

December 31, 2025

MAX-2016569.01

Devens Enterprise Commission
c/o Neil Angus, FAICP CEP, LEED AP BD+C & ND
Director/Land Use Administrator
33 Andrews Parkway
Devens, Massachusetts 01434

SUBJECT: Nitsch Engineering Traffic Peer Review Response to Comments – 12/18/2025
Devens Recycling Facility Expanded Operation
45 Independence Drive
Devens, Massachusetts

Dear Mr. Angus:

Greenman-Pedersen, Inc. (GPI) has received comments from Nitsch Engineering (Nitsch) in a letter dated December 18, 2025 on the Traffic Impact Study (TIS) prepared for the proposed expansion of operations at the Devens Recycling Facility located at 45 Independence Drive in Devens, Massachusetts. We have prepared the following responses to Nitsch's comments related to the TIS. A copy of the peer review comment letter has been appended for ease of reference.

Comment 1: *Nitsch requests the Applicant confirm if a site visit was conducted to observe the study intersections and roadways, particularly during peak hours presented in the TIS; collect information on traffic patterns; and observe vehicular operations for site access and circulation patterns at the DRC driveways.*

Response 1: GPI conducted a site visit on February 25, 2025 to observe traffic operations, roadway, and intersection geometry and obtains signal timings from the existing signal cabinets.

Comment 2: *Upon receiving the Unified Permit Modification, Nitsch notes DRC requests a modification to the permit language to align with their proposal to extend waste acceptance hours from 5:00 AM to 9:00 PM Monday through Friday and to maintain Saturday's waste acceptance hours. We recommend the Applicant implement the proposed hours of operation into the O&M plan, particularly on page 15 where it references the current operating hours and on page 17 regarding signage at the access points of the facility.*

Response 2: The O&M plan identifying the new hours will be updated upon approval of the project.

Comment 3: *The TIS states there are no pedestrian accommodations present at the intersection of Saratoga Boulevard / Buena Vista Street / Independence Drive / Cook Street / Department of Public Works (DPW) Driveway. During the site visit, we observed sidewalks on the south side of Independence Drive, east side of Saratoga Boulevard and north side of Buena Vista Drive. We ask the Applicant to provide further clarity on the pedestrian accommodations at this intersection and any impacts associated with future site operations or Project access.*

Response 3: The site visit for the project was conducted in February 2025 with snow on the ground, covering the sidewalks. There is a sidewalk along the east side of Saratoga Boulevard and the south

side of Independence Drive near the intersection, which is separated from the roadway by a ± 4 -foot grass strip. There are no connections between this sidewalk and the intersection, nor are there any curb ramps or crosswalks provided at the intersection. There is also a sidewalk along the north side of Buena Vista Street that ends at the DPW driveway and does not connect to the intersection. The statement that there are no pedestrian accommodations at the intersection refers to the fact that there are no curb ramps, crosswalks, or pedestrian signage to assist pedestrians in passing through the intersection safely.

The proposed expansion of hours is not anticipated to have any impact on the pedestrian volumes or accommodations in the vicinity of the intersection. The expanded hours will spread the truck volume throughout the day, resulting in reduced traffic volumes being generated by the development during the peak hours.

Comment 4: *During the site visit, Nitsch noted a Montachusett Regional Transit Authority (MART) bus stop located adjacent to the west driveway of 15 Independence Drive, and a Massachusetts Bay Transportation Authority (MBTA) Commuter Rail station for the Fitchburg Line located approximately 0.8 miles north of the Project. Based on the 2020 Traffic Monitoring Program prepared by Vanasse Hangen Brustlin, Inc. (VHB) available on the Devens website, we note that the percentage of commuters using transit is at a marginal 3% and confirm the nearby transit facilities would not impact mode split for the future trips generated by the Project. We request the Applicant comment on any multimodal impacts associated with the Project.*

Response 4: We agree that although a MART bus stop and the MBTA commuter rail stop is nearby, there will be negligible multimodal impacts due to the type of use of the facility.

Comment 5: *The TIS does not include a safety analysis as part of the Existing Conditions assessment. Per MassDOT Guidelines Section 3.III.F, we request the Applicant provide a safety analysis of the study intersections and corridors for the latest five years of data available and assess the Project's impact to the safety of the study area network.*

Response 5: Please see the attached *Traffic Assessment – Updated Scope of Work* that was approved by the Devens Enterprise Commission (DEC) prior to starting the TIS. A safety assessment was not included in the scope of work. In addition, this project does not require a MassDOT Access Permit and is therefore, not subject to MassDOT's guidelines for traffic analysis.

The expansion in hours is intended to spread traffic throughout the day, and is not expected to increase traffic during the peak hours. As such, the proposed project is not expected to have a significant impact on the safety of the surrounding area intersections.

Although a safety analysis was not part of the requested scope of work, GPI has obtained collision history information from the MassDOT IMPACT Crash Portal for the study area intersections for the most recent complete five-year period available (2018 – 2022). The detailed collision data is attached for reference and indicates that all study area intersections experienced an average of two collisions per year or fewer and a crash rate well below the state and district-wide averages over the five-year analysis period. Therefore, no safety issues currently exist at any of the study area locations.

Comment 6: *Nitsch referenced the Site Plans, dated February 9, 2006, and requests the Applicant to clarify how expanded operations with increased employees and trucks would impact the following:*

- *Parking occupancy and compliance with zoning requirements; and*
- *Driveway circulation and access.*

Under the condition the DRC is seeking to expand operations, we recommend the Applicant monitor the future site driveway operations and work with DRC to maintain adequate operations that will process an increased volume of trucks through the site with minimal delay and accommodate the desired parking capacity.

Response 6: The expansion is not expected to impact parking occupancy as the additional trucks do not park on the site. Although additional employees will be added to cover the expanded hours of operation, this will occur by adding a second shift. Therefore, the total number of employees on-site at any one time will not increase as a result of the expanded hours of operation.

The Applicant is willing to conduct a post-occupancy traffic monitoring program as a condition of approval for the proposed expanded hours of operation.

Comment 7: *In the Traffic Growth section, Nitsch acknowledges the Applicant's assumption of a 2% background growth rate to represent the study area. Based on our site visit observations and knowledge of the study area from previous peer reviews, we identified the following background developments in the vicinity of the study area: 111 Hospital Road; 35 Saratoga Boulevard; 31 Independence Drive; 18 Saratoga Boulevard; and 18 Independence Drive. Our research from the Devens Enterprise Commission website also indicates a potential project of a second rail spur proposed to improve capacity and access to the recycling facilities in Devens. Based on the background projects mentioned, we recommend the Applicant coordinate with MassDevelopment to identify all planned developments to implement as part of the traffic growth in the study area and clarify how traffic operations would be affected at the study intersections, particularly at the intersection of Jackson Road and Lake George Street/Patton Road as it represents a major access point to Route 2 for nearby developments along Jackson Road.*

Response 7: Per the attached email correspondence with Dawn Bobcock, Executive Assistant to DEC, on March 10, 2025, there were no planned or approved specific developments in the area that would generate a significant volume of traffic on study area roadways. Traffic generated by the other developments proposed in the area was assumed to be included in the 2% per year background growth rate, which equates to a total of 14.9% growth in traffic on the surrounding area roadways over the seven-year design horizon.

Comment 8: *Nitsch acknowledges the Applicant conducted the following adjustments to the future trip generation projections to make for a more conservative analysis:*

- Utilized the peak day, peak AM peak hour, and peak PM peak hour across the entire one-week count to estimate the existing trip rates;*
- Obtained daily and monthly tonnage acceptance data from the Applicant for the existing DRC to estimate the trips generated by the existing 1,500-ton facility; and*
- Applied the total tonnage accepted of both 1500 Tons per day (TPD) and 2000 TPD under proposed conditions versus 1107 TPD under existing conditions to proportionally increase employee trips.*

Nitsch concurs with the adjustments to analyze the worst-case scenario. No further action is required.

Response 8: Comment acknowledged.

Comment 9: *Nitsch notes the Proposed Trip Generation was assessed through outlining the truck deliveries and an increase in employee trips to meet the increased capacity demand of 2,000 tons per day. We note the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 12th*

edition, was released in Fall 2025 and may provide recent data that could assist in evaluating the impact of the Project. We recommend the Applicant evaluate data available in Trip Generation Manual, 12th edition, and compare with data provided in the TIS. We note that the Trip Generation Manual, 12th edition, may not have been available during production of the June 2025 or October 2025 TIS.

Response 9: GPI researched the ITE Trip Generation Manual, 12th Edition and found that there is a new Land Use Code (LUC) 175 – Industrial Recycling Facility. However, there is limited data available for this land use, which is obtained from only one study location. The only trip rates provided for this LUC are for the Weekday Daily and Weekday AM Peak Hour of the Generator based on the square footage of the building. The size of the facility is not increasing as a result of the expanded hours of operation, and therefore, would result in no increase in trips based on the available data from ITE. Further, it should be noted that although an analysis was provided in the TIS for the impacts associated with a 2,000 tpd facility, the Applicant is not proposing to increase the daily tonnage of the facility at this time.

Comment 10: *Nitsch concurs with the Applicant's methodology to use the existing travel patterns to determine the trip distribution percentages. We ask the Applicant to clarify if there were assigned truck routes mapped out by DRC to consider as part of the trip distribution calculations based on existing travel patterns.*

Response 10: Devens currently has designated truck routes, which the Applicant takes several measures to ensure that trucks follow when traveling to/from the site. All new customers are emailed the designated truck routes prior to their first load. Signage is posted to restrict trucks from entering the residential area on Buena Vista Street. Any drivers found in violation of the designated truck routes are addressed immediately and given another copy of the route. Saratoga Boulevard, Barnum Road, Patton Road, and Jackson Road are among the designated truck routes for the area. A copy of the Devens Designated Truck Route is attached for reference.

Comment 11: *In the Existing Conditions section, the description of Jackson Road / Lake George Street / Patton Road intersection states there is a YIELD sign posted at the end of the channelization island of the Jackson Road northbound approach. Based on our site observations, there was no YIELD sign present at the channelized island, and the channelized approach operates as part of the existing signal to regulate northbound right-turns. We request the Applicant clarify the correct existing conditions, and comment if this modification to the regulation results in changes to the Capacity Analysis.*

Response 11: As shown in the photograph below, at the time of the field visit in February 2025, there was a YIELD sign present on the right-turn channelization island on the Jackson Road northbound approach to Patton Road. At the time of the visit, the sign was leaning toward the roadway and appeared to have been struck by a vehicle or snow removal equipment. This sign was in conflict with the signalized right-turn movement, and appears to have since been removed. The Google Streetview Image from September 2025 depicts where the sign post was formerly mounted within the channelization island.



Image 1 – YIELD sign on Jackson Road NB channelized right-turn to Patton Street



Image 2 – Sign post foundation in channelization island at Jackson Road / Patton Street.

Comment 12: *Based on our site visit observations of the Jackson Road / Lake George Street / Patton Road intersection, Nitsch noted vehicular queuing on the Jackson Road southbound approach extending approximately 20 vehicles (~500 feet) and is notably higher than maximum queues noted in the capacity analysis at 341 feet during the afternoon peak hour. Additionally, the 2032 Build with Improvements scenario shows longer green times for all approaches compared to existing conditions, which results in an overall intersection improvement. However, these timing modifications also result in an increased delay at the Jackson Road southbound approach, causing operations to degrade from level of service (LOS) C to LOS D and increasing 95th percentile queues by approximately 150 feet. We recommend the Applicant commit to a Traffic Monitoring Program approximately six months post-occupancy at this intersection to assess impacts in traffic volumes and operations, and work with Devens to provide additional mitigation if deemed necessary.*

Response 12: The results of the capacity analysis contained in the TIS indicate that the proposed expansion of hours will have minimal impact on the operations of the Jackson Road / Lake George Street / Patton Road intersection, resulting in increases in delay of less than two seconds per vehicle and negligible changes to queues at the intersection. However, GPI noted that there are existing inefficiencies with the signal timing parameters within the cabinet at the time of the February 2025 field visit that were resulting in a level-of-service (LOS) F on the Patton Road WB left-turn movement during the weekday PM peak hour. The signal timings were recommended for consideration by the Devens Enterprise Commission (DEC) to improve the operations on this movement and were not intended as mitigation for the proposed hours expansion.

If requested by DEC, the Applicant is willing to conduct a post-occupancy monitoring study to collect updated traffic counts at this intersection and perform additional capacity analysis to determine an optimal signal timing plan for the intersection.

Comment 13: *Our site observations indicate a 7-second walk interval and 17-second Flash Don't Walk (FDW) interval for a pedestrian phase of at least 24 seconds at the Patton Road / Saratoga Boulevard / Barnum Road intersection, which is inconsistent with the 20-second pedestrian phase modelled for this intersection in the Capacity Analysis. We request the Applicant to clarify how the signal timings were derived for this intersection and how operations would be impacted from the timing adjustments necessary for the pedestrian phase to reflect current field conditions.*

Response 13: GPI obtained the signal timings from the signal cabinet on February 25, 2025. GPI took photographs of the signal plans that were mounted on the cabinet door, as well as the individual signal parameter screens on the traffic controller. It appears that there were discrepancies between the timings for the pedestrian phase on the plans versus in the controller. The plans noted a 7 second WALK time, a 12 second Flashing Don't Walk (FDW) time, and a 1 second Red Clearance for the pedestrian phase, totaling a 20-second phase. However, the signal controller is programmed with a 7-second WALK interval and 17-second FDW interval as observed by Nitsch. As demonstrated in Table 9 of the TIS, all movements at the Patton Road / Saratoga Boulevard / Barnum Road intersection are anticipated to operate at LOS B or better under all analysis conditions with the assumption of a 20-second pedestrian interval. During the entire 7 hours of traffic count data collection at this intersection, no pedestrians were observed crossing the roadway or activating the pedestrian phase. Due to the low occurrence of pedestrians at this intersection and the fact that the intersection currently operates at optimal levels of service, the additional four seconds of pedestrian clearance time is not expected to have a measurable impact on the operations of the intersection.

- Comment 14: *Nitsch reviewed the Capacity Analysis Worksheets and notes the Peak Hour Factor (PHF) was applied intersection-wide, which does not comply with MassDOT guidelines Section 5.II.A.2(a) of calculating the PHFs by approach. We request the Applicant comment on the use of an intersection-wide PHF which is not consistent with MassDOT guidelines, and clarify how the Existing and Future LOS operations are affected by this modification*
- Response 14: As noted earlier, this project does not require a MassDOT Access Permit. The capacity analysis methodology utilized in the TIS was based on the concepts and procedures of the Highway Capacity Manual (6th Edition). Per said methodology (pg 19-26): *“If the peak hour factor is used, a single intersection-wide factor should be used rather than movement-specific or approach-specific factors.”* Accordingly, GPI contends that no further adjustment is required, and the original analysis is valid, without modification.
- It should also be noted that MassDOT’s guidelines apply only to the Existing conditions analysis, as MassDOT requires that a default PHF of 0.92 be utilized for all future-year analysis conditions. The 2032 No-Build and Build capacity analysis was performed utilizing this default PHF. Therefore, there would be no change to the incremental impacts of the project as a result of modifying the PHF under the Existing conditions, and therefore, no change to the results of the study.
- Comment 15: *Nitsch notes some errors in the table headings (V/C, Del., LOS, Queue) under the 2024 Existing category and missing notations for the LOS and Queue in the footers of Table 9 – Intersection Capacity Analysis Summary. Nitsch presumes that the information is consistent with headings from other Capacity Analysis Summary tables, and requests no additional action*
- Response 15: Nitsch is correct that the header and footnote information provided in Table 9 does have some errors and the information should be consistent with the first page of the Table on page 53.
- Comment 16: *Nitsch requests the Applicant provide the capacity analysis worksheets for the 2032 Build with Improvements scenario under the 2000-ton facility, which was not included in the Appendix of the TIS.*
- Response 16: The 2,000-ton facility is not proposed as part of the project at this time. However, these worksheets are provided as an Attachment for reference.
- Comment 17: *Nitsch notes the intersection of the site driveway and Independence Drive is not detailed or analyzed in the TIS. Based on the site visit, we observed the site driveway intersects as a stop-controlled approach at Independence Drive near its eastern terminus at 50 Independence Drive. With a peak hour volume increase ranging to as high as 106 vehicles in the Saturday peak hour for a 2000-ton facility, we recommend the Applicant work with DRC to ensure pavement markings and signage are clearly delineated and recommend markings are compliant with the latest Manual of Uniform Traffic Control Devices (MUTCD) to ensure adequate safety for vehicles accessing and circulating throughout the site and at site driveways.*
- Response 17: As previously noted, the project consists of expanding the hours of operation for the existing 1,500-ton facility only, and does not include an increase in tonnage at this time. There is currently an MUTCD-compliant STOP sign posted at the end of the site driveway as it intersects Independence Drive. There are no pavement markings present on the site driveway aside from shoulder lines. Although a double-yellow centerline is striped on Independence Drive through the intersection, the pavement markings are extremely faded. The Applicant is

willing to stripe a STOP line and centerline on the site driveway approach within 100 feet of the intersection with Independence Drive. In addition, the Applicant is willing to repaint the double-yellow centerline on Independence Drive as a condition of approval for the hours expansion.

Comment 18: *Nitsch notes there are no project recommendations provided in the TIS. We recommend the Applicant commit to a Traffic Monitoring Program approximately six months post-occupancy at this intersection to assess impacts in traffic volumes and operations, and work with Devens to provide additional mitigation if deemed necessary, as noted in Comment 12.*

Response 18: The Applicant is willing to commit to a post-occupancy traffic monitoring program to be conducted six-months following the implementation of the expanded hours of operation. Based on the comments provided by Nitsch, it is assumed that this study will include traffic counts at the site driveway over a one-week period and comparison of this data to the projected site-generated trips from the TIS to verify that the expanded hours of operation are not resulting in unanticipated increases in traffic.

In addition, it is assumed that the post-occupancy monitoring program will include traffic counts during the weekday AM, weekday PM, and Saturday midday peak periods at the Patton Road / Jackson Road / Lake George Street intersection, and conducting capacity and queue analysis for this intersection to identify an optimal signal timing plan based on current traffic volumes.

As described in the Response to Comment 17, the Applicant is also willing to install a STOP line and centerline on the site driveway, and restriped the centerline on Independence Drive to improve the safety of the site driveway intersection with Independence Drive.

Comment 19: *We noted during our site visit observations encroaching vegetation constrains sight lines to the west of the DRC site driveway. We recommend the Applicant provide a sight distance assessment at the site driveway for stopped vehicles looking right (i.e., west) from the site driveway to comply with MassDOT TIA Guidelines Section 5.1.G and ensure safe sight lines between entering and exiting trucks accessing the DRC.*

Response 19: The existing STOP sign on the site driveway is set back significantly from Independence Drive. At the location of the STOP sign, GPI concurs that vegetation on the northwest corner of the intersection impedes intersection sight distance (ISD) for drivers looking right (west) exiting the site driveway. However, a driver is able to pull up beyond the STOP sign with the front of their vehicle in line with the curb on Independence Drive and see over 400 feet down Independence Drive. Further, visibility to the right (west) for drivers exiting the site is only required when making a left-turn onto Independence Drive. Only drivers destined to WestRock or Kenco would exit left out of the site driveway, and the site driveway is angled in such a way to discourage left-turns exiting the driveway. As a condition of approval, the Applicant is willing to prepare a sight line clear zone diagrams depicting the area required to be kept clear of snow storage, vegetation, or any structures that would impede sight lines in order to meet the American Association of State Highway and Transportation Officials (AASHTO) guidelines for safe operations at the site driveway. Further, the Applicant will commit to clearing any existing vegetation located within these clear zones.

Comment 20: *Nitsch notes the proposed weekday waste acceptance hours of operation to expand from 5:00 AM to 9:00 PM on weekdays, which will involve truck operations during nighttime conditions. We recommend the Applicant work with Devens to provide adequate roadway*

lighting and retroreflective devices along the assigned truck routes on the study roadways, and reduce headlight castoff from trucks operating after dark

Response 20: The Applicant will work with Devens and other stakeholders in the area to provide adequate roadway lighting and retroreflective devices along the assigned truck routes on the study roadways. It is assumed a meeting can be held with all parties after the hearing to discuss this topic.

We hope that this information adequately addresses the comments from Nitsch. Should you have any questions, require additional information, please feel free to contact me at (603) 766-5223 or rebeccabrown@gpinet.com.

Sincerely,

GREENMAN-PEDERSEN, INC.



Rebecca L. Brown
Senior Project Manager
116 South River Road, Building B, Suite 1, Bedford, New Hampshire 03110

Attachments:

1. Nitsch Engineering Peer Review Letter – 12/18/2025
2. Approved Traffic Assessment – Updated Scope of Work
3. DEC Email re: background developments – 3/10/2025
4. Collision History Data
5. Devens Designated Truck Route
6. 2032 Build with Improvements Capacity Analysis Worksheets – 2,000-ton facility

cc: Greg Wirsén, Green Seal Environmental, LLC
Angelo Liquori, Republic Services
Michael Green, Republic Services

December 18, 2025

Devens Enterprise Commission
c/o Neil Angus, FAICP CEP, LEED AP BD+C & ND
Director/Land Use Administrator
33 Andrews Parkway
Devens, MA 01434

RE: Nitsch Project #9419.65
Pivotal Manufacturing Partners
Devens Recycling Center
Traffic Review Comments
Devens, MA

Dear Neil,

Nitsch Engineering (Nitsch) received the submission packets of the Request for Level 2 – Unified Permit Modification & Request for Minor Modification to Site Assignment (Unified Permit Modification), dated December 3, 2025, regarding the proposed expansion of the Devens Recycling Center (DRC; the Project) at 45 Independence Drive, Devens, Massachusetts. The package includes the following supplemental items as part of our traffic peer review:

- Traffic Impact Study (TIS), dated June 2025 and prepared by Greenman-Pedersen Inc. (the Applicant);
- TIS, dated October 2025 and prepared by the Applicant; and
- Operation and Maintenance Plans (O&M Plans), dated December 2025 and prepared by Green Seal Environmental, LLC.

The TIS was stamped by a Registered Professional Engineer in the Commonwealth of Massachusetts on June 4, 2025, and was developed to assess traffic impacts for the DRC expansion to increase operating hours and solid waste processing. The O&M Plans were developed to outline and document appropriate operations and maintenance procedures that satisfy requirements based on the Massachusetts Solid Waste Management Regulations. The project expansion does not include any site changes, so the associated Layout and Materials Plans (the Site Plans) prepared by ESS Group, Inc., and dated February 9, 2006, were used as a reference for existing conditions but not reviewed as part of our traffic peer review.

Nitsch conducted a site visit on December 1, 2025, to assess the existing conditions of the study area and to verify consistency between our observations and the TIS. This letter summarizes our review of the TIS and the associated elements of the O&M Plans for conformance with Massachusetts Department of Transportation (MassDOT)'s *TIS Traffic and Safety Engineering 25% Design Submission Guidelines*, dated May 31, 2022 (MassDOT Guidelines), current transportation and traffic engineering standards, and industry practices.

Based on Nitsch's review of the submitted documents, the TIS and method of analysis comply with industry practices and current transportation engineering standards; however, we offer the following comments:

1. Nitsch requests the Applicant confirm if a site visit was conducted to observe the study intersections and roadways, particularly during peak hours presented in the TIS; collect information on traffic patterns; and observe vehicular operations for site access and circulation patterns at the DRC driveways.
2. Upon receiving the Unified Permit Modification, Nitsch notes DRC requests a modification to the permit language to align with their proposal to extend waste acceptance hours from 5:00 AM to 9:00 PM Monday through Friday and to maintain Saturday's waste acceptance hours. We recommend the Applicant implement the proposed hours of operation into the O&M plan, particularly on page 15 where it references the current operating hours and on page 17 regarding signage at the access points of the facility.
3. The TIS states there are no pedestrian accommodations present at the intersection of Saratoga Boulevard / Buena Vista Street / Independence Drive / Cook Street / Department of Public Works (DPW) Driveway. During the site visit, we observed sidewalks on the south side of Independence Drive, east

side of Saratoga Boulevard and north side of Buena Vista Drive. We ask the Applicant to provide further clarity on the pedestrian accommodations at this intersection and any impacts associated with future site operations or Project access.

4. During the site visit, Nitsch noted a Montachusett Regional Transit Authority (MART) bus stop located adjacent to the west driveway of 15 Independence Drive, and a Massachusetts Bay Transportation Authority (MBTA) Commuter Rail station for the Fitchburg Line located approximately 0.8 miles north of the Project. Based on the 2020 Traffic Monitoring Program prepared by Vanasse Hangen Brustlin, Inc. (VHB) available on the Devens website, we note that the percentage of commuters using transit is at a marginal 3% and confirm the nearby transit facilities would not impact mode split for the future trips generated by the Project. We request the Applicant comment on any multimodal impacts associated with the Project.
5. The TIS does not include a safety analysis as part of the Existing Conditions assessment. Per MassDOT Guidelines Section 3.III.F, we request the Applicant provide a safety analysis of the study intersections and corridors for the latest five years of data available and assess the Project's impact to the safety of the study area network.
6. Nitsch referenced the Site Plans, dated February 9, 2006, and requests the Applicant to clarify how expanded operations with increased employees and trucks would impact the following:
 - Parking occupancy and compliance with zoning requirements; and
 - Driveway circulation and access.Under the condition the DRC is seeking to expand operations, we recommend the Applicant monitor the future site driveway operations and work with DRC to maintain adequate operations that will process an increased volume of trucks through the site with minimal delay and accommodate the desired parking capacity.
7. In the Traffic Growth section, Nitsch acknowledges the Applicant's assumption of a 2% background growth rate to represent the study area. Based on our site visit observations and knowledge of the study area from previous peer reviews, we identified the following background developments in the vicinity of the study area: 111 Hospital Road; 35 Saratoga Boulevard; 31 Independence Drive; 18 Saratoga Boulevard; and 18 Independence Drive. Our research from the Devens Enterprise Commission website also indicates a potential project of a second rail spur proposed to improve capacity and access to the recycling facilities in Devens. Based on the background projects mentioned, we recommend the Applicant coordinate with MassDevelopment to identify all planned developments to implement as part of the traffic growth in the study area and clarify how traffic operations would be affected at the study intersections, particularly at the intersection of Jackson Road and Lake George Street/Patton Road as it represents a major access point to Route 2 for nearby developments along Jackson Road.
8. Nitsch acknowledges the Applicant conducted the following adjustments to the future trip generation projections to make for a more conservative analysis:
 - Utilized the peak day, peak AM peak hour, and peak PM peak hour across the entire one-week count to estimate the existing trip rates;
 - Obtained daily and monthly tonnage acceptance data from the Applicant for the existing DRC to estimate the trips generated by the existing 1,500-ton facility; and
 - Applied the total tonnage accepted of both 1500 Tons per day (TPD) and 2000 TPD under proposed conditions versus 1107 TPD under existing conditions to proportionally increase employee trips.Nitsch concurs with the adjustments to analyze the worst-case scenario. No further action is required.
9. Nitsch notes the Proposed Trip Generation was assessed through outlining the truck deliveries and an increase in employee trips to meet the increased capacity demand of 2,000 tons per day. We note the

Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 12th edition*, was released in Fall 2025 and may provide recent data that could assist in evaluating the impact of the Project. We recommend the Applicant evaluate data available in *Trip Generation Manual, 12th edition*, and compare with data provided in the TIS. We note that the *Trip Generation Manual, 12th edition*, may not have been available during production of the June 2025 or October 2025 TIS.

10. Nitsch concurs with the Applicant's methodology to use the existing travel patterns to determine the trip distribution percentages. We ask the Applicant to clarify if there were assigned truck routes mapped out by DRC to consider as part of the trip distribution calculations based on existing travel patterns.
11. In the Existing Conditions section, the description of Jackson Road / Lake George Street / Patton Road intersection states there is a YIELD sign posted at the end of the channelization island of the Jackson Road northbound approach. Based on our site observations, there was no YIELD sign present at the channelized island, and the channelized approach operates as part of the existing signal to regulate northbound right-turns. We request the Applicant clarify the correct existing conditions, and comment if this modification to the regulation results in changes to the Capacity Analysis.
12. Based on our site visit observations of the Jackson Road / Lake George Street / Patton Road intersection, Nitsch noted vehicular queuing on the Jackson Road southbound approach extending approximately 20 vehicles (~500 feet) and is notably higher than maximum queues noted in the capacity analysis at 341 feet during the afternoon peak hour. Additionally, the 2032 Build with Improvements scenario shows longer green times for all approaches compared to existing conditions, which results in an overall intersection improvement. However, these timing modifications also result in an increased delay at the Jackson Road southbound approach, causing operations to degrade from level of service (LOS) C to LOS D and increasing 95th percentile queues by approximately 150 feet. We recommend the Applicant commit to a Traffic Monitoring Program approximately six months post-occupancy at this intersection to assess impacts in traffic volumes and operations, and work with Devens to provide additional mitigation if deemed necessary.
13. Our site observations indicate a 7-second walk interval and 17-second Flash Don't Walk (FDW) interval for a pedestrian phase of at least 24 seconds at the Patton Road / Saratoga Boulevard / Barnum Road intersection, which is inconsistent with the 20-second pedestrian phase modelled for this intersection in the Capacity Analysis. We request the Applicant to clarify how the signal timings were derived for this intersection and how operations would be impacted from the timing adjustments necessary for the pedestrian phase to reflect current field conditions.
14. Nitsch reviewed the Capacity Analysis Worksheets and notes the Peak Hour Factor (PHF) was applied intersection-wide, which does not comply with MassDOT guidelines Section 5.II.A.2(a) of calculating the PHFs by approach. We request the Applicant comment on the use of an intersection-wide PHF which is not consistent with MassDOT guidelines, and clarify how the Existing and Future LOS operations are affected by this modification.
15. Nitsch notes some errors in the table headings (V/C, Del., LOS, Queue) under the 2024 Existing category and missing notations for the LOS and Queue in the footers of Table 9 – Intersection Capacity Analysis Summary. Nitsch presumes that the information is consistent with headings from other Capacity Analysis Summary tables, and requests no additional action.
16. Nitsch requests the Applicant provide the capacity analysis worksheets for the 2032 Build with Improvements scenario under the 2000-ton facility, which was not included in the Appendix of the TIS.
17. Nitsch notes the intersection of the site driveway and Independence Drive is not detailed or analyzed in the TIS. Based on the site visit, we observed the site driveway intersects as a stop-controlled approach

at Independence Drive near its eastern terminus at 50 Independence Drive. With a peak hour volume increase ranging to as high as 106 vehicles in the Saturday peak hour for a 2000-ton facility, we recommend the Applicant work with DRC to ensure pavement markings and signage are clearly delineated and recommend markings are compliant with the latest Manual of Uniform Traffic Control Devices (MUTCD) to ensure adequate safety for vehicles accessing and circulating throughout the site and at site driveways.

18. Nitsch notes there are no project recommendations provided in the TIS. We recommend the Applicant commit to a Traffic Monitoring Program approximately six months post-occupancy at this intersection to assess impacts in traffic volumes and operations, and work with Devens to provide additional mitigation if deemed necessary, as noted in Comment 12.
19. We noted during our site visit observations encroaching vegetation constrains sight lines to the west of the DRC site driveway. We recommend the Applicant provide a sight distance assessment at the site driveway for stopped vehicles looking right (i.e., west) from the site driveway to comply with MassDOT TIA Guidelines Section 5.I.G and ensure safe sight lines between entering and exiting trucks accessing the DRC.
20. Nitsch notes the proposed weekday waste acceptance hours of operation to expand from 5:00 AM to 9:00 PM on weekdays, which will involve truck operations during nighttime conditions. We recommend the Applicant work with Devens to provide adequate roadway lighting and retroreflective devices along the assigned truck routes on the study roadways, and reduce headlight castoff from trucks operating after dark.

We recommend that the Applicant review and respond to these comments and make appropriate revisions or additions prior to approval by the Devens Enterprise Commission.

If the Devens Enterprise Commission has any questions, please call.

Very truly yours,

Nitsch Engineering, Inc.



Jeffrey T. Bandini, PE, PTOE
Senior Project Manager

JTB/pfv

Scope of Traffic Assessment
Devens Recycling Center
45 Industrial Drive, Devens, Massachusetts

- i. Obtain available 7-day Automatic Traffic Recorder (ATR) counts, including vehicle classification and speeds, along the following roadways:
 - Patton Road south of Barnum Road
 - Barnum Road west of Saratoga Boulevard
 - Barnum Road east of Saratoga Boulevard
 - Saratoga Boulevard north of Barnum Road
 - Independence Drive east of Cook Street
 - Buena Vista Street west of Saratoga Boulevard and DPW Driveway
 - Devens Recycling Facility Site Driveway north of Independence Drive

The weekday data to be collected will be discussed with the project team to ensure traffic counts are collected when the facility experiences the highest volume.

- ii. Prepare a summary of the total amount of trucks at the ATR locations (identified previously) on a weekday and Saturday. Document the existing facilities (list to be provided by the CLIENT) that currently generate truck traffic along the roadways of the ATR locations.
- iii. Obtain from the CLIENT how many tons of material were processed on the dates of the counts so that a trip rate based on trips per ton can be calculated for the existing facility.
- iv. Coordinate with the CLIENT and project team on how quickly trucks are processed on the site.
- v. Prepare a comparison of existing trucks and proposed additional trucks as a result of the proposed project at the ATR locations (identified previously) on a weekday and Saturday.
- vi. Conduct Turning Movement Counts (TMCs), including pedestrian and bicycle counts, during the weekday AM peak period (7:00 to 9:00 AM), weekday PM peak period (4:00 to 6:00 PM), and Saturday midday peak period (10:00 AM to 1:00 PM) at the following study area intersections:
 - Saratoga Boulevard / Buena Vista Street / Independence Drive / Cook Street / DPW Driveway (unsignalized)
 - Jackson Road / Patton Road / Lake George Street (signalized)
 - Barnum Street / Saratoga Boulevard / Patton Road (unsignalized)

Again, the weekday data to be collected will be discussed with the project team to ensure traffic counts are collected when the facility experiences the highest volume.

- vii. Gather physical and operating information for the two study area intersections including:
 - Traffic volumes
 - Roadway geometrics
 - Traffic operating parameters
- viii. Review historical traffic data available from MassDOT's Transportation Data Management System for appropriate seasonal adjustments and annual growth rates.
- ix. Coordinate with the Town of Devens to obtain information on other development projects in the surrounding area that may impact traffic volumes at the study area intersections.
- x. Project traffic volumes to a seven-year design horizon consistent with MassDOT guidelines for traffic impact analysis based on the annual growth rate and traffic generated by other developments in the area.

Scope of Traffic Assessment
Devens Recycling Center
45 Industrial Drive, Devens, Massachusetts

- xi. Develop a trip-generation rate for the existing Devens Recycling Facility for the weekday daily, weekday AM, weekday PM, Saturday daily, and Saturday midday time periods.
- xii. Obtain information from the CLIENT for the amount of additional daily and peak hour site traffic (employees, customers, trucks, etc.) that will be expected due to expanding the hours of operation and the tonnage of construction debris and municipal waste. Use this data to estimate the traffic to be generated by the proposed project and add to the Existing conditions to develop the Build conditions traffic-volume networks for each analysis period. Traffic estimates for the proposed development will be based on existing site traffic, information provided by the CLIENT and project team, and the Institute of Transportation Engineers (ITE) trip-generation rates, as applicable.
- xiii. Conduct capacity and queue analyses under the analysis conditions, as applicable, at the two study area intersections identified in sub-task vi. The following analysis conditions will be examined:
 - 2024 Existing conditions without traffic mitigation measures
 - 2031 Build conditions without traffic mitigation measures
 - 2031 Build conditions with traffic mitigation measures, if necessary
- xiv. Evaluate and identify possible mitigating measures to minimize the impact of site traffic on study area locations.
- xv. Prepare a final Technical Memorandum for use in the local project approval processes.

Cecilia Donaldson

From: Babcock, Dawn <dawnbabcock@devensec.com>
Sent: Monday, March 10, 2025 3:42 PM
To: Cecilia Donaldson
Cc: Marc-Aurele, John
Subject: RE: Background Developments near 45 Independence Drive in Devens, Massachusetts

Sorry for the delay I wanted to confirm with our director before getting back to you.

There have been no major projects within the vicinity that have triggered the need for a traffic study recently. Republic/Devens Recycling is looking to expand operating hours but it sounds like this is the project she is working on. 35 Saratoga is the latest project in the vicinity that was permitted a few years ago and was completed last year. Based upon the intended use at 35 Saratoga it was estimated that approximately 1,718 daily trips generated by this stie (182 trips in the AM peak hour [131 in, 42 out] and 213 trips in the PM peak hour [77 in, 136 out]. 35 Saratoga is a warehouse and office space for biotech manufacturing and is a 154,000 sq.ft building. No other active projects in the vicinity that I am aware of.

31 Independence is a vacant parcel that may be able to accommodate a 100,000 sf industrial building in the future but nothing has been submitted or approved to date.

As for upcoming road projects, you should reach out to John Marc Aurele (MassDevelopment Engineering; jmarc-aurele@massdevelopment.com) and Shane Melone (Devens DPW smelone@massdevelopment.com) for that info.

Let me know if there is anything else you need.

Regards,
Dawn

Dawn M. Babcock
Executive Assistant to:
Devens Enterprise Commission
978-772-8831 x 3338
Follow us on Facebook <https://www.facebook.com/devensec>

From: Cecilia Donaldson <cdonaldson@gpinet.com>
Sent: Monday, March 10, 2025 11:45 AM
To: Babcock, Dawn <dawnbabcock@devensec.com>
Subject: Background Developments near 45 Independence Drive in Devens, Massachusetts

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Hello Dawn,

My name is Cecilia, I just gave you a call and wanted to follow up with an email! I am a traffic engineer for GPI, and we are working on a Traffic Study for a proposed development project located near 45 Independence Drive in Devens, Massachusetts. Are there any major development projects near this area that are currently before the town, or

that were recently approved but not yet built? If so, can you send me the traffic studies associated with these developments? If no traffic studies were required/performed, can you simply provide me with the type of development, its location, and its size? If they are major traffic generators, then we will include them in our future traffic-volume projections.

As well, are there any roadway improvement projects near the area that we should be aware of?

Please let me know if you have any questions!

Thank you,
Cecilia

Cecilia Donaldson, E.I.T.
Designer

d 617.812.7298
cdonaldson@gpinet.com | www.gpinet.com



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INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Devens COUNT DATE : 12/4/2024

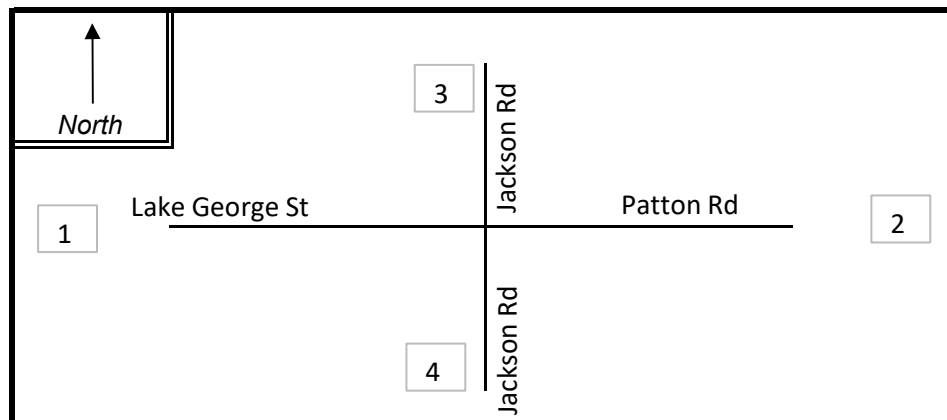
DISTRICT : 3 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : Jackson Road

MINOR STREET(S) : Lake George St and Patton Rd

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	SB	NB		
PEAK HOURLY VOLUMES (AM/PM) :	75	460	648	430		1,613

" K " FACTOR : 0.085 INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME : 18,976

TOTAL # OF CRASHES : 10 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (A) : 2.00

CRASH RATE CALCULATION :

0.29

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : Wednesday PM volumes used

Project Title & Date: MAX-2010569.01 - Devens, Massachusetts

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Devens COUNT DATE : 12/4/2024

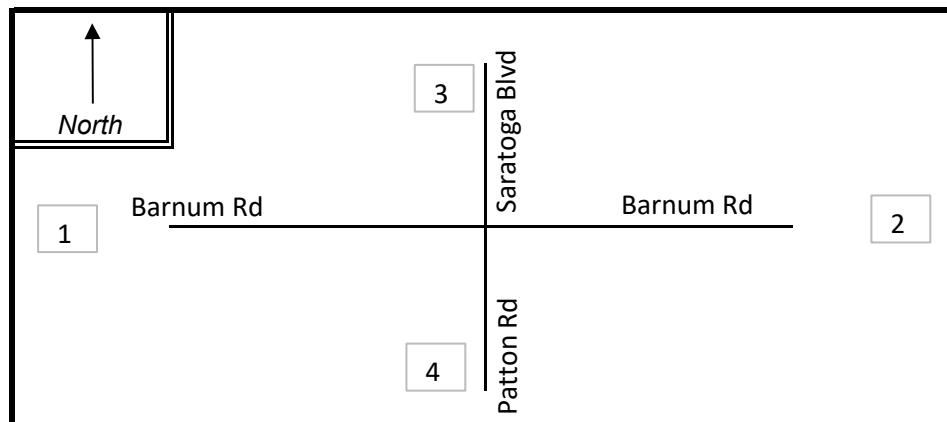
DISTRICT : 3 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : Barnum Rd

MINOR STREET(S) : Saratoga Blvd and Patton Rd

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	SB	NB		
PEAK HOURLY VOLUMES (AM/PM) :	127	226	160	100		613

" K " FACTOR :

0.085

INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

7,212

TOTAL # OF CRASHES :

4

OF YEARS :

5

AVERAGE # OF CRASHES PER YEAR (A) :

0.80

CRASH RATE CALCULATION :

0.30

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : Wednesday PM volumes used

Project Title & Date: MAX-2010569.01 - Devens, Massachusetts

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Devens COUNT DATE : 12/4/2024

DISTRICT : 3 UNSIGNALIZED : ☒ X SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : Buena Vista St/Independence Dr

MINOR STREET(S) : Cook St/Saratoga Blvd

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	SB	NB	SEB	
PEAK HOURLY VOLUMES (AM/PM) :	19	153	8	42	5	227

" K " FACTOR : 0.061 INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME : 3,721

TOTAL # OF CRASHES : 1 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (A) : 0.20

CRASH RATE CALCULATION :

0.15

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : Wednesday PM volumes used

Project Title & Date: MAX-2010569.01 - Devens, Massachusetts

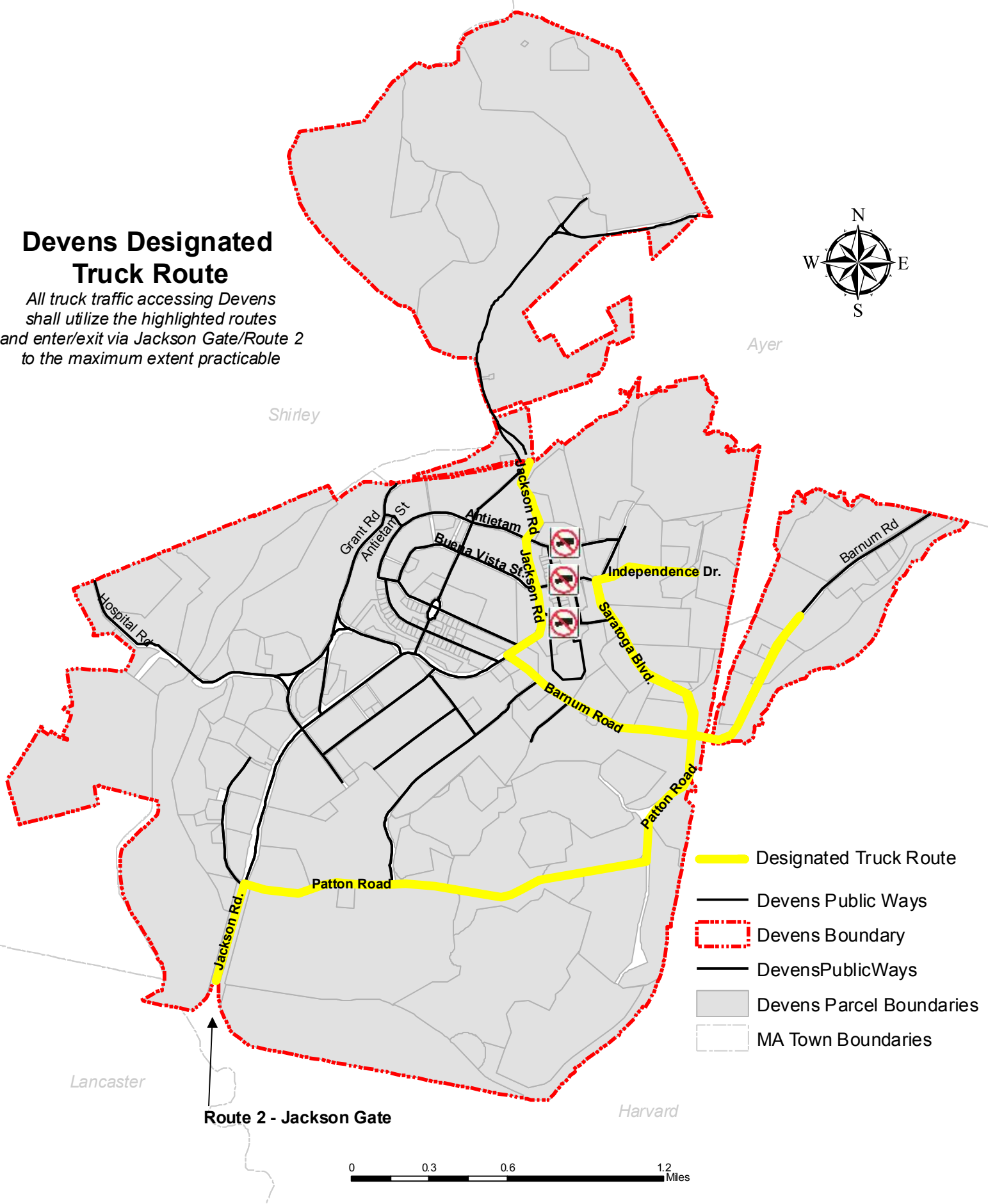
Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Age of Driver - Youngest Known	Age of Driver - Oldest Known	Driver Contributing Circumstances (All Drivers)	Driver Distracted By (All Vehicles)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Traffic Control Device Type	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Hit and Run	Most Harmful Event (All Vehicles)	Road Contributing Circumstance	School Bus Related	Traffic Control Device Function	Vehicle Sequence of Events (All Vehicles)	Work Zone Related	Latitude	Longitude	Street Number	Roadway	Near Intersection Roadway	Distance and Direction From Intersection	Landmark
4580824	HARVARD	08/08/2018	Property damage only (none injured)	10:20 AM	No injury	2	35-44	55-64	D1: (No improper driving) / D2: (Operating defective equipment)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: S / V2: S	Clear	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.52929	-71.629689		JACKSON ROAD / LAKE GEORGE STREET / PATTON ROAD			
4598243	HARVARD	08/04/2018	Property damage only (none injured)	12:07 PM	No injury	2	18-20	35-44	D1: (No improper driving) / D2: (Failed to yield right of way)		Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	Traffic control signal	V2: Travelling straight ahead / V1: Slowing or stopped in traffic	V2:(Passenger car) / V1:(Unknown heavy truck, cannot classify)	V2: N / V1: N	Cloudy	No hit and run	V2:(Collision with motor vehicle in traffic) / V1:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V2:(Collision with motor vehicle in traffic) V1:(Collision with motor vehicle in traffic)	No	42.52929	-71.629689		JACKSON ROAD / GRANT ROAD / PATTON ROAD			
4639458	HARVARD	11/21/2018	Property damage only (none injured)	11:42 PM	No injury	2	21-24	45-54	D1: (No improper driving) / D2: (Inattention)	D1: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	Dry	Four-way intersection	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: S / V2: S	Clear	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.52929	-71.629689		JACKSON ROAD / PATTON ROAD / PATTON ROAD			@ PATTON RD, DEVENS
4894085	HARVARD	10/30/2020	Non-fatal injury	6:38 AM	Suspected Minor Injury (B)	2	25-34	35-44	D1: (No improper driving) / D2: (Failed to yield right of way)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dusk	Angle	Wet	Four-way intersection	Traffic control signal	V1: Travelling straight ahead / V2: Turning left	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: N / V2: S	Cloudy/Snow	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.52929	-71.629689		JACKSON ROAD Rte UNKNOW	PATTON ROAD		
4941300	HARVARD	03/15/2021	Property damage only (none injured)	9:50 PM	No Apparent Injury (O)	2	25-34	45-54	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	Four-way intersection	Traffic control signal	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: W / V2: N	Clear	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.52929	-71.629689		JACKSON ROAD / PATTON ROAD			
4965222	HARVARD	05/21/2021	Non-fatal injury	7:28 AM	Suspected Minor Injury (B)	2	45-54	45-54	D1: (No improper driving) / D2: (Failure to keep in proper lane or running off road)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Head-on	Dry	Four-way intersection	Traffic control signal	V1: Turning left / V2: Overtaking/passing	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Motorcycle)	V1: E / V2: N	Clear	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	Traffic congestion related	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic),(Overturn/rollover)	No	42.52929	-71.629689		JACKSON ROAD / PATTON ROAD			JACKSON RD @ PATTON RD-DEVENS
5027562	HARVARD	10/21/2021	Property damage only (none injured)	2:08 PM	No Apparent Injury (O)	2	45-54	65-74	D1: (Failed to yield right of way) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	Traffic control signal	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Passenger car)	V1: W / V2: N	Clear	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.52929	-71.629689		JACKSON ROAD / PATTON ROAD			
5099281	HARVARD	04/22/2022	Non-fatal injury	7:09 AM	Suspected Serious Injury (A)	2	45-54	55-64	D1: (Failed to yield right of way) / D2: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Head-on	Dry	Four-way intersection	Traffic control signal	V1: Turning left / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: N	Clear	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.52929	-71.629689		JACKSON ROAD / PATTON ROAD			JACKSON RD @ PATTON RD, DEVENS
5121836	HARVARD	06/29/2022	Property damage only (none injured)	8:15 AM	No Apparent Injury (O)	2	21-24	35-44	D1: (No improper driving) / D2: (Failed to yield right of way)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	Traffic control signal	V1: Travelling straight ahead / V2: Turning left	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: N / V2: E	Clear	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.5293	-71.62969		JACKSON ROAD / PATTON ROAD / LAKE GEORGE STREET			
5188728	HARVARD	12/12/2022	Property damage only (none injured)	7:01 AM	No Apparent Injury (O)	2	35-44	45-54	D1: (No improper driving) / D2: (Inattention)		Collision with motor vehicle in traffic	Daylight	Rear-end	Slush	Four-way intersection	Traffic control signal	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: N	Cloudy	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	Road surface condition (wet, icy, snow, slush, etc.)	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.52929	-71.629689		PATTON ROAD / JACKSON ROAD			

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Age of Driver - Youngest Known	Age of Driver - Oldest Known	Driver Contributing Circumstances (All Drivers)	Driver Distracted By (All Vehicles)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Traffic Control Device Type	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Hit and Run	Most Harmful Event (All Vehicles)	Road Contributing Circumstance	School Bus Related	Traffic Control Device Function	Vehicle Sequence of Events (All Vehicles)	Work Zone Related	Latitude	Longitude	Street Number	Roadway	Near Intersection Roadway	Landmark
4677088	HARVARD	03/12/2019	Property damage only (none injured)	3:05 PM	No Apparent Injury (O)	3	25-34	45-54	D1: (Made an improper turn) / D3: (No improper driving)	D1: Not Distracted / D3: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	Traffic control signal	V1: Turning left / V2: Turning left / V3: Slowing or stopped in traffic	V1:(Tractor/semi-trailer) / V2:(Unknown heavy truck, cannot classify) / V3:(Light truck(van, mini-van, pickup, sport utility))	V1: E / V2: E / V3: W	Clear	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) / V3:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)	No	42.53773	-71.596042		BARNUM ROAD Rte UNKNOW	SARATOGA BOULEVARD	
4841104	HARVARD	04/03/2020	Property damage only (none injured)	3:50 PM	No Apparent Injury (O)	2	55-64	55-64	D2: (No improper driving)	D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Angle	Wet	Four-way intersection	Traffic control signal	V1: Turning left / V2: Travelling straight ahead	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: W / V2: E	Not Reported	No hit and run	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	No	42.53773	-71.596042		BARNUM ROAD / PATTON ROAD		BARNUM RD AT PATTON RD DEVENS
4939076	HARVARD	03/01/2021	Property damage only (none injured)	3:25 PM	No Apparent Injury (O)	3	18-20	45-54	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings) / D3: (No improper driving)	D1: Not Distracted / D2: Not Distracted	Collision with motor vehicle in traffic	Daylight	Head-on	Dry	Four-way intersection	Traffic control signal	V2: Slowing or stopped in traffic / V1: Turning left / V3: Turning left	V2:(Passenger car) / V1:(Single-unit truck (3-or-more axles)) / V3:(Tractor/semi-trailer)	V2: S / V1: E / V3: E	Clear	No hit and run	V2:(Collision with motor vehicle in traffic) / V1:(Collision with motor vehicle in traffic) / V3:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Yes, device functioning	V2:(Collision with motor vehicle in traffic) V1:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)	No	42.53773	-71.596042		BARNUM ROAD / SARATOGA BOULEVARD		
5109841	HARVARD	05/28/2022	Unknown	7:45 AM	Not reported	1	18-20	18-20	D1: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner)		Collision with motor vehicle in traffic	Dark - roadway not lighted	Single vehicle crash	Dry	Not at junction	No controls	V1: Travelling straight ahead	V1:(Passenger car)	V1: S	Cloudy	Yes, hit and run	V1:(Collision with motor vehicle in traffic)	None	No, school bus not involved	Not reported	V1:(Collision with motor vehicle in traffic)	No	42.53767	-71.595488		BARNUM ROAD		

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Age of Driver - Youngest Known	Age of Driver - Oldest Known	Driver Contributing Circumstances (All Drivers)	Driver Distracted By (All Vehicles)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Traffic Control Device Type	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	First Harmful Event Location	Hit and Run	Most Harmful Event (All Vehicles)	Road Contributing Circumstance	School Bus Related	Traffic Control Device Function	Vehicle Sequence of Events (All Vehicles)	Work Zone Related	Latitude	Longitude	Street Number	Roadway	Landmark
4503725	AYER	01/23/2018	Property damage only (none injured)	5:07 AM	No injury	1	25-34	25-34	D1: (No improper driving)	D1: Not Distracted	Collision with tree	Dark - roadway not lighted	Single vehicle crash	Ice	Not at junction	No controls	V1: Travelling straight ahead	V1:(Light truck(van, mini-van, pickup, sport utility))	V1: E	Rain	Roadside	No hit and run	V1:(Collision with tree)	None	No, school bus not involved	No, device not functioning	V1:(Collision with motor vehicle in traffic),(Collision with tree)	No	42.54634	-71.60381		BUENA VISTA STREET	NEAR SARATOGA BOULEVARD

Devens Designated Truck Route



















All truck traffic accessing Devens shall utilize the highlighted routes and enter/exit via Jackson Gate/Route 2 to the maximum extent practicable



4: Jackson Road & Lake George Street/Patton Road 2032 Build - 1500 tpd with Improvements

Timings

Timing Plan: Weekday PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	3	69	472	2	69	12	416	78	7	754	0
Future Volume (vph)	3	3	69	472	2	69	12	416	78	7	754	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	285		0	0		430	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		693			836			564			516	
Travel Time (s)		13.5			16.3			11.0			10.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	33%	33%	1%	5%	0%	2%	0%	4%	17%	17%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Minimum Split (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Total Split (s)	36.0	36.0		36.0	36.0		38.0	38.0	38.0	38.0	38.0	
Total Split (%)	36.0%	36.0%		36.0%	36.0%		38.0%	38.0%	38.0%	38.0%	38.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 74

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Jackson Road & Lake George Street/Patton Road









4: Jackson Road & Lake George Street/Patton Road 2032 Build - 1500 tpd with Improvements

Timings Timing Plan: Weekday PM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Intersection Summary	



















4: Jackson Road & Lake George Street/Patton Road 2032 Build - 1500 tpd with Improvements
Queues Timing Plan: Weekday PM

						
Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	81	513	77	465	85	828
v/c Ratio	0.11	0.96	0.11	0.59	0.13	0.99
Control Delay (s/veh)	4.5	54.7	4.2	19.1	3.7	52.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	4.5	54.7	4.2	19.1	3.7	52.7
Queue Length 50th (ft)	2	221	1	153	0	362
Queue Length 95th (ft)	25	#418	23	244	23	#608
Internal Link Dist (ft)	613		756	484		436
Turn Bay Length (ft)		285			430	
Base Capacity (vph)	713	533	710	794	662	833
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.96	0.11	0.59	0.13	0.99

Intersection Summary

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

4: Jackson Road & Lake George Street/Patton Road 2032 Build - 1500 tpd with Improvements
 HCM Signalized Intersection Capacity Analysis Timing Plan: Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	3	69	472	2	69	12	416	78	7	754	0
Future Volume (vph)	3	3	69	472	2	69	12	416	78	7	754	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.88		1.00	0.85			1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)		1605		1719	1591			1826	1380		1877	
Flt Permitted		0.99		0.70	1.00			0.97	1.00		1.00	
Satd. Flow (perm)		1600		1275	1591			1781	1380		1870	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	3	75	513	2	75	13	452	85	8	820	0
RTOR Reduction (vph)	0	44	0	0	44	0	0	0	47	0	0	0
Lane Group Flow (vph)	0	37	0	513	33	0	0	465	38	0	828	0
Heavy Vehicles (%)	33%	33%	1%	5%	0%	2%	0%	4%	17%	17%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		31.0		31.0	31.0			33.0	33.0		33.0	
Effective Green, g (s)		31.0		31.0	31.0			33.0	33.0		33.0	
Actuated g/C Ratio		0.42		0.42	0.42			0.45	0.45		0.45	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		670		534	666			794	615		833	
v/s Ratio Prot					0.02							
v/s Ratio Perm		0.02		c0.40				0.26	0.03		c0.44	
v/c Ratio		0.06		0.96	0.05			0.59	0.06		0.99	
Uniform Delay, d1		12.8		20.9	12.8			15.4	11.7		20.4	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.0		29.1	0.0			1.1	0.0		29.5	
Delay (s)		12.8		50.0	12.8			16.5	11.7		49.9	
Level of Service		B		D	B			B	B		D	
Approach Delay (s/veh)		12.8			45.2			15.7			49.9	
Approach LOS		B			D			B			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			37.9			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			74.0			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			86.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												