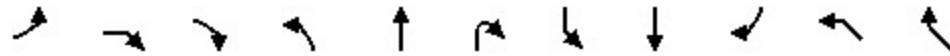
Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	280	0	496	517	12	1	865
Future Volume (vph)	2	0	2	0	280	0	496	517	12	1	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		0	2		0	1	1
Taper Length (ft)	25			25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00
Frt		0.850						0.997			0.850
Flt Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1805	1214	0	1900	3574	0	3433	1876	0	1805	1583
Flt Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1805	1214	0	1900	3574	0	3433	1876	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		551						2			509
Link Speed (mph)	30				35			35		30	
Link Distance (ft)	1269				1792			1735		2109	
Travel Time (s)	28.8				34.9			33.8		47.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	2	0	2	0	311	0	539	562	13	1	961
Shared Lane Traffic (%)											
Lane Group Flow (vph)	2	2	0	0	311	0	539	575	0	1	961
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	12				24			24		12	
Link Offset(ft)	0				0			0		0	
Crosswalk Width(ft)	16				16			16		16	
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	9
Number of Detectors	1	1		1	2		1	2		1	1
Detector Template	Left	Right		Left	Thru		Left	Thru		Left	Right
Leading Detector (ft)	20	20		20	100		20	100		20	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0
Detector 1 Size(ft)	20	20		20	6		20	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 2 Position(ft)					94			94			
Detector 2 Size(ft)					6			6			
Detector 2 Type					Cl+Ex			Cl+Ex			
Detector 2 Channel											
Detector 2 Extend (s)					0.0			0.0			
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5

Lanes, Volumes, Timings

2027 AM BUILD

1: Lowell Road (Route 3A) & Dracut Road & Steele Road

03/06/2026

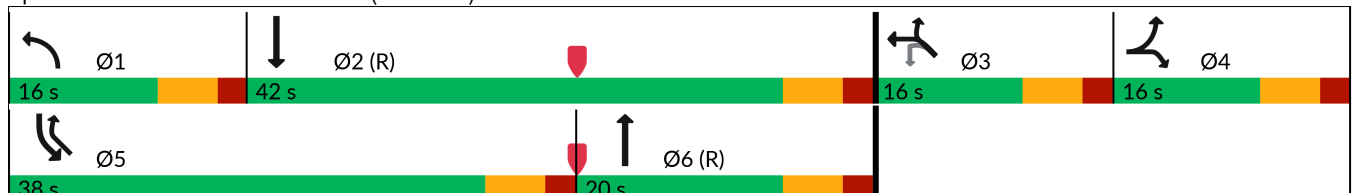


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Permitted Phases		4									
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	
Recall Mode	None	None		None	C-Max		None	C-Max		None	
Act Effct Green (s)	7.7	7.7			26.5		37.1	67.6		12.0	49.9
Actuated g/C Ratio	0.09	0.09			0.29		0.41	0.75		0.13	0.55
v/c Ratio	0.01	0.00			0.30		0.38	0.41		0.00	0.87
Control Delay (s/veh)	37.5	0.0			28.3		18.8	5.8		34.0	17.4
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay (s/veh)	37.5	0.0			28.3		18.8	5.8		34.0	17.4
LOS	D	A			C		B	A		C	B
Approach Delay (s/veh)	18.8				28.3			12.0		17.5	
Approach LOS	B				C			B		B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay (s/veh): 16.3 Intersection LOS: B
 Intersection Capacity Utilization 69.6% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	2	2	311	539	575	1	961
v/c Ratio	0.01	0.00	0.30	0.38	0.41	0.00	0.87
Control Delay (s/veh)	37.5	0.0	28.3	18.8	5.8	34.0	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.5	0.0	28.3	18.8	5.8	34.0	17.4
Queue Length 50th (ft)	1	0	70	103	81	1	195
Queue Length 95th (ft)	8	0	126	145	222	5	#487
Internal Link Dist (ft)	1189		1712		1655	2029	
Turn Bay Length (ft)		50		775		100	
Base Capacity (vph)	240	639	1052	1485	1409	240	1126
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.00	0.30	0.36	0.41	0.00	0.85

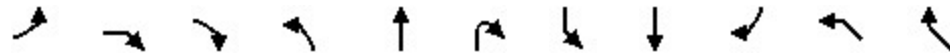
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

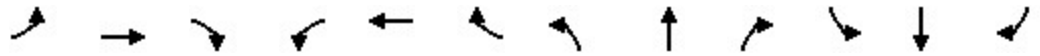
2027 AM BUILD

03/06/2026

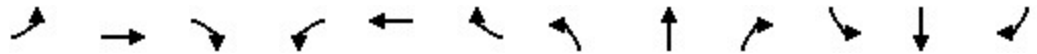


Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	280	0	496	517	12	1	865
Future Volume (vph)	2	0	2	0	280	0	496	517	12	1	865
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	6.0
Lane Util. Factor	1.00	1.00			0.95		0.97	1.00		1.00	1.00
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)	1805	1214			3574		3433	1875		1805	1583
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)	1805	1214			3574		3433	1875		1805	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90
Adj. Flow (vph)	2	0	2	0	311	0	539	562	13	1	961
RTOR Reduction (vph)	0	2	0	0	0	0	0	1	0	0	254
Lane Group Flow (vph)	2	0	0	0	311	0	539	574	0	1	707
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases		4									
Actuated Green, G (s)	1.2	1.2			19.7		35.1	60.8		10.0	45.1
Effective Green, g (s)	3.2	3.2			21.7		37.1	62.8		12.0	45.1
Actuated g/C Ratio	0.04	0.04			0.24		0.41	0.70		0.13	0.50
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)	64	43			861		1415	1308		240	793
v/s Ratio Prot	c0.00	0.00			0.09		0.16	c0.31		0.00	c0.45
v/s Ratio Perm											
v/c Ratio	0.03	0.00			0.36		0.38	0.44		0.00	0.89
Uniform Delay, d1	41.9	41.9			28.4		18.4	5.9		33.8	20.2
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.0			1.2		0.2	1.1		0.0	12.3
Delay (s)	42.1	41.9			29.6		18.6	7.0		33.8	32.5
Level of Service	D	D			C		B	A		C	C
Approach Delay (s/veh)	42.0				29.6			12.6		32.5	
Approach LOS	D				C			B		C	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	22.9	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.73	
Actuated Cycle Length (s)	90.0	Sum of lost time (s) 20.0
Intersection Capacity Utilization	69.6%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	291	0	58	1	0	16	42	1277	5	24	1251	243
Future Volume (vph)	291	0	58	1	0	16	42	1277	5	24	1251	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.872			0.999				0.850
Flt Protected	0.950				0.997		0.950			0.950		
Satd. Flow (prot)	3367	1615	0	0	1652	0	1805	3606	0	1805	3610	1442
Flt Permitted	0.950				0.976		0.950			0.950		
Satd. Flow (perm)	3367	1615	0	0	1617	0	1805	3606	0	1805	3610	1442
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		331										232
Link Speed (mph)		30			30			35				35
Link Distance (ft)		525			828			938				1037
Travel Time (s)		11.9			18.8			18.3				20.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%
Adj. Flow (vph)	323	0	64	1	0	18	45	1373	5	27	1390	270
Shared Lane Traffic (%)												
Lane Group Flow (vph)	323	64	0	0	19	0	45	1378	0	27	1390	270
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2		1	2	1
Detector Template	Left	Thru			Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100			100		20	100		20	100	20
Trailing Detector (ft)	0	0			0		0	0		0	0	0
Detector 1 Position(ft)	0	0			0		0	0		0	0	0
Detector 1 Size(ft)	20	6			6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1		6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8						6		
Detector Phase	7	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	21.0	32.0		11.0	11.0		27.0	61.0		27.0	61.0	61.0
Total Split (%)	17.5%	26.7%		9.2%	9.2%		22.5%	50.8%		22.5%	50.8%	50.8%
Maximum Green (s)	16.5	26.0		5.0	5.0		22.5	55.0		22.5	55.0	55.0
Yellow Time (s)	3.5	4.0		4.0	4.0		3.5	4.0		3.5	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-0.5	-2.0			-2.0		-0.5	-2.0		-0.5	-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead			Lag			Lead			Lag		
Lead-Lag Optimize?	Yes			Yes			Yes			Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Act Effct Green (s)	14.3	18.0			7.2		8.4	61.2		7.5	58.3	58.3
Actuated g/C Ratio	0.16	0.20			0.08		0.09	0.67		0.08	0.63	0.63
v/c Ratio	0.62	0.11			0.15		0.27	0.57		0.18	0.61	0.27
Control Delay (s/veh)	43.6	0.4			48.8		47.3	12.3		47.1	14.4	3.4
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	43.6	0.4			48.8		47.3	12.3		47.1	14.4	3.4
LOS	D	A			D		D	B		D	B	A
Approach Delay (s/veh)	36.5			48.8			13.4			13.2		
Approach LOS	D			D			B			B		

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	91.9
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay (s/veh):	16.0
Intersection LOS:	B
Intersection Capacity Utilization:	57.1%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue

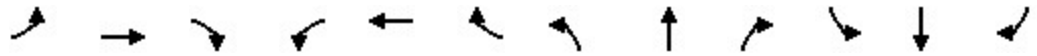


Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	323	64	19	45	1378	27	1390	270
v/c Ratio	0.62	0.11	0.15	0.27	0.57	0.18	0.61	0.27
Control Delay (s/veh)	43.6	0.4	48.8	47.3	12.3	47.1	14.4	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	43.6	0.4	48.8	47.3	12.3	47.1	14.4	3.4
Queue Length 50th (ft)	91	0	11	25	134	15	237	8
Queue Length 95th (ft)	156	0	37	66	436	46	460	53
Internal Link Dist (ft)		445	748		858		957	
Turn Bay Length (ft)				300		350		
Base Capacity (vph)	637	731	126	462	2403	462	2290	999
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.09	0.15	0.10	0.57	0.06	0.61	0.27

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Lowell Road & Green Meadow Drive/Rena Avenue

2027 PM BU
03/06/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔			↔↔		↔	↔↔		↔	↔↔	↔
Traffic Volume (vph)	291	0	58	1	0	16	42	1277	5	24	1251	243
Future Volume (vph)	291	0	58	1	0	16	42	1277	5	24	1251	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.85			0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	1615			1653		1805	3608		1805	3610	1442
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3367	1615			1617		1805	3608		1805	3610	1442
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	323	0	64	1	0	18	45	1373	5	27	1390	270
RTOR Reduction (vph)	0	50	0	0	0	0	0	0	0	0	0	93
Lane Group Flow (vph)	323	14	0	0	19	0	45	1378	0	27	1390	177
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8								6
Actuated Green, G (s)	13.8	20.0			1.7		4.9	59.2		2.9	57.2	57.2
Effective Green, g (s)	14.3	22.0			3.7		5.4	61.2		3.4	59.2	59.2
Actuated g/C Ratio	0.15	0.22			0.04		0.05	0.62		0.03	0.60	0.60
Clearance Time (s)	4.5	6.0			6.0		4.5	6.0		4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	488	360			60		98	2239		62	2167	865
v/s Ratio Prot	c0.10	0.01					c0.02	0.38		0.01	c0.39	
v/s Ratio Perm					c0.01							0.12
v/c Ratio	0.66	0.04			0.32		0.46	0.62		0.44	0.64	0.20
Uniform Delay, d1	39.9	30.0			46.2		45.2	11.5		46.7	12.8	9.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.4	0.0			3.0		3.4	1.3		4.8	1.5	0.5
Delay (s)	43.2	30.1			49.2		48.6	12.8		51.5	14.3	9.5
Level of Service	D	C			D		D	B		D	B	A
Approach Delay (s/veh)		41.0			49.2			13.9			14.1	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	17.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.62	B
Actuated Cycle Length (s)	98.6	Sum of lost time (s)
Intersection Capacity Utilization	57.1%	16.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Lanes, Volumes, Timings
6: Site Drive & Green Meadow Drive



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑		↑
Traffic Volume (vph)	324	0	22	263	0	25
Future Volume (vph)	324	0	22	263	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected				0.996		
Satd. Flow (prot)	3539	0	0	1855	0	1611
Flt Permitted				0.996		
Satd. Flow (perm)	3539	0	0	1855	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	217			525	202	
Travel Time (s)	4.9			11.9	4.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	360	0	24	292	0	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	360	0	0	316	0	28
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM 2010 TWSC

6: Site Drive & Green Meadow Drive

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑		↑
Traffic Vol, veh/h	324	0	22	263	0	25
Future Vol, veh/h	324	0	22	263	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	360	0	24	292	0	28
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	360	0	-	180
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.13	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.219	-	-	3.319
Pot Cap-1 Maneuver	-	-	1197	-	0	832
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1197	-	-	832
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Ctrl Dly, s/v	0	0.6	9.5			
HCM LOS				A		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	832	-	-	1197	-	
HCM Lane V/C Ratio	0.033	-	-	0.02	-	
HCM Ctrl Dly (s/v)	9.5	-	-	8.1	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	36	2	2	1	601	1	902	403	13	4	0	669
Future Volume (vph)	36	2	2	1	601	1	902	403	13	4	0	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		0	2		0		1	1
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850						0.995				0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1787	1615	0	1805	3610	0	3502	1872	0	0	1805	1615
Flt Permitted	0.950			0.950			0.950				0.444	
Satd. Flow (perm)	1787	1615	0	1805	3610	0	3502	1872	0	0	844	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						2				447
Link Speed (mph)	30			35			35				30	
Link Distance (ft)	1269			1792			1735				2109	
Travel Time (s)	28.8			34.9			33.8				47.9	
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	40	2	2	1	660	1	1002	448	14	4	0	735
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	4	0	1	661	0	1002	462	0	0	4	735
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			24			24				12	
Link Offset(ft)	0			0			0				0	
Crosswalk Width(ft)	16			16			16				16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	15	9
Number of Detectors	1	1		1	2		1	2			1	1
Detector Template	Left	Right		Left	Thru		Left	Thru			Left	Right
Leading Detector (ft)	20	20		20	100		20	100			20	20
Trailing Detector (ft)	0	0		0	0		0	0			0	0
Detector 1 Position(ft)	0	0		0	0		0	0			0	0
Detector 1 Size(ft)	20	20		20	6		20	6			20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3.5

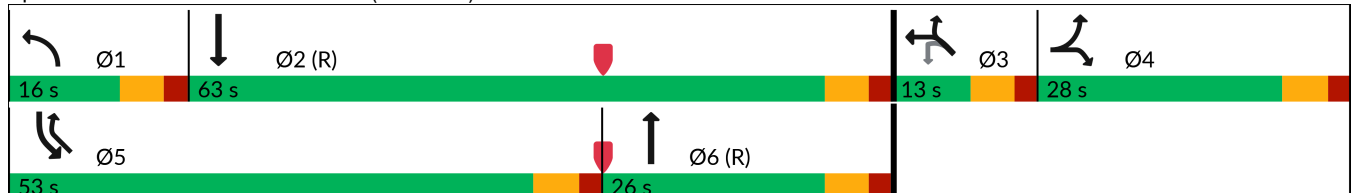


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Permitted Phases		4								3		
Detector Phase	4	4		1	6		5	2		3	3	3 5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	28.0	28.0		16.0	26.0		53.0	63.0		13.0	13.0	
Total Split (%)	23.3%	23.3%		13.3%	21.7%		44.2%	52.5%		10.8%	10.8%	
Maximum Green (s)	22.0	22.0		10.0	20.0		47.0	57.0		7.0	7.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0				-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				4.0
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	C-Max		None	C-Max		None	None	
Act Effct Green (s)	10.2	10.2		7.6	41.9		45.2	88.7			9.0	51.4
Actuated g/C Ratio	0.09	0.09		0.06	0.35		0.38	0.74			0.08	0.43
v/c Ratio	0.26	0.01		0.01	0.52		0.76	0.33			0.06	0.78
Control Delay (s/veh)	55.0	0.0		53.0	35.5		36.4	7.5			54.0	15.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)	55.0	0.0		53.0	35.5		36.4	7.5			54.0	15.1
LOS	E	A		D	D		D	A			D	B
Approach Delay (s/veh)	50.0				35.5			27.3			15.3	
Approach LOS	D				D			C			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay (s/veh): 26.5 Intersection LOS: C
 Intersection Capacity Utilization 66.4% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBL	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	40	4	1	661	1002	462	4	735
v/c Ratio	0.26	0.01	0.01	0.52	0.76	0.33	0.06	0.78
Control Delay (s/veh)	55.0	0.0	53.0	35.5	36.4	7.5	54.0	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	55.0	0.0	53.0	35.5	36.4	7.5	54.0	15.1
Queue Length 50th (ft)	30	0	1	221	342	107	3	125
Queue Length 95th (ft)	64	0	7	320	379	238	15	255
Internal Link Dist (ft)	1189			1712		1655	2029	
Turn Bay Length (ft)		50	200		775		100	
Base Capacity (vph)	357	475	180	1261	1451	1385	63	991
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.01	0.01	0.52	0.69	0.33	0.06	0.74

Intersection Summary

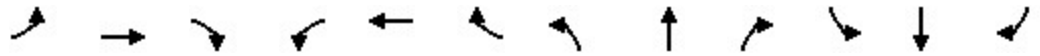
HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

2027 PM BUILD
 03/06/2026



Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	36	2	2	1	601	1	902	403	13	4	0	669
Future Volume (vph)	36	2	2	1	601	1	902	403	13	4	0	669
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	6.0
Lane Util. Factor	1.00	1.00		1.00	0.95		0.97	1.00			1.00	1.00
Frt	1.00	0.85		1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1787	1615		1805	3609		3502	1873			1805	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.44	1.00
Satd. Flow (perm)	1787	1615		1805	3609		3502	1873			844	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	40	2	2	1	660	1	1002	448	14	4	0	735
RTOR Reduction (vph)	0	4	0	0	0	0	0	1	0	0	0	260
Lane Group Flow (vph)	40	0	0	1	661	0	1002	461	0	0	4	475
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3 5
Permitted Phases		4								3		
Actuated Green, G (s)	7.1	7.1		1.2	38.7		43.2	80.7			7.0	50.2
Effective Green, g (s)	9.1	9.1		3.2	40.7		45.2	82.7			9.0	50.2
Actuated g/C Ratio	0.08	0.08		0.03	0.34		0.38	0.69			0.08	0.42
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	135	122		48	1224		1319	1290			63	675
v/s Ratio Prot	c0.02	0.00		0.00	c0.18		c0.29	0.25				c0.29
v/s Ratio Perm											0.00	
v/c Ratio	0.30	0.00		0.02	0.54		0.76	0.36			0.06	0.70
Uniform Delay, d1	52.4	51.3		56.9	32.1		32.7	7.7			51.6	28.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.2	0.0		0.2	1.7		2.6	0.8			0.4	3.3
Delay (s)	53.7	51.3		57.0	33.8		35.2	8.5			52.0	32.1
Level of Service	D	D		E	C		D	A			D	C
Approach Delay (s/veh)	53.4				33.8			26.8			32.2	
Approach LOS	D				C			C			C	

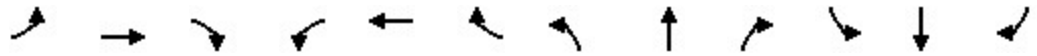
Intersection Summary		
HCM 2000 Control Delay (s/veh)	30.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.64	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 20.0
Intersection Capacity Utilization	66.4%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	25	1	1	36	43	1256	2	8	1100	241
Future Volume (vph)	156	0	25	1	1	36	43	1256	2	8	1100	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.871							0.850
Flt Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	3502	1214	0	0	1604	0	1805	3538	0	1570	3539	1615
Flt Permitted	0.950				0.990		0.950			0.950		
Satd. Flow (perm)	3502	1214	0	0	1590	0	1805	3538	0	1570	3539	1615
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		330										254
Link Speed (mph)		30			30			35				35
Link Distance (ft)		742			828			938				1037
Travel Time (s)		16.9			18.8			18.3				20.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Adj. Flow (vph)	173	0	28	1	1	40	48	1396	2	8	1158	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	28	0	0	42	0	48	1398	0	8	1158	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2		1	2	1
Detector Template	Left	Thru			Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100			100		20	100		20	100	20
Trailing Detector (ft)	0	0			0		0	0		0	0	0
Detector 1 Position(ft)	0	0			0		0	0		0	0	0
Detector 1 Size(ft)	20	6			6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1		6

Lanes, Volumes, Timings
3: Lowell Road & Green Meadow Drive/Rena Avenue

2037 AM NB
03/06/2026



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8								6
Detector Phase	7	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	10.0	21.0		11.0	11.0		22.0	49.0		20.0	47.0	47.0
Total Split (%)	11.1%	23.3%		12.2%	12.2%		24.4%	54.4%		22.2%	52.2%	52.2%
Maximum Green (s)	5.5	15.0		5.0	5.0		17.5	43.0		15.5	41.0	41.0
Yellow Time (s)	3.5	4.0		4.0	4.0		3.5	4.0		3.5	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-0.5	-2.0			-2.0		-0.5	-2.0		-0.5	-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Act Effect Green (s)	6.8	12.8			7.1		8.0	49.9		6.6	44.9	44.9
Actuated g/C Ratio	0.09	0.18			0.10		0.11	0.68		0.09	0.62	0.62
v/c Ratio	0.53	0.06			0.27		0.24	0.58		0.06	0.53	0.23
Control Delay (s/veh)	41.4	0.2			39.1		35.5	8.7		35.4	11.5	2.1
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	41.4	0.2			39.1		35.5	8.7		35.4	11.5	2.1
LOS	D	A			D		D	A		D	B	A
Approach Delay (s/veh)		35.6			39.1			9.6			10.0	
Approach LOS		D			D			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	72.9
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.58
Intersection Signal Delay (s/veh):	11.8
Intersection LOS:	B
Intersection Capacity Utilization:	53.5%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	173	28	42	48	1398	8	1158	254
v/c Ratio	0.53	0.06	0.27	0.24	0.58	0.06	0.53	0.23
Control Delay (s/veh)	41.4	0.2	39.1	35.5	8.7	35.4	11.5	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	41.4	0.2	39.1	35.5	8.7	35.4	11.5	2.1
Queue Length 50th (ft)	44	0	20	23	160	4	194	0
Queue Length 95th (ft)	#88	0	52	54	335	17	275	33
Internal Link Dist (ft)		662	748		858		957	
Turn Bay Length (ft)				300		350		
Base Capacity (vph)	329	540	155	455	2422	352	2178	1091
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.05	0.27	0.11	0.58	0.02	0.53	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 3: Lowell Road & Green Meadow Drive/Rena Avenue

2037 AM NB
 03/06/2026

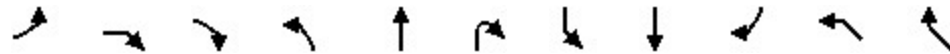


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	25	1	1	36	43	1256	2	8	1100	241
Future Volume (vph)	156	0	25	1	1	36	43	1256	2	8	1100	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.85			0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	1214			1604		1805	3538		1570	3539	1615
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	1214			1591		1805	3538		1570	3539	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Adj. Flow (vph)	173	0	28	1	1	40	48	1396	2	8	1158	254
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	105
Lane Group Flow (vph)	173	5	0	0	42	0	48	1398	0	8	1158	149
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8								6
Actuated Green, G (s)	6.3	13.5			2.7		4.7	47.9		1.2	44.4	44.4
Effective Green, g (s)	6.8	15.5			4.7		5.2	49.9		1.7	46.4	46.4
Actuated g/C Ratio	0.09	0.20			0.06		0.07	0.63		0.02	0.59	0.59
Clearance Time (s)	4.5	6.0			6.0		4.5	6.0		4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	301	237			94		118	2231		33	2075	947
v/s Ratio Prot	c0.05	0.00					c0.03	c0.40		0.01	0.33	
v/s Ratio Perm					c0.03							0.09
v/c Ratio	0.57	0.02			0.45		0.41	0.63		0.24	0.56	0.16
Uniform Delay, d1	34.8	25.7			35.9		35.5	8.9		38.1	10.0	7.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.6	0.0			3.4		2.3	1.3		3.8	1.1	0.4
Delay (s)	37.4	25.7			39.3		37.8	10.3		41.9	11.1	7.8
Level of Service	D	C			D		D	B		D	B	A
Approach Delay (s/veh)		35.8			39.3			11.2			10.7	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	12.9	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.61	
Actuated Cycle Length (s)	79.1	Sum of lost time (s) 16.0
Intersection Capacity Utilization	53.5%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	304	0	540	567	14	1	943
Future Volume (vph)	2	0	2	0	304	0	540	567	14	1	943
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		0	2		0	1	1
Taper Length (ft)	25			25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00
Frt		0.850						0.996			0.850
Flt Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1805	1214	0	1900	3574	0	3433	1874	0	1805	1583
Flt Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1805	1214	0	1900	3574	0	3433	1874	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		533						2			497
Link Speed (mph)	30				35			35		30	
Link Distance (ft)	1269				1792			1735		2109	
Travel Time (s)	28.8				34.9			33.8		47.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	2	0	2	0	338	0	587	616	15	1	1048
Shared Lane Traffic (%)											
Lane Group Flow (vph)	2	2	0	0	338	0	587	631	0	1	1048
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	12				24			24		12	
Link Offset(ft)	0				0			0		0	
Crosswalk Width(ft)	16				16			16		16	
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	9
Number of Detectors	1	1		1	2		1	2		1	1
Detector Template	Left	Right		Left	Thru		Left	Thru		Left	Right
Leading Detector (ft)	20	20		20	100		20	100		20	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0
Detector 1 Size(ft)	20	20		20	6		20	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 2 Position(ft)					94			94			
Detector 2 Size(ft)					6			6			
Detector 2 Type					Cl+Ex			Cl+Ex			
Detector 2 Channel											
Detector 2 Extend (s)					0.0			0.0			
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road

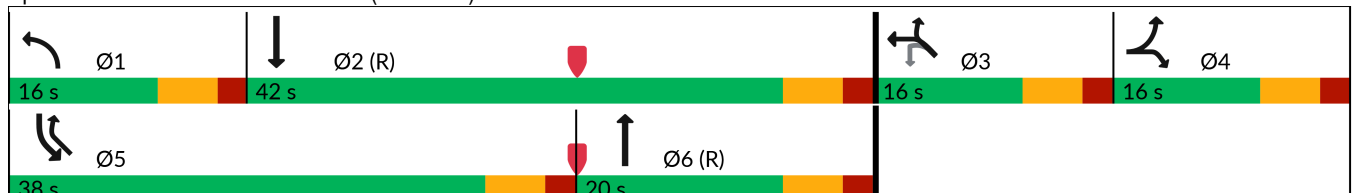


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Permitted Phases		4									
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	
Recall Mode	None	None		None	C-Max		None	C-Max		None	
Act Effct Green (s)	7.7	7.7			16.0		47.6	67.6		12.0	60.4
Actuated g/C Ratio	0.09	0.09			0.18		0.53	0.75		0.13	0.67
v/c Ratio	0.01	0.00			0.53		0.32	0.45		0.00	0.86
Control Delay (s/veh)	37.5	0.0			37.1		13.5	6.2		34.0	15.5
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay (s/veh)	37.5	0.0			37.1		13.5	6.2		34.0	15.5
LOS	D	A			D		B	A		C	B
Approach Delay (s/veh)	18.8				37.1			9.7		15.5	
Approach LOS	B				D			A		B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay (s/veh): 15.6 Intersection LOS: B
 Intersection Capacity Utilization 75.1% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	2	2	338	587	631	1	1048
v/c Ratio	0.01	0.00	0.53	0.32	0.45	0.00	0.86
Control Delay (s/veh)	37.5	0.0	37.1	13.5	6.2	34.0	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.5	0.0	37.1	13.5	6.2	34.0	15.5
Queue Length 50th (ft)	1	0	92	86	92	1	167
Queue Length 95th (ft)	8	0	136	159	254	5	#778
Internal Link Dist (ft)	1189		1712		1655	2029	
Turn Bay Length (ft)		50		775		100	
Base Capacity (vph)	240	623	635	1815	1408	240	1225
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.00	0.53	0.32	0.45	0.00	0.86

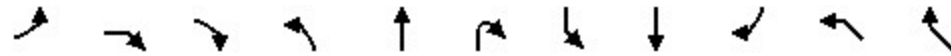
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Lowell Road (Route 3A) & Dracut Road & Steele Road

2037 AM NO-BUILD

03/06/2026



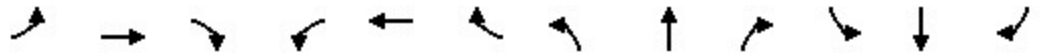
Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	304	0	540	567	14	1	943
Future Volume (vph)	2	0	2	0	304	0	540	567	14	1	943
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	6.0
Lane Util. Factor	1.00	1.00			0.95		0.97	1.00		1.00	1.00
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)	1805	1214			3574		3433	1875		1805	1583
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)	1805	1214			3574		3433	1875		1805	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90
Adj. Flow (vph)	2	0	2	0	338	0	587	616	15	1	1048
RTOR Reduction (vph)	0	2	0	0	0	0	0	1	0	0	190
Lane Group Flow (vph)	2	0	0	0	338	0	587	630	0	1	858
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases		4									
Actuated Green, G (s)	1.2	1.2			9.2		45.6	60.8		10.0	55.6
Effective Green, g (s)	3.2	3.2			11.2		47.6	62.8		12.0	55.6
Actuated g/C Ratio	0.04	0.04			0.12		0.53	0.70		0.13	0.62
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)	64	43			444		1815	1308		240	977
v/s Ratio Prot	c0.00	0.00			c0.09		0.17	0.34		0.00	c0.54
v/s Ratio Perm											
v/c Ratio	0.03	0.00			0.76		0.32	0.48		0.00	0.88
Uniform Delay, d1	41.9	41.9			38.1		12.0	6.2		33.8	14.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.0			11.7		0.1	1.3		0.0	9.0
Delay (s)	42.1	41.9			49.8		12.2	7.5		33.8	23.4
Level of Service	D	D			D		B	A		C	C
Approach Delay (s/veh)	42.0				49.8			9.7		23.4	
Approach LOS	D				D			A		C	

Intersection Summary

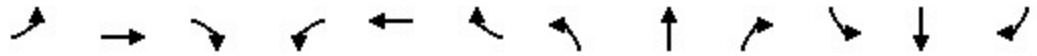
HCM 2000 Control Delay (s/veh)	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Lowell Road & Green Meadow Drive/Rena Avenue

2037 PM NB
03/06/2026



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	0	51	1	0	17	35	1407	6	26	1379	228
Future Volume (vph)	273	0	51	1	0	17	35	1407	6	26	1379	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.872			0.999				0.850
Flt Protected	0.950				0.998		0.950			0.950		
Satd. Flow (prot)	3467	1615	0	0	1653	0	1805	3606	0	1805	3610	1482
Flt Permitted	0.950				0.977		0.950			0.950		
Satd. Flow (perm)	3467	1615	0	0	1619	0	1805	3606	0	1805	3610	1482
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		326										197
Link Speed (mph)		30			30			35				35
Link Distance (ft)		742			828			938				1037
Travel Time (s)		16.9			18.8			18.3				20.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Adj. Flow (vph)	303	0	57	1	0	19	38	1513	6	29	1532	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	303	57	0	0	20	0	38	1519	0	29	1532	253
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2		1	2	1
Detector Template	Left	Thru			Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100			100		20	100		20	100	20
Trailing Detector (ft)	0	0			0		0	0		0	0	0
Detector 1 Position(ft)	0	0			0		0	0		0	0	0
Detector 1 Size(ft)	20	6			6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1		6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8						6		
Detector Phase	7	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	21.0	32.0		11.0	11.0		27.0	61.0		27.0	61.0	61.0
Total Split (%)	17.5%	26.7%		9.2%	9.2%		22.5%	50.8%		22.5%	50.8%	50.8%
Maximum Green (s)	16.5	26.0		5.0	5.0		22.5	55.0		22.5	55.0	55.0
Yellow Time (s)	3.5	4.0		4.0	4.0		3.5	4.0		3.5	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-0.5	-2.0			-2.0		-0.5	-2.0		-0.5	-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead			Lag			Lead			Lag		
Lead-Lag Optimize?	Yes			Yes			Yes			Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Act Effct Green (s)	13.5	17.2			7.2		8.0	58.7		7.6	58.4	58.4
Actuated g/C Ratio	0.15	0.19			0.08		0.09	0.65		0.08	0.64	0.64
v/c Ratio	0.59	0.10			0.16		0.24	0.65		0.19	0.66	0.25
Control Delay (s/veh)	42.8	0.4			48.4		46.7	14.6		46.6	15.1	3.9
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	42.8	0.4			48.4		46.7	14.6		46.6	15.1	3.9
LOS	D	A			D		D	B		D	B	A
Approach Delay (s/veh)	36.1			48.4			15.4			14.1		
Approach LOS	D			D			B			B		

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	90.9
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.66
Intersection Signal Delay (s/veh):	16.9
Intersection LOS:	B
Intersection Capacity Utilization:	60.2%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue

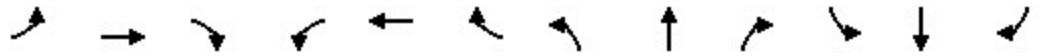


Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	303	57	20	38	1519	29	1532	253
v/c Ratio	0.59	0.10	0.16	0.24	0.65	0.19	0.66	0.25
Control Delay (s/veh)	42.8	0.4	48.4	46.7	14.6	46.6	15.1	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	42.8	0.4	48.4	46.7	14.6	46.6	15.1	3.9
Queue Length 50th (ft)	84	0	11	21	259	16	266	11
Queue Length 95th (ft)	145	0	39	58	515	48	532	58
Internal Link Dist (ft)		662	748		858		957	
Turn Bay Length (ft)				300		350		
Base Capacity (vph)	663	732	127	467	2328	467	2317	1021
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.08	0.16	0.08	0.65	0.06	0.66	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 3: Lowell Road & Green Meadow Drive/Rena Avenue

2037 PM NB
 03/06/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↗			↖↗		↖	↖↗		↖	↖↗	↖
Traffic Volume (vph)	273	0	51	1	0	17	35	1407	6	26	1379	228
Future Volume (vph)	273	0	51	1	0	17	35	1407	6	26	1379	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.85			0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3467	1615			1652		1805	3608		1805	3610	1482
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3467	1615			1619		1805	3608		1805	3610	1482
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	303	0	57	1	0	19	38	1513	6	29	1532	253
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	0	0	0	78
Lane Group Flow (vph)	303	12	0	0	20	0	38	1519	0	29	1532	175
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8								6
Actuated Green, G (s)	13.0	19.2			1.7		4.7	56.7		4.3	56.3	56.3
Effective Green, g (s)	13.5	21.2			3.7		5.2	58.7		4.8	58.3	58.3
Actuated g/C Ratio	0.14	0.22			0.04		0.05	0.61		0.05	0.60	0.60
Clearance Time (s)	4.5	6.0			6.0		4.5	6.0		4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	484	354			61		97	2190		89	2176	893
v/s Ratio Prot	c0.09	0.01					c0.02	0.42		0.02	c0.42	
v/s Ratio Perm					c0.01							0.12
v/c Ratio	0.63	0.04			0.33		0.39	0.69		0.33	0.70	0.20
Uniform Delay, d1	39.2	29.7			45.3		44.2	12.9		44.4	13.2	8.6
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.5	0.0			3.1		2.6	1.8		2.1	1.9	0.5
Delay (s)	41.7	29.7			48.4		46.8	14.7		46.5	15.2	9.1
Level of Service	D	C			D		D	B		D	B	A
Approach Delay (s/veh)		39.8			48.4			15.5			14.8	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	17.7	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.65	
Actuated Cycle Length (s)	96.7	Sum of lost time (s) 16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	40	2	2	1	661	1	992	443	15	5	0	735
Future Volume (vph)	40	2	2	1	661	1	992	443	15	5	0	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		0	2		0		1	1
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850						0.995				0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1787	1615	0	1805	3610	0	3502	1872	0	0	1805	1615
Flt Permitted	0.950			0.950			0.950				0.444	
Satd. Flow (perm)	1787	1615	0	1805	3610	0	3502	1872	0	0	844	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						2				434
Link Speed (mph)	30			35			35				30	
Link Distance (ft)	1269			1792			1735				2109	
Travel Time (s)	28.8			34.9			33.8				47.9	
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	44	2	2	1	726	1	1102	492	17	5	0	808
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	4	0	1	727	0	1102	509	0	0	5	808
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			24			24				12	
Link Offset(ft)	0			0			0				0	
Crosswalk Width(ft)	16			16			16				16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	15	9
Number of Detectors	1	1		1	2		1	2			1	1
Detector Template	Left	Right		Left	Thru		Left	Thru			Left	Right
Leading Detector (ft)	20	20		20	100		20	100			20	20
Trailing Detector (ft)	0	0		0	0		0	0			0	0
Detector 1 Position(ft)	0	0		0	0		0	0			0	0
Detector 1 Size(ft)	20	20		20	6		20	6			20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3.5

Lanes, Volumes, Timings

1: Lowell Road (Route 3A) & Dracut Road & Steele Road

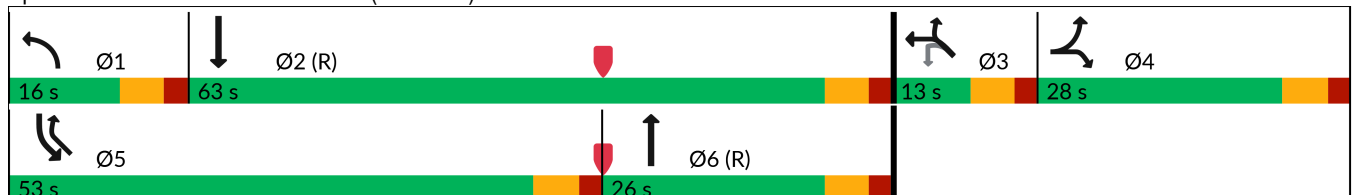


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Permitted Phases		4								3		
Detector Phase	4	4		1	6		5	2		3	3	3 5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	28.0	28.0		16.0	26.0		53.0	63.0		13.0	13.0	
Total Split (%)	23.3%	23.3%		13.3%	21.7%		44.2%	52.5%		10.8%	10.8%	
Maximum Green (s)	22.0	22.0		10.0	20.0		47.0	57.0		7.0	7.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0			-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	C-Max		None	C-Max		None	None	
Act Effct Green (s)	10.4	10.4		7.6	37.4		49.5	88.5			9.0	55.7
Actuated g/C Ratio	0.09	0.09		0.06	0.31		0.41	0.74			0.08	0.46
v/c Ratio	0.29	0.01		0.01	0.65		0.76	0.37			0.08	0.82
Control Delay (s/veh)	55.3	0.0		53.0	41.3		33.6	8.0			54.8	18.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)	55.3	0.0		53.0	41.3		33.6	8.0			54.8	18.2
LOS	E	A		D	D		C	A			D	B
Approach Delay (s/veh)	50.6				41.3			25.5			18.5	
Approach LOS	D				D			C			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay (s/veh): 27.7 Intersection LOS: C
 Intersection Capacity Utilization 72.1% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBL	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	44	4	1	727	1102	509	5	808
v/c Ratio	0.29	0.01	0.01	0.65	0.76	0.37	0.08	0.82
Control Delay (s/veh)	55.3	0.0	53.0	41.3	33.6	8.0	54.8	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	55.3	0.0	53.0	41.3	33.6	8.0	54.8	18.2
Queue Length 50th (ft)	33	0	1	261	373	122	4	197
Queue Length 95th (ft)	69	0	7	#460	384	272	17	319
Internal Link Dist (ft)	1189			1712		1655	2029	
Turn Bay Length (ft)		50	200		775		100	
Base Capacity (vph)	357	475	180	1126	1510	1381	63	1004
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.01	0.01	0.65	0.73	0.37	0.08	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

2037 PM NO-BUILD

03/06/2026

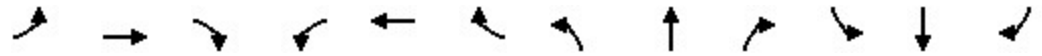


Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	40	2	2	1	661	1	992	443	15	5	0	735
Future Volume (vph)	40	2	2	1	661	1	992	443	15	5	0	735
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	6.0
Lane Util. Factor	1.00	1.00		1.00	0.95		0.97	1.00			1.00	1.00
Frt	1.00	0.85		1.00	1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1787	1615		1805	3609		3502	1872			1805	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.44	1.00
Satd. Flow (perm)	1787	1615		1805	3609		3502	1872			844	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	44	2	2	1	726	1	1102	492	17	5	0	808
RTOR Reduction (vph)	0	4	0	0	0	0	0	1	0	0	0	237
Lane Group Flow (vph)	44	0	0	1	727	0	1102	508	0	0	5	571
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3.5
Permitted Phases		4								3		
Actuated Green, G (s)	7.3	7.3		1.2	34.2		47.5	80.5			7.0	54.5
Effective Green, g (s)	9.3	9.3		3.2	36.2		49.5	82.5			9.0	54.5
Actuated g/C Ratio	0.08	0.08		0.03	0.30		0.41	0.69			0.08	0.45
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	138	125		48	1088		1444	1287			63	733
v/s Ratio Prot	c0.02	0.00		0.00	c0.20		c0.31	0.27				c0.35
v/s Ratio Perm											0.01	
v/c Ratio	0.32	0.00		0.02	0.67		0.76	0.40			0.08	0.78
Uniform Delay, d1	52.4	51.1		56.9	36.6		30.2	8.0			51.6	27.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.3	0.0		0.2	3.3		2.5	0.9			0.5	5.2
Delay (s)	53.7	51.1		57.0	39.9		32.7	9.0			52.2	32.9
Level of Service	D	D		E	D		C	A			D	C
Approach Delay (s/veh)	53.5				39.9			25.2			33.0	
Approach LOS	D				D			C			C	

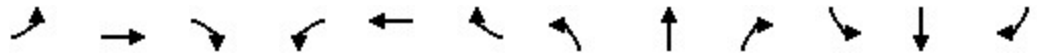
Intersection Summary		
HCM 2000 Control Delay (s/veh)	31.0	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.70	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 20.0
Intersection Capacity Utilization	72.1%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
3: Lowell Road & Green Meadow Drive/Rena Avenue

2037 AM BU
03/06/2026



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	0	31	1	1	36	53	1256	2	8	1100	264
Future Volume (vph)	169	0	31	1	1	36	53	1256	2	8	1100	264
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.871							0.850
Flt Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	3183	1214	0	0	1604	0	1805	3538	0	1570	3539	1524
Flt Permitted	0.950				0.990		0.950			0.950		
Satd. Flow (perm)	3183	1214	0	0	1590	0	1805	3538	0	1570	3539	1524
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		330										278
Link Speed (mph)		30			30			35				35
Link Distance (ft)		525			828			938				1037
Travel Time (s)		11.9			18.8			18.3				20.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	6%
Adj. Flow (vph)	188	0	34	1	1	40	59	1396	2	8	1158	278
Shared Lane Traffic (%)												
Lane Group Flow (vph)	188	34	0	0	42	0	59	1398	0	8	1158	278
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2		1	2	1
Detector Template	Left	Thru			Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100			100		20	100		20	100	20
Trailing Detector (ft)	0	0			0		0	0		0	0	0
Detector 1 Position(ft)	0	0			0		0	0		0	0	0
Detector 1 Size(ft)	20	6			6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1		6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8								6
Detector Phase	7	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	10.0	21.0		11.0	11.0		22.0	49.0		20.0	47.0	47.0
Total Split (%)	11.1%	23.3%		12.2%	12.2%		24.4%	54.4%		22.2%	52.2%	52.2%
Maximum Green (s)	5.5	15.0		5.0	5.0		17.5	43.0		15.5	41.0	41.0
Yellow Time (s)	3.5	4.0		4.0	4.0		3.5	4.0		3.5	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-0.5	-2.0			-2.0		-0.5	-2.0		-0.5	-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Act Effect Green (s)	6.9	12.8			7.2		8.4	50.3		6.6	44.9	44.9
Actuated g/C Ratio	0.09	0.17			0.10		0.11	0.69		0.09	0.61	0.61
v/c Ratio	0.63	0.07			0.27		0.29	0.58		0.06	0.53	0.27
Control Delay (s/veh)	46.7	0.3			39.5		35.9	8.6		35.6	11.8	2.2
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	46.7	0.3			39.5		35.9	8.6		35.6	11.8	2.2
LOS	D	A			D		D	A		D	B	A
Approach Delay (s/veh)		39.6			39.5			9.7			10.1	
Approach LOS		D			D			A			B	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	73.3
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay (s/veh):	12.4
Intersection LOS:	B
Intersection Capacity Utilization:	60.4%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue



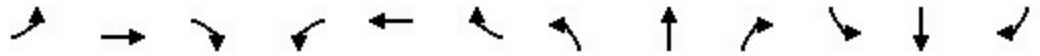
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	188	34	42	59	1398	8	1158	278
v/c Ratio	0.63	0.07	0.27	0.29	0.58	0.06	0.53	0.27
Control Delay (s/veh)	46.7	0.3	39.5	35.9	8.6	35.6	11.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	46.7	0.3	39.5	35.9	8.6	35.6	11.8	2.2
Queue Length 50th (ft)	48	0	20	28	160	4	198	0
Queue Length 95th (ft)	#106	0	53	63	334	17	281	35
Internal Link Dist (ft)		445	748		858		957	
Turn Bay Length (ft)				300		350		
Base Capacity (vph)	297	539	155	453	2429	350	2168	1041
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.06	0.27	0.13	0.58	0.02	0.53	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Lowell Road & Green Meadow Drive/Rena Avenue

2037 AM BU
03/06/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔			↔		↔	↕↕		↔	↕↕	↔
Traffic Volume (vph)	169	0	31	1	1	36	53	1256	2	8	1100	264
Future Volume (vph)	169	0	31	1	1	36	53	1256	2	8	1100	264
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.85			0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3183	1214			1604		1805	3538		1570	3539	1524
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3183	1214			1590		1805	3538		1570	3539	1524
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Adj. Flow (vph)	188	0	34	1	1	40	59	1396	2	8	1158	278
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	0	0	0	115
Lane Group Flow (vph)	188	7	0	0	42	0	59	1398	0	8	1158	163
Heavy Vehicles (%)	10%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	6%
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8								6
Actuated Green, G (s)	6.3	13.5			2.7		5.0	48.3		1.2	44.5	44.5
Effective Green, g (s)	6.8	15.5			4.7		5.5	50.3		1.7	46.5	46.5
Actuated g/C Ratio	0.09	0.19			0.06		0.07	0.63		0.02	0.58	0.58
Clearance Time (s)	4.5	6.0			6.0		4.5	6.0		4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	272	236			94		124	2238		33	2069	891
v/s Ratio Prot	c0.06	0.01					c0.03	c0.40		0.01	0.33	
v/s Ratio Perm					c0.03							0.11
v/c Ratio	0.69	0.03			0.45		0.48	0.62		0.24	0.56	0.18
Uniform Delay, d1	35.3	25.9			36.1		35.6	8.9		38.3	10.2	7.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.4	0.0			3.4		2.9	1.3		3.8	1.1	0.5
Delay (s)	42.7	26.0			39.5		38.5	10.2		42.1	11.3	8.1
Level of Service	D	C			D		D	B		D	B	A
Approach Delay (s/veh)		40.1			39.5			11.3			10.8	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	13.5	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.63	
Actuated Cycle Length (s)	79.5	Sum of lost time (s) 16.0
Intersection Capacity Utilization	60.4%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
6: Site Drive & Green Meadow Drive



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑		↑
Traffic Volume (vph)	181	0	33	258	0	19
Future Volume (vph)	181	0	33	258	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected				0.994		
Satd. Flow (prot)	3539	0	0	1852	0	1611
Flt Permitted				0.994		
Satd. Flow (perm)	3539	0	0	1852	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	217			525	202	
Travel Time (s)	4.9			11.9	4.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	201	0	37	287	0	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	201	0	0	324	0	21
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

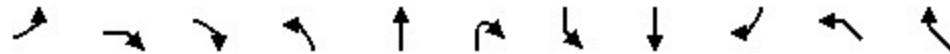
Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.1%
Analysis Period (min)	15
	ICU Level of Service A

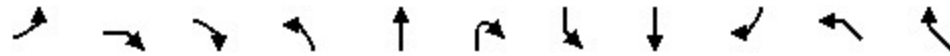
HCM 2010 TWSC

6: Site Drive & Green Meadow Drive

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑		↑
Traffic Vol, veh/h	181	0	33	258	0	19
Future Vol, veh/h	181	0	33	258	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	201	0	37	287	0	21
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	201	0	-	101
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.13	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.219	-	-	3.319
Pot Cap-1 Maneuver	-	-	1370	-	0	935
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1370	-	-	935
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Ctrl Dly, s/v	0	0.9	8.9			
HCM LOS				A		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	935	-	-	1370	-	
HCM Lane V/C Ratio	0.023	-	-	0.027	-	
HCM Ctrl Dly (s/v)	8.9	-	-	7.7	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	307	0	544	569	14	1	950
Future Volume (vph)	2	0	2	0	307	0	544	569	14	1	950
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		0	2		0	1	1
Taper Length (ft)	25			25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00
Frt		0.850						0.996			0.850
Flt Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1805	1214	0	1900	3574	0	3433	1874	0	1805	1583
Flt Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1805	1214	0	1900	3574	0	3433	1874	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		532						2			496
Link Speed (mph)	30				35			35		30	
Link Distance (ft)	1269				1792			1735		2109	
Travel Time (s)	28.8				34.9			33.8		47.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	2	0	2	0	341	0	591	618	15	1	1056
Shared Lane Traffic (%)											
Lane Group Flow (vph)	2	2	0	0	341	0	591	633	0	1	1056
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	12				24			24		12	
Link Offset(ft)	0				0			0		0	
Crosswalk Width(ft)	16				16			16		16	
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	9
Number of Detectors	1	1		1	2		1	2		1	1
Detector Template	Left	Right		Left	Thru		Left	Thru		Left	Right
Leading Detector (ft)	20	20		20	100		20	100		20	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0
Detector 1 Size(ft)	20	20		20	6		20	6		20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Detector 2 Position(ft)					94			94			
Detector 2 Size(ft)					6			6			
Detector 2 Type					Cl+Ex			Cl+Ex			
Detector 2 Channel											
Detector 2 Extend (s)					0.0			0.0			
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Permitted Phases		4									
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	
Recall Mode	None	None		None	C-Max		None	C-Max		None	
Act Effct Green (s)	7.7	7.7			16.0		47.6	67.6		12.0	60.4
Actuated g/C Ratio	0.09	0.09			0.18		0.53	0.75		0.13	0.67
v/c Ratio	0.01	0.00			0.54		0.33	0.45		0.00	0.86
Control Delay (s/veh)	37.5	0.0			37.2		13.5	6.2		34.0	16.0
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay (s/veh)	37.5	0.0			37.2		13.5	6.2		34.0	16.0
LOS	D	A			D		B	A		C	B
Approach Delay (s/veh)	18.8				37.2			9.7		16.0	
Approach LOS	B				D			A		B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 38 (42%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay (s/veh): 15.8 Intersection LOS: B
 Intersection Capacity Utilization 75.6% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	2	2	341	591	633	1	1056
v/c Ratio	0.01	0.00	0.54	0.33	0.45	0.00	0.86
Control Delay (s/veh)	37.5	0.0	37.2	13.5	6.2	34.0	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.5	0.0	37.2	13.5	6.2	34.0	16.0
Queue Length 50th (ft)	1	0	93	87	93	1	173
Queue Length 95th (ft)	8	0	137	161	256	5	#788
Internal Link Dist (ft)	1189		1712		1655	2029	
Turn Bay Length (ft)		50		775		100	
Base Capacity (vph)	240	622	635	1815	1408	240	1224
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.00	0.54	0.33	0.45	0.00	0.86

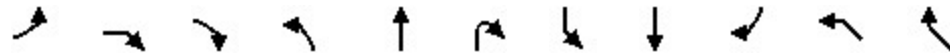
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

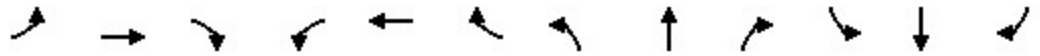
HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

2037 AM BUILD

03/06/2026



Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR	
Lane Configurations												
Traffic Volume (vph)	2	0	2	0	307	0	544	569	14	1	950	
Future Volume (vph)	2	0	2	0	307	0	544	569	14	1	950	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	6.0	
Lane Util. Factor	1.00	1.00			0.95		0.97	1.00		1.00	1.00	
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1214			3574		3433	1875		1805	1583	
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1214			3574		3433	1875		1805	1583	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90	
Adj. Flow (vph)	2	0	2	0	341	0	591	618	15	1	1056	
RTOR Reduction (vph)	0	2	0	0	0	0	0	1	0	0	190	
Lane Group Flow (vph)	2	0	0	0	341	0	591	632	0	1	866	
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%	
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov	
Protected Phases	4	4		1	6		5	2		3	3 5	
Permitted Phases		4										
Actuated Green, G (s)	1.2	1.2			9.2		45.6	60.8		10.0	55.6	
Effective Green, g (s)	3.2	3.2			11.2		47.6	62.8		12.0	55.6	
Actuated g/C Ratio	0.04	0.04			0.12		0.53	0.70		0.13	0.62	
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0		
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		
Lane Grp Cap (vph)	64	43			444		1815	1308		240	977	
v/s Ratio Prot	c0.00	0.00			c0.10		0.17	0.34		0.00	c0.55	
v/s Ratio Perm												
v/c Ratio	0.03	0.00			0.77		0.33	0.48		0.00	0.89	
Uniform Delay, d1	41.9	41.9			38.1		12.1	6.2		33.8	14.5	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0			12.0		0.1	1.3		0.0	9.8	
Delay (s)	42.1	41.9			50.2		12.2	7.5		33.8	24.3	
Level of Service	D	D			D		B	A		C	C	
Approach Delay (s/veh)	42.0				50.2			9.7		24.3		
Approach LOS	D				D			A		C		
Intersection Summary												
HCM 2000 Control Delay (s/veh)			20.9		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			75.6%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	291	0	58	1	0	17	42	1407	5	26	1379	243
Future Volume (vph)	291	0	58	1	0	17	42	1407	5	26	1379	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.872							0.850
Flt Protected	0.950				0.998		0.950			0.950		
Satd. Flow (prot)	3367	1615	0	0	1653	0	1805	3610	0	1805	3610	1442
Flt Permitted	0.950				0.977		0.950			0.950		
Satd. Flow (perm)	3367	1615	0	0	1619	0	1805	3610	0	1805	3610	1442
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		326										211
Link Speed (mph)		30			30			35				35
Link Distance (ft)		525			828			938				1037
Travel Time (s)		11.9			18.8			18.3				20.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%
Adj. Flow (vph)	323	0	64	1	0	19	45	1513	5	29	1532	270
Shared Lane Traffic (%)												
Lane Group Flow (vph)	323	64	0	0	20	0	45	1518	0	29	1532	270
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2		1	2	1
Detector Template	Left	Thru			Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100			100		20	100		20	100	20
Trailing Detector (ft)	0	0			0		0	0		0	0	0
Detector 1 Position(ft)	0	0			0		0	0		0	0	0
Detector 1 Size(ft)	20	6			6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1		6

Lanes, Volumes, Timings

3: Lowell Road & Green Meadow Drive/Rena Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases				8						6			
Detector Phase	7	4		8	8		5	2		1	6	6	
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0	
Minimum Split (s)	9.5	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0	
Total Split (s)	21.0	32.0		11.0	11.0		27.0	61.0		27.0	61.0	61.0	
Total Split (%)	17.5%	26.7%		9.2%	9.2%		22.5%	50.8%		22.5%	50.8%	50.8%	
Maximum Green (s)	16.5	26.0		5.0	5.0		22.5	55.0		22.5	55.0	55.0	
Yellow Time (s)	3.5	4.0		4.0	4.0		3.5	4.0		3.5	4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0	
Lost Time Adjust (s)	-0.5	-2.0			-2.0		-0.5	-2.0		-0.5	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0	
Lead/Lag	Lead			Lag			Lead		Lag		Lead		Lag
Lead-Lag Optimize?	Yes			Yes		Yes		Yes		Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	Max	
Act Effct Green (s)	14.3	18.0			7.2		8.4	58.9		7.7	58.3	58.3	
Actuated g/C Ratio	0.16	0.20			0.08		0.09	0.64		0.08	0.63	0.63	
v/c Ratio	0.62	0.11			0.16		0.27	0.66		0.19	0.67	0.27	
Control Delay (s/veh)	43.6	0.4			48.9		47.3	14.9		47.0	15.7	4.0	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay (s/veh)	43.6	0.4			48.9		47.3	14.9		47.0	15.7	4.0	
LOS	D	A			D		D	B		D	B	A	
Approach Delay (s/veh)	36.5			48.9			15.8			14.5			
Approach LOS	D			D			B			B			

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	91.9
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.67
Intersection Signal Delay (s/veh):	17.5
Intersection LOS:	B
Intersection Capacity Utilization:	60.7%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Lowell Road & Green Meadow Drive/Rena Avenue



Queues

3: Lowell Road & Green Meadow Drive/Rena Avenue



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	323	64	20	45	1518	29	1532	270
v/c Ratio	0.62	0.11	0.16	0.27	0.66	0.19	0.67	0.27
Control Delay (s/veh)	43.6	0.4	48.9	47.3	14.9	47.0	15.7	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	43.6	0.4	48.9	47.3	14.9	47.0	15.7	4.0
Queue Length 50th (ft)	91	0	11	25	267	16	278	12
Queue Length 95th (ft)	156	0	38	66	515	48	540	62
Internal Link Dist (ft)		445	748		858		957	
Turn Bay Length (ft)				300		350		
Base Capacity (vph)	637	727	126	462	2313	462	2290	992
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.09	0.16	0.10	0.66	0.06	0.67	0.27

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 3: Lowell Road & Green Meadow Drive/Rena Avenue

2037 PM BU
 03/06/2026



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔			↔↔		↔	↔↔		↔	↔↔	↔
Traffic Volume (vph)	291	0	58	1	0	17	42	1407	5	26	1379	243
Future Volume (vph)	291	0	58	1	0	17	42	1407	5	26	1379	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.85			0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	1615			1652		1805	3608		1805	3610	1442
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3367	1615			1618		1805	3608		1805	3610	1442
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	323	0	64	1	0	19	45	1513	5	29	1532	270
RTOR Reduction (vph)	0	50	0	0	0	0	0	0	0	0	0	85
Lane Group Flow (vph)	323	14	0	0	20	0	45	1518	0	29	1532	185
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8								6
Actuated Green, G (s)	13.8	20.0			1.7		4.9	56.9		4.4	56.4	56.4
Effective Green, g (s)	14.3	22.0			3.7		5.4	58.9		4.9	58.4	58.4
Actuated g/C Ratio	0.15	0.22			0.04		0.06	0.60		0.05	0.60	0.60
Clearance Time (s)	4.5	6.0			6.0		4.5	6.0		4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	492	363			61		99	2172		90	2155	861
v/s Ratio Prot	c0.10	0.01					c0.02	0.42		0.02	c0.42	
v/s Ratio Perm					c0.01							0.13
v/c Ratio	0.66	0.04			0.33		0.45	0.70		0.32	0.71	0.21
Uniform Delay, d1	39.4	29.6			45.8		44.8	13.4		44.8	13.8	9.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.2	0.0			3.1		3.3	1.9		2.1	2.0	0.6
Delay (s)	42.6	29.7			49.0		48.1	15.3		46.9	15.8	9.7
Level of Service	D	C			D		D	B		D	B	A
Approach Delay (s/veh)		40.4			49.0			16.2			15.4	
Approach LOS		D			D			B			B	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	18.5	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.67	
Actuated Cycle Length (s)	97.8	Sum of lost time (s) 16.0
Intersection Capacity Utilization	60.7%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
6: Site Drive & Green Meadow Drive



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑		↑
Traffic Volume (vph)	324	0	22	263	0	25
Future Volume (vph)	324	0	22	263	0	25
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Fr _t						0.865
Fl _t Protected				0.996		
Satd. Flow (prot)	3539	0	0	1855	0	1611
Fl _t Permitted				0.996		
Satd. Flow (perm)	3539	0	0	1855	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	217			525	202	
Travel Time (s)	4.9			11.9	4.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	360	0	24	292	0	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	360	0	0	316	0	28
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM 2010 TWSC

6: Site Drive & Green Meadow Drive

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑		↑
Traffic Vol, veh/h	324	0	22	263	0	25
Future Vol, veh/h	324	0	22	263	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	360	0	24	292	0	28
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	360	0	-	180
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.13	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.219	-	-	3.319
Pot Cap-1 Maneuver	-	-	1197	-	0	832
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1197	-	-	832
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Ctrl Dly, s/v	0	0.6	9.5			
HCM LOS				A		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	832	-	-	1197	-	
HCM Lane V/C Ratio	0.033	-	-	0.02	-	
HCM Ctrl Dly (s/v)	9.5	-	-	8.1	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	40	2	2	1	658	1	987	441	15	5	0	731
Future Volume (vph)	40	2	2	1	658	1	987	441	15	5	0	731
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		0	2		0		1	1
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850						0.995				0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1787	1615	0	1805	3610	0	3502	1872	0	0	1805	1615
Flt Permitted	0.950			0.950			0.950				0.444	
Satd. Flow (perm)	1787	1615	0	1805	3610	0	3502	1872	0	0	844	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						2				434
Link Speed (mph)	30			35			35				30	
Link Distance (ft)	1269			1792			1735				2109	
Travel Time (s)	28.8			34.9			33.8				47.9	
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	44	2	2	1	723	1	1097	490	17	5	0	803
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	4	0	1	724	0	1097	507	0	0	5	803
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			24			24				12	
Link Offset(ft)	0			0			0				0	
Crosswalk Width(ft)	16			16			16				16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9	15		9	15		9	15	15	9
Number of Detectors	1	1		1	2		1	2			1	1
Detector Template	Left	Right		Left	Thru		Left	Thru			Left	Right
Leading Detector (ft)	20	20		20	100		20	100			20	20
Trailing Detector (ft)	0	0		0	0		0	0			0	0
Detector 1 Position(ft)	0	0		0	0		0	0			0	0
Detector 1 Size(ft)	20	20		20	6		20	6			20	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3.5

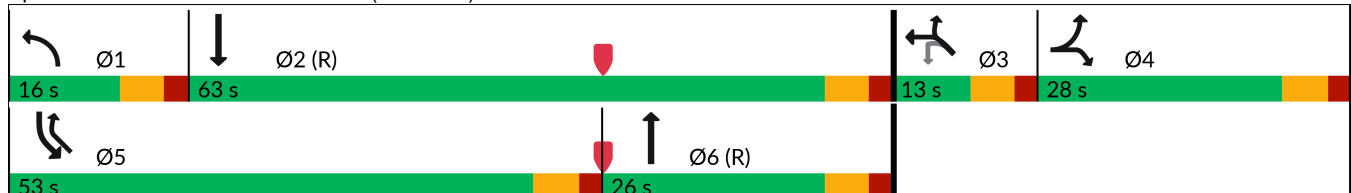


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Permitted Phases		4								3		
Detector Phase	4	4		1	6		5	2		3	3	3 5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	28.0	28.0		16.0	26.0		53.0	63.0		13.0	13.0	
Total Split (%)	23.3%	23.3%		13.3%	21.7%		44.2%	52.5%		10.8%	10.8%	
Maximum Green (s)	22.0	22.0		10.0	20.0		47.0	57.0		7.0	7.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0				-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				4.0
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	C-Max		None	C-Max		None	None	
Act Effct Green (s)	10.4	10.4		7.6	37.6		49.4	88.5			9.0	55.6
Actuated g/C Ratio	0.09	0.09		0.06	0.31		0.41	0.74			0.08	0.46
v/c Ratio	0.29	0.01		0.01	0.64		0.76	0.37			0.08	0.82
Control Delay (s/veh)	55.3	0.0		53.0	41.1		33.6	8.0			54.8	17.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)	55.3	0.0		53.0	41.1		33.6	8.0			54.8	17.9
LOS	E	A		D	D		C	A			D	B
Approach Delay (s/veh)	50.6				41.1			25.5			18.2	
Approach LOS	D				D			C			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay (s/veh): 27.6 Intersection LOS: C
 Intersection Capacity Utilization 71.8% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Queues

1: Lowell Road (Route 3A) & Dracut Road & Steele Road



Lane Group	EBL	EBR	NBL	NBT	SBL	SBT	NWL	NWR
Lane Group Flow (vph)	44	4	1	724	1097	507	5	803
v/c Ratio	0.29	0.01	0.01	0.64	0.76	0.37	0.08	0.82
Control Delay (s/veh)	55.3	0.0	53.0	41.1	33.6	8.0	54.8	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	55.3	0.0	53.0	41.1	33.6	8.0	54.8	17.9
Queue Length 50th (ft)	33	0	1	258	372	122	4	193
Queue Length 95th (ft)	69	0	7	#456	381	271	17	311
Internal Link Dist (ft)	1189			1712		1655	2029	
Turn Bay Length (ft)		50	200		775		100	
Base Capacity (vph)	357	475	180	1129	1509	1381	63	1004
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.01	0.01	0.64	0.73	0.37	0.08	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Lowell Road (Route 3A) & Dracut Road & Steele Road

2037 PM BUILD
 03/06/2026

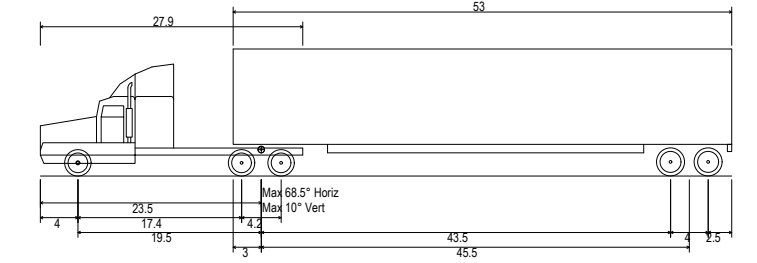


Movement	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↙	↘		↙	↑↑		↙↘	↘			↘	↙
Traffic Volume (vph)	40	2	2	1	658	1	987	441	15	5	0	731
Future Volume (vph)	40	2	2	1	658	1	987	441	15	5	0	731
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	6.0
Lane Util. Factor	1.00	1.00		1.00	0.95		0.97	1.00			1.00	1.00
Frt	1.00	0.85		1.00	1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1787	1615		1805	3609		3502	1872			1805	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.44	1.00
Satd. Flow (perm)	1787	1615		1805	3609		3502	1872			844	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	44	2	2	1	723	1	1097	490	17	5	0	803
RTOR Reduction (vph)	0	4	0	0	0	0	0	1	0	0	0	237
Lane Group Flow (vph)	44	0	0	1	724	0	1097	506	0	0	5	566
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Perm	Prot	pt+ov
Protected Phases	4	4		1	6		5	2			3	3 5
Permitted Phases		4								3		
Actuated Green, G (s)	7.3	7.3		1.2	34.3		47.4	80.5			7.0	54.4
Effective Green, g (s)	9.3	9.3		3.2	36.3		49.4	82.5			9.0	54.4
Actuated g/C Ratio	0.08	0.08		0.03	0.30		0.41	0.69			0.08	0.45
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	138	125		48	1091		1441	1287			63	732
v/s Ratio Prot	c0.02	0.00		0.00	c0.20		c0.31	0.27				c0.35
v/s Ratio Perm											0.01	
v/c Ratio	0.32	0.00		0.02	0.66		0.76	0.39			0.08	0.77
Uniform Delay, d1	52.4	51.1		56.9	36.5		30.2	8.0			51.6	27.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.3	0.0		0.2	3.2		2.4	0.9			0.5	5.1
Delay (s)	53.7	51.1		57.0	39.7		32.7	8.9			52.2	32.7
Level of Service	D	D		E	D		C	A			D	C
Approach Delay (s/veh)	53.5				39.7			25.2			32.8	
Approach LOS	D				D			C			C	

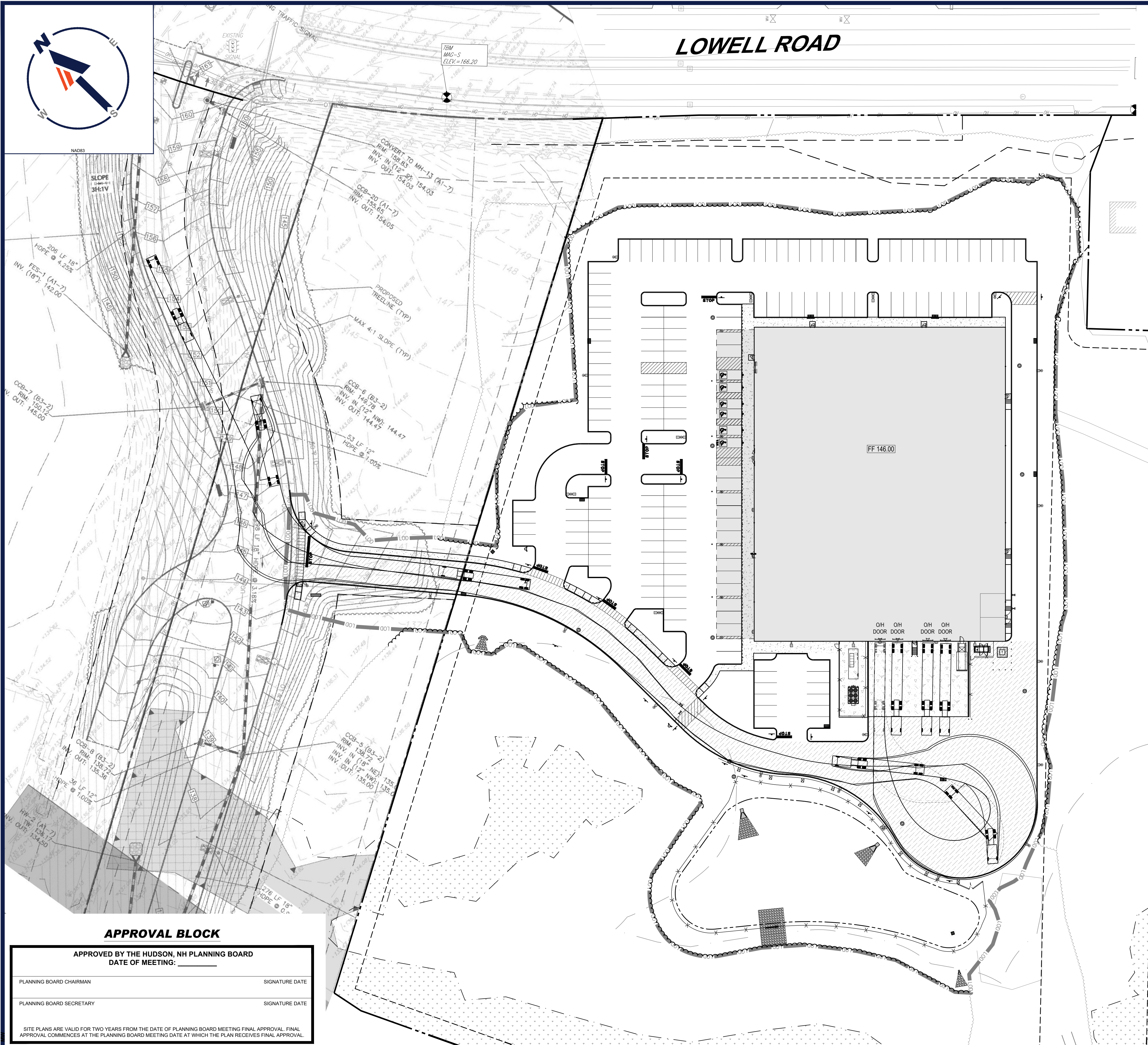
Intersection Summary		
HCM 2000 Control Delay (s/veh)	30.9	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.70	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 20.0
Intersection Capacity Utilization	71.8%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		



LOWELL ROAD



WB-67 Interstate Semi-Trailer
 Overall Length 73.50ft
 Overall Width 8.50ft
 Overall Body Height 13.50ft
 Min Body Ground Clearance 1.33ft
 Max Track Width 8.50ft
 Lock-to-lock time 6.00s
 Max Steering Angle (Virtual) 28.40°



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 LAND SURVEYING
 PROGRAM MANAGEMENT
 LANDSCAPE ARCHITECTURE
 SUSTAINABLE DESIGN
 PERMITTING SERVICES
 TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY	CHECKED BY
1	03/24/2026	TOWN & PEER REVIEW COMMENTS	MJW	KWC
2	05/12/2026	TOWN COMMENTS	MJW	KWC

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 PROJECT No.: NHA250020.01-2A
 DRAWN BY: MJW
 CHECKED BY: KWC
 DATE: 01/23/2026
 CAD I.D.: P-CIVIL-PROP

SITE DEVELOPMENT PLANS
 FOR

PROPOSED RESTAURANT DEPOT
 273 LOWELL ROAD
 HUDSON, NEW HAMPSHIRE
 PARCEL ID: 234-034-000

BOHLER
 3 EXECUTIVE PARK DRIVE FLOOR 2
 BEDFORD, NH 03110
 Phone: (603) 441-2900
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SHEET TITLE:
WB-67 TRUCK TURN EXHIBIT
 SHEET NUMBER:
EX-01
 REVISION 2 - 05/12/2026

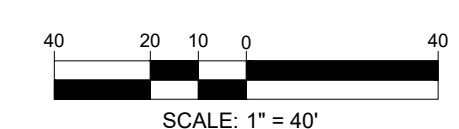
APPROVAL BLOCK

APPROVED BY THE HUDSON, NH PLANNING BOARD
 DATE OF MEETING: _____

PLANNING BOARD CHAIRMAN	SIGNATURE	DATE
PLANNING BOARD SECRETARY	SIGNATURE	DATE

SITE PLANS ARE VALID FOR TWO YEARS FROM THE DATE OF PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

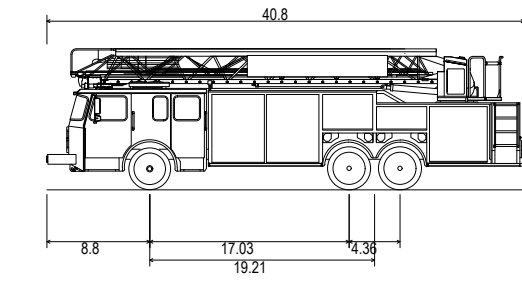
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May 11, 2026
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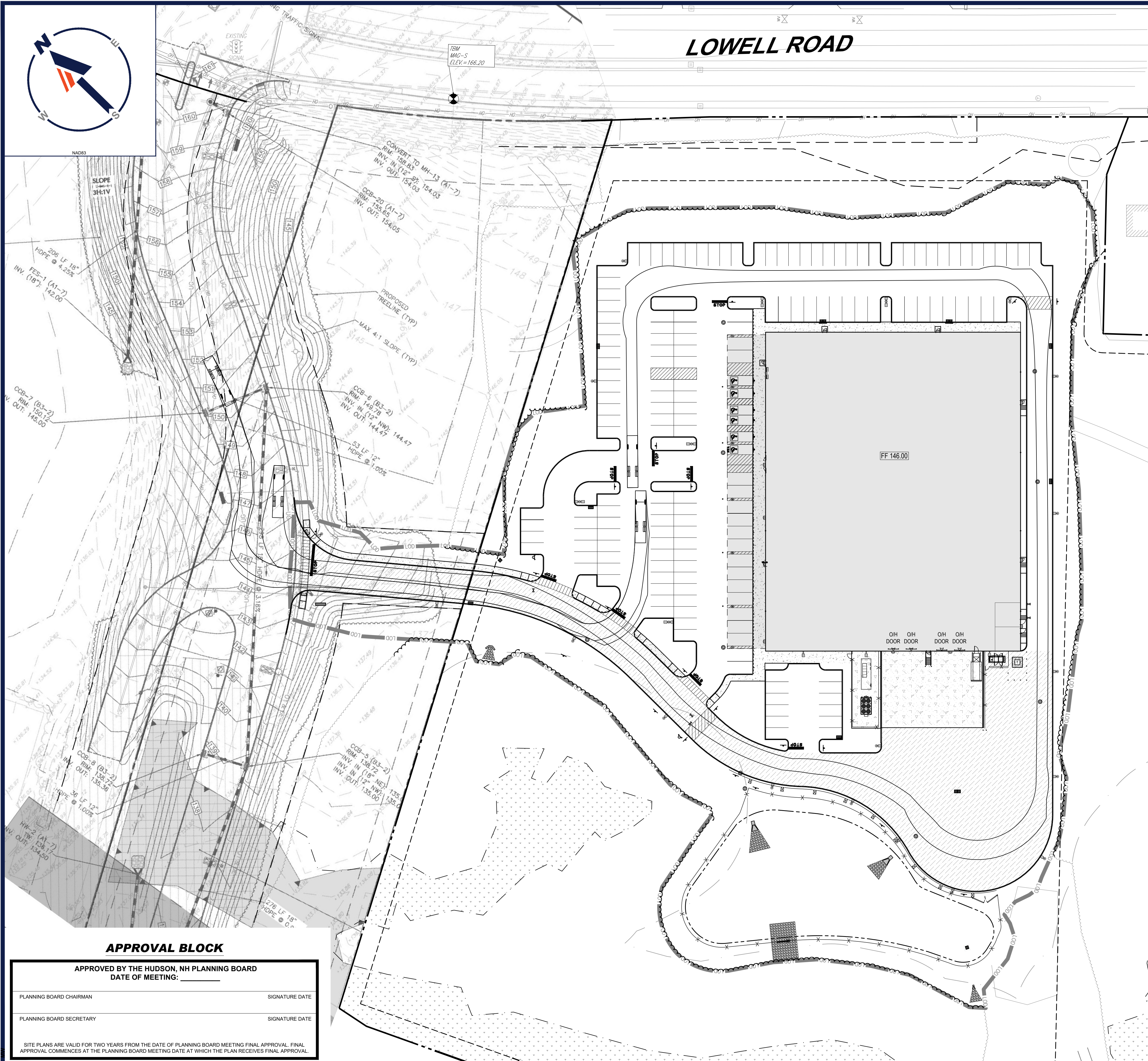


LOWELL ROAD



HUDSON, NH FIRE TRUCK
 Overall Length 40.80ft
 Overall Width 8.330ft
 Overall Body Height 12.065ft
 Min Body Ground Clearance 1.572ft
 Track Width 8.330ft
 Lock-to-lock time 6.00s
 Max Steering Angle (Virtual) 33.30°

40.800ft
 8.330ft
 12.065ft
 1.572ft
 8.330ft
 6.00s
 33.30°



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SITE DEVELOPMENT PLANS
 FOR

PROPOSED RESTAURANT DEPOT
 273 LOWELL ROAD
 HUDSON, NEW HAMPSHIRE
 PARCEL ID: 234-034-000

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JAMES W. BOHLER
 STATE OF NEW HAMPSHIRE
 LICENSED PROFESSIONAL ENGINEER
 No. 15476
 EXPIRES 12/31/2026

SHEET TITLE:
FIRE TRUCK APPARATUS PLAN
 SHEET NUMBER:
EX-02

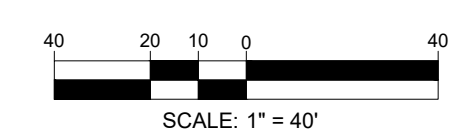
APPROVAL BLOCK

APPROVED BY THE HUDSON, NH PLANNING BOARD
 DATE OF MEETING: _____

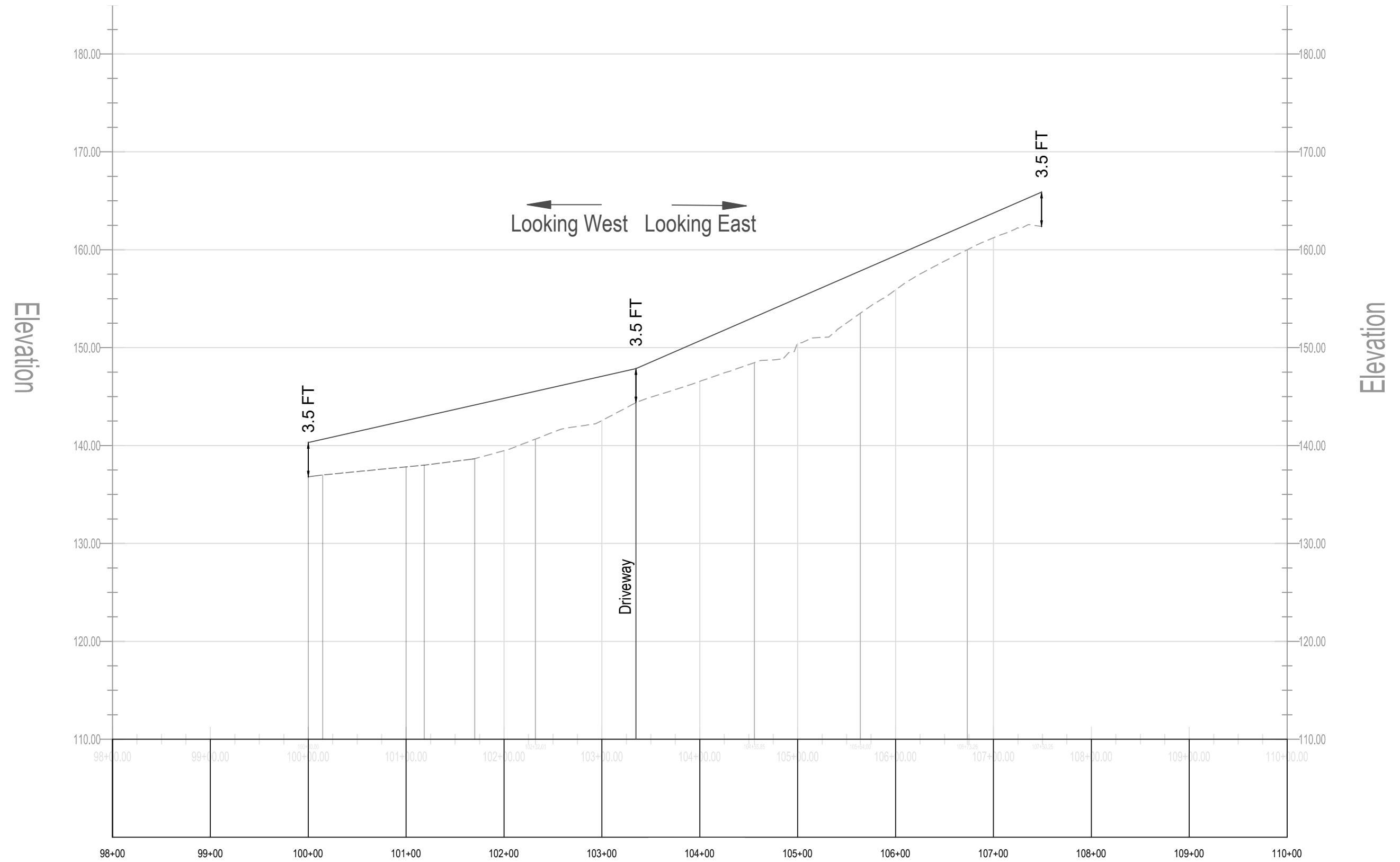
PLANNING BOARD CHAIRMAN	SIGNATURE	DATE
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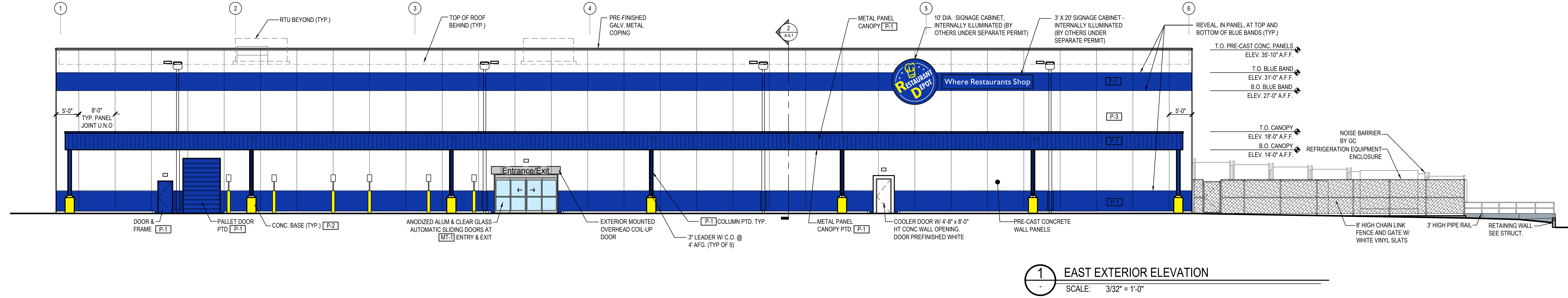
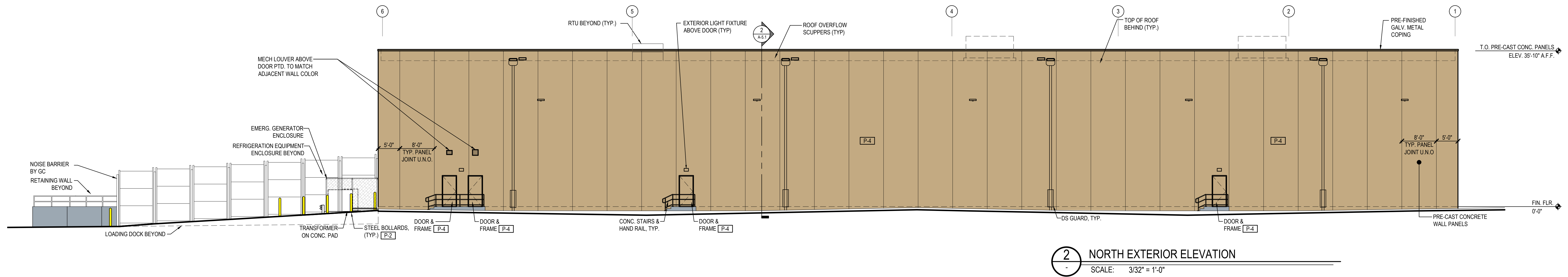
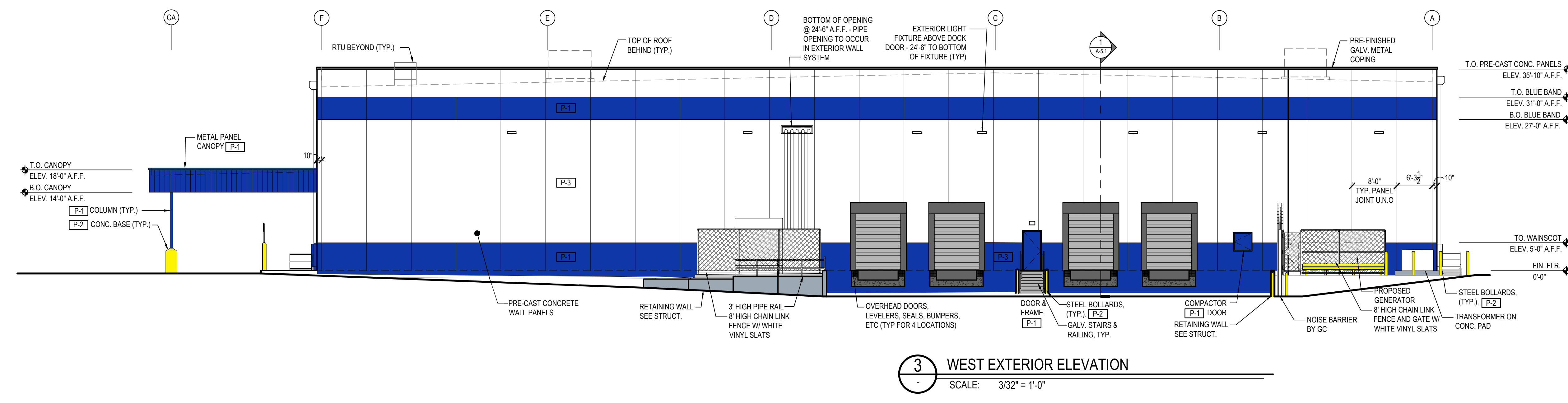
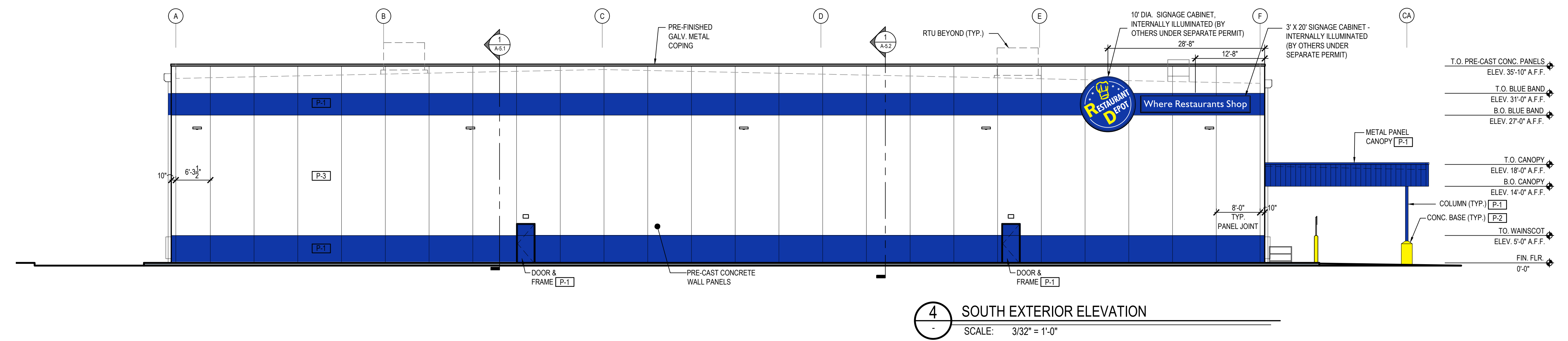
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Sight Lines Profile View

EXTERIOR FINISH MATERIAL SCHEDULE				
MARK	MATERIAL	COLOR / NAME	MANUFACTURER	REMARKS
P-1	PAINT	BLUE	SHERWIN WILLIAMS	"RD-BLUE"
P-2	PAINT	YELLOW	SHERWIN WILLIAMS	"RD-YELLOW"
P-3	PAINT	WHITE	SHERWIN WILLIAMS	SEE INTERIOR FINISH SCHEDULE
P-4	PAINT	"CAMELBACK"	SHERWIN WILLIAMS	SW 6122 "CAMELBACK"

NOTE: ANY CHANGES TO MATERIAL MANUFACTURER, DESIGN, COLOR, ETC. SHALL BE APPROVED BY THE ARCHITECT. IMMEDIATELY REQUEST APPROVAL FROM THE ARCHITECT UPON MATERIAL PROPOSAL.



HUDSON, NH

Restaurant Depot - Hudson, NH

273 LOWELL ROAD

ISSUANCES

DATE	TYPE	BY	PROGRESS
03/15/26	REV	PROGRESS	100% PROGRESS
04/02/26	REV	PROGRESS	100% PROGRESS
04/16/26	REV	PROGRESS	100% PROGRESS

EXTERIOR ELEVATIONS

DATE: 04-16-2026

JOB NO. 25335

EL-5 SHEET NO.

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File: SP# 01 Crowley review.pdf

as of 05-31-2026

The following were comments I wanted to make at the 05-27-2026 Planning Board meeting, but the applicant requested a deferral to 06-24-2026. It would be beneficial for the applicant to know about them and prepare responses prior to that meeting. If the applicant agrees with incorporating some of the comments onto the plans, there should be time to revise them prior to that 06-24-2026 meeting.

1. **OBSERVATION:** Per Site Plan & CUP Applications received January 27, 2026– Attachment “A” (epage 32) It states in part” This location will be **open to the public** and open 7 days a week” From previous testimony this seems to be incorrect. **QUESTION:** Where in plan notes to be approved by the PB are **membership qualifications** mentioned as necessary, and **hours of operation stated**?
2. **OBSERVATION:** Refer to previous testimony, Restaurant Depot has been acquired by Sysco. Sysco standard operating procedure is to sell in bulk quantities and supply direct deliveries to clients. **QUESTION:** **Will the Restaurant Depot applicant agree to a stipulation that delivery service will NOT be provided to clients from this facility.**
3. **OBSERVATION:** I note on drawing C-301Site Plan the proposed 12-foot-high barrier wall and the “refer to arch plan note.” However, when I view the arch plan supplied in the 05-27-2026 PB packet, it lacks specifications for the proposed design. Per previous 04-08-2026 deliberations, the Planning Board didn’t agree on a motion to request a sound study report with any possible associated design considerations. However, during testimony the applicant agreed that the design of the barrier wall was to supply some acoustical attenuation. **QUESTION:** On future revised plans would the applicant add more detail information for this barrier wall design and information on what qualities it incorporates for sound attenuation?
4. **OBSERVATION:** I note the Town engineer wants the driveway entrance connection to Green Meadow Drive to be 30 feet and side slopes of the facility driveway to be 3:1. **QUESTION:** Will the applicant agree to change Driveway entrance to 30 feet width and taper driveway back to 24-foot width within a practical distance.
5. **OBSERVATION:** Refer to the following Figure No.1 on additional Driveway Realignment Crowley review comments:

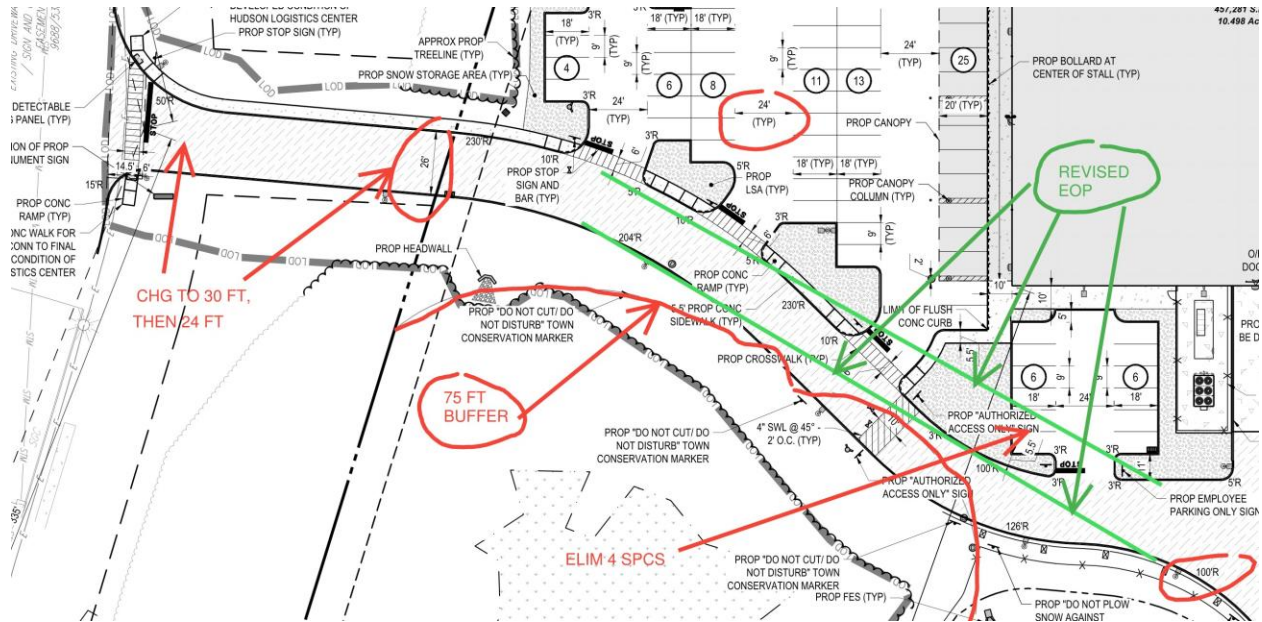


Figure No.1 additional Driveway Realignment Crowley review comments

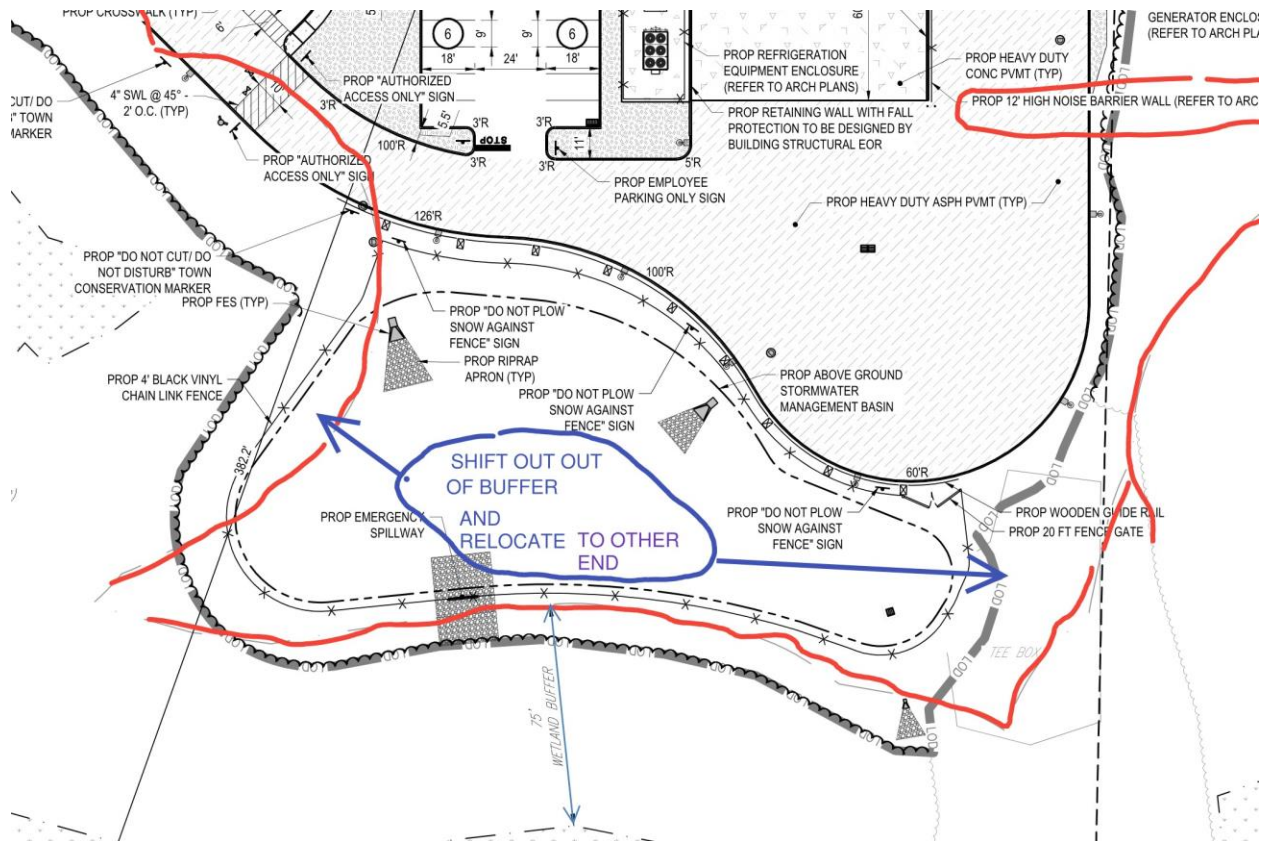
- Red outlines are 75-foot Wetlands Buffer
- Green lines are 24-foot driveway alignment to keep pavement out of buffer area

6. **OBSERVATION:** Per 04-08-2026 approved PB minutes page 4 of 8

- Mr. Malley asked why 173 parking spaces are needed for the site, based on the projected traffic counts. Mr. Kelly explained that the applicant conducted an observed parking demand at some of its other sites. Typically, 60 vehicles were the number seen on site at any given time. **The maximum seen was in the 80-90 vehicle range. The 173 spaces proposed is more than appropriate for the site's traffic.** He noted that Avon's location is 88,000 s.f. and Andover's is 80,000 s.f.
- Then per 04-08-2026 minutes, and the applicant's testimony the current reduction of parking spaces to 166 is more than adequate for this facility per the applicant and that 100 parking spaces are the maximum necessary amount for this site.
- QUESTION:** Will the applicant agree to investigate realignment of the driveway to avoid intrusions of **PAVEMENT** into the wetland buffer area.
 - Straighten the revised 24-foot Driveway paved alignment starting at approximately the first aisle entrance to the proposed parking lot to the 100-foot radius of the paved area opposite the proposed refrigeration enclosure.

- ii. Therefore, all **pavements** would be completely outside the wetland buffer area which would be better aligned with the spirit of the ordinance.
- iii. I estimate that this realignment would reduce the designated employee parking area from 12 spaces to about 8. Total parking on the site would then be approximately 162 spaces, although the applicant states that, based on experience, actual demand would peak at only 80 to 100 spaces.

7. **OBSERVATION:** Refer to the following Figure No.2 for Basin outline configuration:



- a. Red outlines are 75-foot Wetlands Buffer
- b. Blue suggested relocations to basin perimeter to eliminate intrusion into wetland buffer area

8. **OBSERVATION:** I note the proposed stormwater management basin drawing C-301Site Plan intrudes into the wetlands buffer at its NW edge.

- a. **QUESTION:** Can basin footprint be shortened in that area and an equal amount of capacity be added at the other end which would be outside the wetlands buffer area?

