282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Richard Benevento
Zoning Board of Appeals
Town of Middleton
195 N Main Street
Middleton, MA 01949

October 12, 2023

Ref. T1404

Re: 10 Boston Street, Middleton, MA
40B Comprehensive Permit Application
Civil Engineering and Traffic Engineering Peer Review #1

Dear Mr. Benevento:

On behalf of the Town of Middleton, TEC, Inc. (TEC) has reviewed documents as part of the traffic and civil engineering peer review for a proposed multi-family residential development via a MGL Chapter 40B Comprehensive Permit located at 10 Boston Street (Route 60) in Middleton, Massachusetts ("the Project"). The Project will include the construction of sixty (60) single-family rental units in a single multi-family building.

The following materials were considered as part of our review:

- *Comprehensive Permit Application Package – Villebridge Middleton – 10 Boston Street – Middleton, MA*; prepared by Villebridge Real Estate Development, dated August 22, 2023.
- *Traffic Impact Assessment – Villebridge – 10 Boston Street – Middleton, MA*; prepared by Vanasse & Associates, Inc., dated August 2023.
- *Comprehensive Permit Plans – Villebridge – 10 Boston Street – Middleton, MA*; prepared by The Architectural Team, Inc., dated August 2023.
- *Preliminary Stormwater Report – 10 Boston Street – Middleton, MA*; prepared by Hancock Associates, dated August 22, 2023.

TEC completed a review of these documents consistent with Town of Middleton zoning requirements and other industry standards and offers the following comments:

Civil Engineering Site Plan Review

1. Plans as submitted are labeled as "Preliminary", and in the opinion of TEC, do not provide sufficient detail to determine adequacy of the site and stormwater design.
2. A waiver has been requested for the requirements of Section 9.5 of the Middleton Zoning Bylaws, "Site Plan Review". The plans as submitted do not meet the following requirements:
   a. Plans shall be submitted on twenty-four-by-thirty-six-inches sheets whereas the plans currently are thirty-by-forty-two-inches. TEC defers to the Board.

b. Plans should provide a locus plan at a scale of one-inch equals to 100 feet, showing the entire project and its relation to existing areas, buildings, and roads for a distance of 1,000 feet from the project boundaries.
c. Plans should indicate snow storage areas.

3. A waiver for maximum building height is requested. The allowable height is 35ft (3 stories) – the applicant's proposed building height is 42ft (3 stories). TEC defers to the Board.

4. Per the MA Stormwater BMP Handbook, a minimum of (2) test pits should be conducted within the footprint of each subsurface infiltration system. Several test pits are shown on the plans, however none appear to have been conducted within the footprint of the (2) proposed infiltration systems. Additional test pits in the footprint of the proposed infiltration systems should be conducted to confirm soil classification, infiltration rate, and estimated seasonal high groundwater elevation.

5. (8) test pit locations are indicated on the plans. It appears that test pit results are only provided for (4) test pits. The locations of (2) of the test pits for which results are provided are not indicated on the plans.

6. The Applicant should provide turning templates showing the ability of fire apparatus to access, circulate, and egress the site through the circulation pattern without leaving the paved surface. This includes a Town of Middleton fire apparatus. The Applicant should coordinate with the Town of Middleton Fire Department for preferred locations of fire lanes (if needed), confirmation of hydrant locations, and sign requirements for fire lanes within the site. TEC defers to local police and fire.

7. The site layout plans indicate trash will be stored inside the building and trash pickup access will be through the south side of the building from the adjacent parking lot of "Lot 3". Grading of this access should be confirmed as it appears the first 20' of the access path will be greater than 20% until the parking lot is regraded/reconstructed on "Lot 3". The Applicant should provide turning templates showing the ability of dump trucks to access, circulate, and egress the site through the circulation pattern without leaving the paved surface while accessing the location of the trash room. Adequate access for trash removal should be incorporated into the development of "Lot 2". Should the refuge truck need to access the trash room from Lot 3 as depicted, and common ownership of "Lot 2" and Lot "3" ceases, a cross-access easement may need to be in place to conduct this business.

8. The plan set does not include any construction details.

9. No construction period erosion and sediment controls are indicated on the plans.

10. No drainage conveyance structure inverts are indicated. No drainage conveyance pipe size, material, length, or slope are indicated. Assuming a minimum of 36" from rim to invert for proposed catch basins to the west of the proposed infiltration systems indicate a potential backflow condition (inverts of catch basins approximately elevation 101.2, 101.5; bottom of chambers elevation 101.5).

11. The plan set does not provide for details regarding proposed retaining walls. A DMH is proposed in between the retaining walls and detail on the walls should be provided to ensure constructability.

12. Infiltration system construction details should be provided. Isolator row details should be provided. Infiltration system inlet manholes and manifold details should be provided. The outlet control structure call outs indicate weir elevation but do not indicate orifice size and elevation as included in the HydroCAD model. Outlet control structure details should be provided.

13. Plans indicate a minimum offset from infiltration system to subsurface soil absorption system of 25', assumed to be taken from Title 5 for the setback from SAS to dry wells. Per the MA Stormwater BMP handbook, the offset from infiltration BMPs (basins and trenches) to soil absorption systems is 50'. TEC defers to MassDEP as to the superseding regulation. TEC defers to the local Health Department and MassDEP on septic system design.

14. Per the standard Stormtech construction details, a minimum of 18" is required from the top of the chambers to the bottom of pavement for adequate structural integrity under parking areas. The current proposed design indicates approximately 16" from the top of the chambers of infiltration system "1P" to the top of pavement along the western side of the system.

15. The applicant proposes connecting the new drainage system to the existing drainage network on "Lot 3" via a proposed utility easement. The existing drainage network on Lot "3" is connected to the existing drainage system within MassDOT jurisdiction on South Main Steet (Route 114). A DOT Access Permit may be required for the expanded drainage connection. TEC suggests the applicant and DPW engage MassDOT regarding the proposed expanded drainage system interconnection.

16. Proposed lighting is indicated on the provided landscape plans, however no photometrics are provided to ensure no light spillage/pollution and conformance with local regulations.

17. Lighting plan shows proposed light pole within infiltration system "1P", details on how that would be constructed should be provided.

18. The landscape plan shows a proposed tree within infiltration system "2P." There is also a proposed tree at the southwest corner of the site that is proximate to a proposed area drain and pipe connection.

19. The landscape plan proposes plantings within the Boston Street right-of-way adjacent to the proposed entry sign. With regards to ownership of on-going landscape maintenance, TEC suggests proposed landscaping remain outside the public right-of-way.

20. Is a cross-access easement to be established between the subdivided lots to allow for residential traffic to utilize the South Main Street parking areas and driveway?

21. The Applicant should verify the location of bus stops for resident children with the local school district and ensure the location is easily accessible by a school bus.

22. The Applicant shall provide a dedicated plan for all traffic signage and pavement markings to be installed as part of the project. A sign summary shall also be included which depicts the sign legend, sign size, and sign lettering dimensions in compliance with the *Manual on Uniform Traffic Control Devices* (*MUTCD*).

    a. This includes the placement of a stop sign and stop lines along the site driveways at its intersection with Boston Street and South Main Street.

b. This includes placement of a stop sign and stop lines along the Boston Street Driveway and its intersection with the main drive aisle leading to Lot 3's surface parking.

c. The Applicant should provide standard details and/or notes that denote the height of traffic signage on-site. Note that the height of some signage will be different than others.

23. The proposed site provides for 102 off-street parking spaces. The land use is identified in Bylaw Section 5.1.2. The site would require 120 parking spaces to satisfy the Bylaw. The Applicant has noted a need for relief from parking spaces with 1.7 spaces per unit.

a. Parking demand calculations published by the Institute of Transportation Engineers (ITE) in the most recent industry standard *Parking Generation, 5th Edition* for Land Use Code (LUC) 221 – Multifamily Housing Mid-Rise denote an average peak parking demand of seventy-nine (45) parking spaces needed for sixty (60) units or sixty-eight (68) parking spaces for ninety (90) bedrooms. Parking demand calculations also note an 85th percentile peak parking demand of eighty-nine (89) parking spaces needed for sixty (60) units or seventy-eight (78) parking spaces for ninety (90) bedrooms. Even under the most limited parking demand combination from the ITE publication would suggest the Applicant's parking spot count would be sufficient to meet demand.

24. Dimensions are provided for a typical parking space on-site in compliance with the Bylaw. In addition, dimensions for the accessible spaces on-site are in compliance with 521 CMR 23.4.1. The Applicant should revise the plans to show accessible signage at the head of each accessible parking space with the associated 'Van Accessible' plaque.

25. The plans should be revised to depict both intersection sight distance and stopping sight distance measurements for both directions at Boston Street and South Main Street. Intersection sight distance measurements should be taken from a point 14.5-feet from the proposed edge of travel way on each mainline roadway. The sheet should denote all areas of clear view and resulting from the sight lines both on the public ROW and land under the control of the Applicant.

26. Concrete sidewalks are provided along Boston Street opposite the site frontage. A proposed sidewalk is shown on-site connecting from the building frontage out to Boston Street and terminating. The location is not ideal for a crosswalk to allow connection to the sidewalk along the northerly side of the roadway. The Applicant should provide a pedestrian connection along the southerly side of Boston Road connecting to the intersection with South Main Street.

27. The Applicant should provide standard details for all accessible ramp types and crosswalks.

28. The plan does not show electric vehicle charging stations on-site. The Applicant should clarify if spaces on-site will be constructed as EV-compatible or EV-ready.

29. The Applicant shall define the location of resident bicycle storage including weather-protection and security.

MassDEP Stormwater Standards

30. Standard 1 (Untreated discharges): *No new stormwater conveyance may discharge untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth.*

Standard appears to be met. All stormwater runoff from the site is proposed to be discharged to an existing drainage network within South Main Street. See Standard 4 regarding water quality treatment.

31. Standard 2 (Peak rate control and flood prevention): *Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.*

TEC provides the following comments in relation to Standard 2:

a) The existing watershed analysis map indicates (3) analysis points. The proposed watershed analysis indicates (1) analysis point. The majority of the site runoff has been redirected towards the South Main Street drainage network analysis point, however, there appears to still be a small area of the post development condition which drains towards Boston Street. The watershed maps and analysis should be revised to incorporate the Boston Street analysis point. All (3) analysis points should be indicated in the Stormwater Report discharge rate table. It appears peak flows will likely still be met.

b) The HydroCAD analysis indicates the proposed pipe network to an existing drainage manhole will be constructed within 12" reinforced concrete pipe. The outlet of the existing drainage manhole appears to be an 8" cast iron pipe. The analysis should include the existing pipe to ensure the reduction in flow capacity of the 8" pipe will not negatively impact or cause backflow of the proposed stormwater management system for the development.

c) The plans do not indicate size, material, length, slope, or inverts of the proposed pipe network. Some pipes are included in the HydroCAD analysis. All proposed pipes should be modeled to ensure adequate size and flow capacities for the site. TEC recommends adding all structures and pipes to the HydroCAD model.

d) The HydroCAD model and the plan call outs indicate a total of 192 chambers in infiltration system "1P". It appears there are 191 chambers as (1) chamber appears to have been removed for the inlet of the CB in the northeast corner of the proposed parking area. TEC recommends this CB be directed the system manifold DMH in the northeast corner of the system, allowing for 192 total chambers.

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

TEC provides the following comments in relation to Standard 3:

a) Per the plan call out for infiltration system "1P", the bottom of the system is 2' above seasonal high groundwater. The system is also used proposed for peak flow attenuation for storms greater than and equal to the 10-year storm, therefore a mounding analysis should be provided.

b) As mentioned prior, additional test pits should be conducted within the footprint of infiltration systems.

c) The checklist indicates that runoff from all impervious areas at the site discharges to infiltration BMPs. There are areas (sidewalks to the north, east, and south of the building; a portion of the driveway draining to Boston Street) which are not conveyed to the proposed infiltration systems. The checklist should be revised.

d) It appears that required recharge volumes are met.

33. Standard 4 (80% TSS removal): *Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).*

TEC provides the following comments in relation to Standard 4:

a) It appears that required water quality volumes are met for the (2) infiltration systems.

b) As mentioned prior, there is a portion of the proposed driveway which discharges to Boston Street. This runoff is not captured and therefore is untreated. The water quality analysis should provide calculations showing that the site averages the required 80% TSS removal for all impervious areas requiring treatment.

c) The proposed parking area catch basin located in the southwest corner of the site is proposed as an inline structure. Per the Stormwater BMP Handbook, all deep sump catch basins should be off-line structures.

d) A Long-Term Pollution Prevention Plan should be provided per the stormwater checklist.

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

Standard does not apply to this proposed project. The checklist should be revised as it indicates the EPA NPDES MSGP covers the land use.

35. Standard 6 (Critical Areas): *Stormwater discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or any other critical area require the use of the specific source control and pollution prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters or Special Resource Waters shall be set back from the receiving water and receive the highest and best practical method of treatment. A "stormwater discharge," as defined in 314 CMR 3.04(2)(a)1. or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to Zone I or Zone A are prohibited unless essential to the operation of the public water supply.*

Standard does not apply to this proposed project.

36. Standard 7 (Redevelopment*). A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met, and the project shall improve existing conditions.*

    Standard does not apply to this proposed project.

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

    TEC provides the following comments in relation to the Standard 8:

    a) No construction period pollution prevention and erosion and sediment control plan is provided with information as required per the stormwater checklist. The plan should also include any additional information as required by the Middleton local stormwater management regulations.

    b) No construction period controls are indicated on the plans.

    c) The project will be required to obtain coverage under the EPA NPDES CGP as it will disturb over an acre. This will require the development of a SWPPP as indicated on the stormwater checklist. If the project were to be approved, TEC recommends this be added as a condition of approval.

38. Standard 9 (Operation and Maintenance): *A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed.*

    Standard appears to be met. The operation and maintenance plan should be revised to indicate that local police and fire will also be notified of any potential spills per the Middleton local stormwater management regulations. Based on the Massachusetts Stormwater Handbook the operation and maintenance plan should include mosquito control for subsurface infiltration systems.

39. Standard 10 (Illicit Discharges): *All illicit discharges to the stormwater management system are prohibited.*

    Standard appears to be met. Measures for the prevention of illicit discharges are provided within the Long-Term Operation and Maintenance Plan. No illicit discharge compliance statement is provided, and the report indicates one will be provided prior to discharge of stormwater to post construction BMPs. If the project were to be approved, TEC recommends this be added as a condition of approval.

Traffic Impact Assessment Comments

40. The Transportation Impact Assessment (TIA) indicates driveway related trips accessing directly to/from South Main Street, signed as Route 114, which is under the jurisdiction of the Massachusetts Department of Transportation (MassDOT). The Applicant should consult with MassDOT for the Permit to Access State Highway.

41. The TIA indicates that the overall subdivision project is directly associated with an abutting commercial development on “Lot 3” of the subdivision at the South Main Street / Boston

Street / Town Hall Driveways intersection corner. TEC notes that the Board should take this into consideration for conditions on any approval that the overall traffic impact of the several lots should be evaluated without segmentation as traffic impacts will be compounded with each part of the development process. This may result in any off-site mitigation being pushed to a subsequent development phase once the compounded impact, if any, becomes a further hinderance to traffic operations and safety.

42. The TIA included the following intersections within the study area:

- South Main Street (Route 114) / Boston Street (Route 62) / Town Hall Driveways
- South Main Street (Route 114) / Maple Street (Route 62)
- North Main Street (Route 114) / South Main Street (Route 114) / Central Street / Lake Street
- South Main Street (Route 114) / Orchard Circle

TEC generally concurs with the scope of the study area intersections based on the Massachusetts Department of Transportation (MassDOT) *Traffic Impact Assessment (TIA) Guidelines* (Section 3.I.C) to evaluate intersections in which the site-generated trips increase the peak hour traffic volume by more than 5 percent and/or by more than 100 new vehicles per hour. Note that based on the compounding of development area with Lot 3, the study area in subsequent traffic studies for Lot 3 may need to the expanded.

43. Existing traffic volumes at the study area intersections were collected May 2022 while area schools were in general session. TEC concurs with the usage of existing traffic volumes.

44. The TIA evaluates traffic volumes for a COVID adjustment comparing May 2022 traffic volumes at the nearest permanent count station along Interstate 95. The TIA does note, with which TEC agrees, that MassDOT no longer requires COVID adjustments following March 2022 unless the predominant land uses in the area is office. The COVID adjustment institutes an 8.8 percent upward increase in traffic volumes from May 2022 taking into account that seasonally, traffic volumes in May 2022 are 5.3 percent higher than average-month conditions. Existing traffic volumes were further increased to a 2023 condition utilizing a year-over-year background growth rate. TEC generally concurs that this methodology results in a conservative scenario for traffic volumes in the area.

45. The TIA presents motor vehicle crash data for each of the study area intersections. The crash data indicates the number, type, and severity of crashes at the study area intersections between 2016 and 2020 obtained from MassDOT's IMPACT crash portal. The TIA notes that several study area intersections experience crash rates below statewide and district wide averages with the exception to the intersection of South Main Street / Maple Street which experiences a rate well above those respective averages. The intersection is also designated as HSIP-eligible which represents a top 5 percent crash location in the region. The Applicant has noted commitment to implement safety-related improvements at this location further described in this review letter.

46. The TIA references a 1.5% growth rate on traffic volumes per year (compounded) based on the growth of traffic of several roadways in the vicinity from 2009 to 2018 (prior to COVID). TEC generally concurs that the growth rate of 1.5% as used by the TIAS.

47. The TIA documents five (5) specific developments by others which are anticipated to contribute additional traffic to the study area which are not accounted for in the March 2022 traffic counts. In addition, the TIA also projects traffic for the abutting subdivided lot as expected to contain a 5,000 square foot (SF) bank and an 8,000 SF coffee shop, restaurant, or pharmacy with drive-through; however, the TIA has projected traffic related to this abutting lot as separate from the subject project described in this TIA and included the traffic in both the No-Build and Build conditions. TEC disagrees that traffic related to Lot 3 should be assessed in the No-Build condition as it is directly related to subject residential project by subdivision. Its inclusion may affect the Build to No-Build comparison of traffic impacts from the subject project. TEC recommends that the Board identify a condition of approval that requires the Applicant, or future Applicant, to assess traffic for Lot 3 in its separate traffic study based on the site's segmentation; thereby, reassessing the residential development in conjunction with the commercial space of Lot 3 for the overall project subdivision's impact.

48. Site trip generation calculations for the proposed residential development were generated based on standard trip rates published in the Institute of Transportation Engineers (ITE) publication *Trip Generation, 11th Edition* for Land Use Code (LUC) 220 – Multifamily Housing Low-Rise. Overall, the residential project is anticipated to result in 460 new vehicle trips on a typical weekday with 41 new vehicle trips during the weekday morning peak hour, 46 new vehicle trips during the weekday evening peak hour, and 25 new vehicle trips during the Saturday midday peak hour. The TIA identifies that trips were distributed on the roadway network based on US Census Journey to Work Data. This data is not provided in the TIA Appendix and the trip distribution cannot be verified.

49. Values within Table 6 – Peak Hour Traffic Volume Increases appear to be duplicated from 2030 No-Build to 2030 Build along South Main Street, south of Orchard Circle. Please adjust accordingly.

50. TEC agrees with the TIA that the projected site-specific traffic volumes are not expected to result in any significant change at the various study area intersections. TEC reiterates the recommendation for assessing traffic for Lot 3 in its separate traffic study based on the site's segmentation.

51. The capacity and queue analysis indicates that the queues along Boston Street would extend back to the location of the proposed site driveway. This is likely to be exacerbated as the queue for the Boston Street eastbound left-turn lane already exceeds the storage length of the lane provided where the Synchro software is not taking into account the actual storage length of the lane. The blockage of the site driveway may result in vehicles attempting to turn left into the site to be blocked and themselves block westbound traffic along Boston Street. Although a left-turn lane for this location may not be warranted, the Applicant should evaluate the need for a left-turn lane under the full build-out condition with Lot 3 to account for any need for this lane in the future (more through traffic on Boston Street). Furthermore, the Applicant should provide recommendations to reduce the likelihood of driveway blockage along Boston Street.

52. Similarly, the project projects a significant number of left turns into the South Main Street Driveway from the south. The Applicant should provide a left-turn warrant analysis for this location with and without the full build-out of Lot 3.

53. TEC agrees that stopping sight distance (SSD) measurements meet the minimum thresholds for the 85th percentile speeds as identified by the project's ATR counts. Intersection sight distance (ISD) looking east from the Boston Street Driveway is close to

the AASHSTO minimum and below the desired sight line. The Applicant shall ensure that the site frontage remains clear of obstructions so that this ISD is maintained following construction.

54. The Applicant has noted that it is committed to the following recommended off-site measures:

a) Traffic signal timing / phasing adjustments prior to the Certificate of Occupancy and at an 80-percent occupancy level for the South Main Street / Boston Stret / Town Hall Driveway intersection, the South Main Street / Maple Street intersection and the North Main Street / South Main Street / Lake Street / Central Street intersection.

b) Facilitation of a Road Safety Audit (RSA) at the intersection of South Main Street / Maple Street. The Applicant should provide information as to what, if any, improvements identified in the RSA would be implemented as part of off-site mitigation.

55. The Applicant should indicate if additional Transportation Demand Management (TDM) measures will be incorporated into the site, such as electric vehicle charging stations, preferential parking, parking for ride-hailing, or parking for delivery vehicles.

Please do not hesitate to contact me directly if you have any questions concerning our comments at 774-670-3569. Thank you for your attention to these matters.

Sincerely,
TEC, Inc.
*"**T**he **E**ngineering **C**orporation"*

Jared M. Duval, P.E.
Worcester Regional Director

Samuel W. Gregorio, PE, PTOE, RSP_1
Senior Traffic Engineer

HANCOCK
ASSOCIATES
Surveyors | Engineers | Scientists

October 17, 2023

Richard Benevento
Zoning Board of Appeals
Town of Middleton
195 N Main Street
Middleton, MA 01949

Re: 10 Boston Street, Middleton, MA
40B Comprehensive Permit Application
Response to Civil Engineering and Traffic Engineering Peer Review #1

Dear Mr. Benevento:

Hancock Associates is pleased to offer the following correspondence in response to the Peer Review memorandum from TEC dated October 12, 2023.

Civil Engineering Site Plan Review

1. Plans as submitted are labeled as "Preliminary", and in the opinion of TEC, do not provide sufficient detail to determine adequacy of the site and stormwater design.

Response: 760 CMR 56.05 requires the submission of preliminary site development plan. We believe we have fully complied with the regulatory provisions but understand TEC's call for additional details as outlined in their memorandum. We commit to work with The Board as the process continues to provide the additional details and information requested.

2. A waiver has been requested for the requirements of Section 9.5 of the Middleton Zoning Bylaws, "Site Plan Review". The plans as submitted do not meet the following requirements:

   a) Plans shall be submitted on twenty-four-by-thirty-six-inches sheets whereas the plans currently are thirty-by-forty-two-inches. TEC defers to the Board.

Response: We feel the larger sheets allow for ease of review at an appropriate scale without having to break the site into separate sheets.

   b) Plans should provide a locus plan at a scale of one-inch equals to 100 feet, showing the entire project and its relation to existing areas, buildings, and roads for a distance of 1,000 feet from the project boundaries.

Response: A 100 scale locus plan will be provided.

c) Plans should indicate snow storage areas.

Response: Snow storage area will be added to the plan.

3. A waiver for maximum building height is requested. The allowable height is 35ft (3 stories) – the applicant's proposed building height is 42ft (3 stories). TEC defers to the Board.

4. Per the MA Stormwater BMP Handbook, a minimum of (2) test pits should be conducted within the footprint of each subsurface infiltration system. Several test pits are shown on the plans, however none appear to have been conducted within the footprint of the (2) proposed infiltration systems. Additional test pits in the footprint of the proposed infiltration systems should be conducted to confirm soil classification, infiltration rate, and estimated seasonal high groundwater elevation.

Response: Extensive testing has been performed throughout the site. Hancock is confident suitable soils exist within the proposed infiltration areas. We would ask that the Board consider additional testing be required as a condition of approval and performed prior to the submittal of the building permit application.

5. (8) test pit locations are indicated on the plans. It appears that test pit results are only provided for (4) test pits. The locations of (2) of the test pits for which results are provided are not indicated on the plans.

Response: The plans and logs will be updated to address these differences.

6. The Applicant should provide turning templates showing the ability of fire apparatus to access, circulate, and egress the site through the circulation pattern without leaving the paved surface. This includes a Town of Middleton fire apparatus. The Applicant should coordinate with the Town of Middleton Fire Department for preferred locations of fire lanes (if needed), confirmation of hydrant locations, and sign requirements for fire lanes within the site. TEC defers to local police and fire.

Response: We have produced a Swept Path Analysis and shared it with the Middleton Fire Department. This plan is attached to complete the Zoning Board record.

7. The site layout plans indicate trash will be stored inside the building and trash pickup access will be through the south side of the building from the adjacent parking lot of "Lot 3". Grading of this access should be confirmed as it appears the first 20' of the access path will be greater than 20% until the parking lot is regraded/reconstructed on "Lot 3". The Applicant should provide turning templates showing the ability of dump trucks to access, circulate, and egress the site through the circulation pattern without leaving the paved surface while accessing the location of the trash room. Adequate access for trash removal should be incorporated into the development of "Lot 2". Should the refuge truck need to

access the trash room from Lot 3 as depicted, and common ownership of "Lot 2" and Lot "3" ceases, a cross-access easement may need to be in place to conduct this business.

Response: Hancock will review grading and truck maneuvering to the trash area and revise the plan as necessary.

8. The plan set does not include any construction details.

Response: 760 CMR 56.05 does not require the submission of construction details. As committed above, Hancock will advance plan details as we move through the process adding necessary details to the plan set for review.

9. No construction period erosion and sediment controls are indicated on the plans.

Response: 760 CMR 56.05 does not require the submission of erosion and sediment control plans. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

10. No drainage conveyance structure inverts are indicated. No drainage conveyance pipe size, material, length, or slope are indicated. Assuming a minimum of 36" from rim to invert for proposed catch basins to the west of the proposed infiltration systems indicate a potential backflow condition (inverts of catch basins approximately elevation 101.2, 101.5; bottom of chambers elevation 101.5).

Response: We feel this level of detail is beyond the submission requirements. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

11. The plan set does not provide for details regarding proposed retaining walls. A DMH is proposed in between the retaining walls and detail on the walls should be provided to ensure constructability.

Response: Due to changes with the building plan and site plan, the eastern walkway/stairway and associated retaining walls are being eliminated. Revised plans reflecting this change will be provided.

12. Infiltration system construction details should be provided. Isolator row details should be provided. Infiltration system inlet manholes and manifold details should be provided. The outlet control structure call outs indicate weir elevation but do not indicate orifice size and elevation as included in the HydroCAD model. Outlet control structure details should be provided.

Response: We feel this level of detail is beyond the submission requirements. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

13. Plans indicate a minimum offset from infiltration system to subsurface soil absorption system of 25', assumed to be taken from Title 5 for the setback from SAS to dry wells. Per the MA Stormwater BMP handbook, the offset from infiltration BMPs (basins and trenches) to soil absorption systems is 50'. TEC defers to MassDEP as to the superseding regulation. TEC defers to the local Health Department and MassDEP on septic system design.

Response: We feel the requirements of Title 5 prevail as ensuring the proper function of a subsurface sewage disposal system is of a higher regard to environmental and health protection. Title 5 requires the design systems exceeding 2,000 gallons per day consider groundwater mounding which would include the potential for interaction between the stormwater system and the subsurface sewage disposal system. We see this analysis happening as we finish the Zoning Board process prior to submission to the Board of Health.

14. Per the standard Stormtech construction details, a minimum of 18" is required from the top of the chambers to the bottom of pavement for adequate structural integrity under parking areas. The current proposed design indicates approximately 16" from the top of the chambers of infiltration system "1P" to the top of pavement along the western side of the system.

Response: The plans will be revised to meet the 18-inch cover requirement.

15. The applicant proposes connecting the new drainage system to the existing drainage network on "Lot 3" via a proposed utility easement. The existing drainage network on Lot "3" is connected to the existing drainage system within MassDOT jurisdiction on South Main Steet (Route 114). A DOT Access Permit may be required for the expanded drainage connection. TEC suggests the applicant and DPW engage MassDOT regarding the proposed expanded drainage system interconnection.

Response: We understand the need for a MassDOT access permit which will require submission of drainage calculations to their satisfaction. We are controlling post development rates to pre-development rates.

16. Proposed lighting is indicated on the provided landscape plans, however no photometrics are provided to ensure no light spillage/pollution and conformance with local regulations.

Response: A photometric plan will be supplied to the Board by the Landscape Architect by mid-November. We hope this will provide sufficient time for peer review before the December meeting at which landscaping is scheduled to be reviewed.

17. Lighting plan shows proposed light pole within infiltration system "1P", details on how that would be constructed should be provided.

Response: The system can be interrupted with the use of intermittent end caps. Details will be provided to the Board with the next plan submission.

18. The landscape plan shows a proposed tree within infiltration system "2P." There is also a proposed tree at the southwest corner of the site that is proximate to a proposed area drain and pipe connection.

Response: The tree locations will be adjusted to avoid the infiltration system by the Landscape Architect by mid-November. We hope this will provide sufficient time for peer review before the December meeting at which landscaping is scheduled to be reviewed..

19. The landscape plan proposes plantings within the Boston Street right-of-way adjacent to the proposed entry sign. With regards to ownership of on-going landscape maintenance, TEC suggests proposed landscaping remain outside the public right-of-way.

Response: The planting locations will be adjusted to have all planting within the lot.

20. Is a cross-access easement to be established between the subdivided lots to allow for residential traffic to utilize the South Main Street parking areas and driveway?

Response: Cross easements will be established upon presentation of a recordable subdivision plan to the Zoning Board later in the process.

21. The Applicant should verify the location of bus stops for resident children with the local school district and ensure the location is easily accessible by a school bus.

Response: The bus stop for resident children with the local school district is located less than 200 feet to the west of the site at the intersection of Boston Street and Pleasant Street. The bus stop is serviced by Route # 8 for the Middleton Elementary Schools and Route # 24 for the Masconomet Middle and High Schools."

22. The Applicant shall provide a dedicated plan for all traffic signage and pavement markings to be installed as part of the project. A sign summary shall also be

included which depicts the sign legend, sign size, and sign lettering dimensions in compliance with the *Manual on Uniform Traffic Control Devices (MUTCD)*.

a) This includes the placement of a stop sign and stop lines along the site driveways at its intersection with Boston Street and South Main Street.

b) This includes placement of a stop sign and stop lines along the Boston Street Driveway and its intersection with the main drive aisle leading to Lot 3's surface parking.

c) The Applicant should provide standard details and/or notes that denote the height of traffic signage on-site. Note that the height of some signage will be different than others.

Response: Final plans will include all signage noted above.

23. The proposed site provides for 102 off-street parking spaces. The land use is identified in Bylaw Section 5.1.2. The site would require 120 parking spaces to satisfy the Bylaw. The Applicant has noted a need for relief from parking spaces with 1.7 spaces per unit.

a) Parking demand calculations published by the Institute of Transportation Engineers (ITE) in the most recent industry standard *Parking Generation, 5th Edition* for Land Use Code (LUC) 221 – Multifamily Housing Mid-Rise denote an average peak parking demand of seventy-nine (45) parking spaces needed for sixty (60) units or sixty-eight (68) parking spaces for ninety (90) bedrooms. Parking demand calculations also note an 85th percentile peak parking demand of eighty-nine (89) parking spaces needed for sixty (60) units or seventy-eight (78) parking spaces for ninety (90) bedrooms. Even under the most limited parking demand combination from the ITE publication would suggest the Applicant's parking spot count would be sufficient to meet demand.

Response: We concur with TEC's finding that adequate parking has been provided.

24. Dimensions are provided for a typical parking space on-site in compliance with the Bylaw. In addition, dimensions for the accessible spaces on-site are in compliance with 521 CMR 23.4.1. The Applicant should revise the plans to show accessible signage at the head of each accessible parking space with the associated 'Van Accessible' plaque.

Response: Final plans will include the signage noted above.

25. The plans should be revised to depict both intersection sight distance and stopping sight distance measurements for both directions at Boston Street and South Main Street. Intersection sight distance measurements should be taken from a point 14.5-feet from the proposed edge of travel way on each mainline roadway. The

sheet should denote all areas of clear view and resulting from the sight lines both on the public ROW and land under the control of the Applicant.

Response: Sight distances noted in the Vanasse Associates TIA will be added to the plan as noted with the next plan submission.

26. Concrete sidewalks are provided along Boston Street opposite the site frontage. A proposed sidewalk is shown on-site connecting from the building frontage out to Boston Street and terminating. The location is not ideal for a crosswalk to allow connection to the sidewalk along the northerly side of the roadway. The Applicant should provide a pedestrian connection along the southerly side of Boston Road connecting to the intersection with South Main Street.

Response: Plans will be revised to show a sidewalk along Boston Street. Although not a subject of this application, it is expected that redevelopment of the adjacent commercial property will include extending the sidewalk along the south side of Boston Street, connecting to the existing sidewalks along South Main Street.

27. The Applicant should provide standard details for all accessible ramp types and crosswalks.

Response: Final plans will include these details.

28. The plan does not show electric vehicle charging stations on-site. The Applicant should clarify if spaces on-site will be constructed as EV-compatible or EV-ready.

Response: Building permit application plans will comply with the then-applicable building code requirements for EV spaces.

29. The Applicant shall define the location of resident bicycle storage including weather-protection and security.

Response: Outdoor, open-air bike racks will be added to the plans and submitted to the Zoning Board with the next plan submission.

<u>MassDEP Stormwater Standards</u>

30. Standard 1 (Untreated discharges): No new stormwater conveyance may discharge untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth.

    Standard appears to be met. All stormwater runoff from the site is proposed to be discharged to an existing drainage network within South Main Street. See Standard 4 regarding water quality treatment.

Response: We concur with TEC that the standard is met.

31. Standard 2 (Peak rate control and flood prevention): Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

TEC provides the following comments in relation to Standard 2:

a) The existing watershed analysis map indicates (3) analysis points. The proposed watershed analysis indicates (1) analysis point. The majority of the site runoff has been redirected towards the South Main Street drainage network analysis point, however, there appears to still be a small area of the post development condition which drains towards Boston Street. The watershed maps and analysis should be revised to incorporate the Boston Street analysis point. All (3) analysis points should be indicated in the Stormwater Report discharge rate table. It appears peak flows will likely still be met.

Response: The watershed maps and analysis will be revised to reflect three analysis points in the post-development condition.

b) The HydroCAD analysis indicates the proposed pipe network to an existing drainage manhole will be constructed within 12" reinforced concrete pipe. The outlet of the existing drainage manhole appears to be an 8" cast iron pipe. The analysis should include the existing pipe to ensure the reduction in flow capacity of the 8" pipe will not negatively impact or cause backflow of the proposed stormwater management system for the development.

Response: The analysis will be revised to reflect the 8-inch outlet pipe. The current analysis demonstrates no increase in flow to this pipe in the post-development condition.

c) The plans do not indicate size, material, length, slope, or inverts of the proposed pipe network. Some pipes are included in the HydroCAD analysis. All proposed pipes should be modeled to ensure adequate size and flow capacities for the site. TEC recommends adding all structures and pipes to the HydroCAD model.

Response: This information will be added to the plans and submitted to the Zoning Board with the next plan submission.

d) The HydroCAD model and the plan call outs indicate a total of 192 chambers in infiltration system "1P". It appears there are 191 chambers as (1) chamber appears to have been removed for the inlet of the CB in the northeast corner of the proposed parking area. TEC recommends this CB

be directed the system manifold DMH in the northeast corner of the system, allowing for 192 total chambers.

Response: The plans will be revised as noted.

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

TEC provides the following comments in relation to Standard 3:

a) Per the plan call out for infiltration system "1P", the bottom of the system is 2' above seasonal high groundwater. The system is also used proposed for peak flow attenuation for storms greater than and equal to the 10-year storm, therefore a mounding analysis should be provided.

Response: A mounding analysis will be provided prior to completion of final plans.

b) As mentioned prior, additional test pits should be conducted within the footprint of infiltration systems.

Response: Extensive testing has been performed throughout the site. Hancock is confident suitable soils exist within the proposed infiltration areas. We would ask that the Board consider additional testing be required as a condition of approval and performed prior to the submittal of Final Plan.

c) The checklist indicates that runoff from all impervious areas at the site discharges to infiltration BMPs. There are areas (sidewalks to the north, east, and south of the building; a portion of the driveway draining to Boston Street) which are not conveyed to the proposed infiltration systems. The checklist should be revised.

Response: The recharge calculations will be revised to include capture adjustment for this small area.

d) It appears that required recharge volumes are met.

Response: We concur with TEC' s finding.

33. Standard 4 (80% TSS removal): Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

TEC provides the following comments in relation to Standard 4:

a) It appears that required water quality volumes are met for the (2) infiltration systems.

Response: We concur with TEC' s finding.

b) As mentioned prior, there is a portion of the proposed driveway which discharges to Boston Street. This runoff is not captured and therefore is untreated. The water quality analysis should provide calculations showing that the site averages the required 80% TSS removal for all impervious areas requiring treatment.

Response: We will provide a weighted average of TSS removal of the site to account for this de minimus area that is untreated.

c) The proposed parking area catch basin located in the southwest corner of the site is proposed as an inline structure. Per the Stormwater BMP Handbook, all deep sump catch basins should be off-line structures.

Response: We will revise the plan to correct this issue and provide to the Board with the next plan submission.

d) A Long-Term Pollution Prevention Plan should be provided per the stormwater checklist.

Response: A Long-Term Pollution Prevention Plan will be provided with the Final Plans.

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

Standard does not apply to this proposed project. The checklist should be revised as it indicates the EPA NPDES MSGP covers the land use.

Response: We concur with TEC's finding.

35. Standard 6 (Critical Areas): Stormwater discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or any other critical area require the use of the specific source control and pollution

prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters or Special Resource Waters shall be set back from the receiving water and receive the highest and best practical method of treatment. A "stormwater discharge," as defined in 314 CMR 3.04(2)(a)1. or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to Zone I or Zone A are prohibited unless essential to the operation of the public water supply.

Standard does not apply to this proposed project.

Response: We concur with TEC's finding.

36. Standard 7 (Redevelopment). A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met, and the project shall improve existing conditions.

Standard does not apply to this proposed project.

Response: We concur with TEC's finding.

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

TEC provides the following comments in relation to the Standard 8:

a) No construction period pollution prevention and erosion and sediment control plan is provided with information as required per the stormwater checklist. The plan should also include any additional information as required by the Middleton local stormwater management regulations.

Response: A SWPPP Plan will be added to the plan set and provided to the Board with the next plan submission.

b) No construction period controls are indicated on the plans.

Response: A SWPPP Plan with details will be added to the plan set and provided to the Board with the next plan submission.

c) The project will be required to obtain coverage under the EPA NPDES CGP as it will disturb over an acre. This will require the development of a SWPPP

as indicated on the stormwater checklist. If the project were to be approved, TEC recommends this be added as a condition of approval.

Response: We concur with TEC's finding.

38. Standard 9 (Operation and Maintenance): A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed.

    Standard appears to be met. The operation and maintenance plan should be revised to indicate that local police and fire will also be notified of any potential spills per the Middleton local stormwater management regulations. Based on the Massachusetts Stormwater Handbook the operation and maintenance plan should include mosquito control for subsurface infiltration systems.

Response: The O & M will be revised as noted.

39. Standard 10 (Illicit Discharges): All illicit discharges to the stormwater management system are prohibited.

    Standard appears to be met. Measures for the prevention of illicit discharges are provided within the Long-Term Operation and Maintenance Plan. No illicit discharge compliance statement is provided, and the report indicates one will be provided prior to discharge of stormwater to post construction BMPs. If the project were to be approved, TEC recommends this be added as a condition of approval.

Response: We concur with TEC's suggestion.

Responses to the Traffic Impact Assessment comments will be provided by VAI under separate cover prior to the November 16th meeting of the ZBA.

We look forward to working with TEC and the Board as the process continues.

Sincerely,

Hancock Associates

Acting On Behalf of Villebridge Acquisitions LLC

Joseph D. Peznola, P.E.

Director of Engineering

Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810

Ref: 9301

November 7, 2023

Mr. Richard Benevento, Chair
Zoning Board of Appeals
Town of Middleton
195 North Main Street
Middleton, MA 01949

Re: Response to Traffic Engineering Peer Review #1
Proposed Residential Development – 10 Boston Street (Route 62)
Middleton, Massachusetts

Dear Chair Benevento and Members of the Zoning Board of Appeals:

Vanasse & Associates, Inc. (VAI) is providing responses to the comments that were raised in the October 12, 2023 *Civil Engineering and Traffic Engineering Peer Review #1* letter prepared by The Engineering Corporation (TEC) concerning their review of the materials that have been submitted in support the proposed residential development to be located at 10 Boston Street (Route 62) in Middleton, Massachusetts (hereafter referred to as the "Project"). Specifically, we are responding to Comment No.'s 40 through 55 which pertain to the August 2023 *Transportation Impact Assessment* (the "August 2023 TIA") that was prepared by VAI in support of the Project. Responses to Comment No.'s 1 through 39 will be provided by others under separate cover. Listed below are the comments that were identified by TEC in the subject letter that pertain to the August 2023 TIA followed by our response on behalf of the Project proponent.

Traffic Impact Assessment Comments

Comment 40: *The Transportation Impact Assessment (TIA) indicates driveway related trips accessing directly to/from South Main Street, signed as Route 114, which is under the jurisdiction of the Massachusetts Department of Transportation (MassDOT). The Applicant should consult with MassDOT for the Permit to Access State Highway.*

Response: The Applicant has consulted with MassDOT during the preparation of the August 2023 TIA and will apply for a State Highway Access Permit at the conclusion of the local approval process.

Comment 41: *The TIA indicates that the overall subdivision project is directly associated with an abutting commercial development on "Lot 3" of the subdivision at the South Main Street/ Boston Street/Town Hall Driveways intersection corner. TEC notes that the Board should take this into consideration for conditions on any approval that the overall traffic impact of the several lots should be evaluated without segmentation as traffic impacts will be compounded with each part of the development process. This may result in any off-site mitigation being pushed to a subsequent development phase once the compounded impact, if any, becomes a further hinderance to traffic operations and safety.*

Response: The Project is not associated with or dependent upon further development on the abutting property referred to "Lot 3". If and when a development proposal is advanced for "Lot 3", the development will be the subject of a future application to be filed with the Town. That being said and as detailed in the August 2023 TIA, trips associated with a potential future development on "Lot 3" have been considered and are included in the 2030 No-Build and 2030 Build condition traffic volumes. As such, the cumulative impact of the Project and the potential development of "Lot 3" have been considered in the August 2023 TIA and the elements of the transportation improvement program as they relate to the Project reflect the measures that are required to off-set the impact of the Project.

Comment 42: *The TIA included the following intersections within the study area:*

- *South Main Street (Route 114) / Boston Street (Route 62) / Town Hall Driveways*
- *South Main Street (Route 114) / Maple Street (Route 62)*
- *North Main Street (Route 114) / South Main Street (Route 114) / Central Street / Lake Street*
- *South Main Street (Route 114) / Orchard Circle*

TEC generally concurs with the scope of the study area intersections based on the Massachusetts Department of Transportation (MassDOT) Traffic Impact Assessment (TIA) Guidelines (Section 3.I.C) to evaluate intersections in which the site-generated trips increase the peak hour traffic volume by more than 5 percent and/or by more than 100 new vehicles per hour. Note that based on the compounding of development area with Lot 3, the study area in subsequent traffic studies for Lot 3 may need to the expanded.

Response: As stated previously, the Project is not associated with or dependent upon further development on the abutting property referred to "Lot 3". If and when a development proposal is advanced for "Lot 3", the development will be the subject of a future application to be filed with the Town that will include a TIA prepared for the then proposed development.

Comment 43: *Existing traffic volumes at the study area intersections were collected May 2022 while area schools were in general session. TEC concurs with the usage of existing traffic volumes.*

Response: No response required.

Comment 44: *The TIA evaluates traffic volumes for a COVID adjustment comparing May 2022 traffic volumes at the nearest permanent count station along Interstate 95. The TIA does note, with which TEC agrees, that MassDOT no longer requires COVID adjustments following March 2022 unless the predominant land uses in the area is office. The COVID adjustment institutes an 8.8 percent upward increase in traffic volumes from May 2022 taking into account that seasonally, traffic volumes in May 2022 are 5.3 percent higher than average-month conditions. Existing traffic volumes were further increased to a 2023 condition utilizing a year-over-year background growth rate. TEC generally concurs that this methodology results in a conservative scenario for traffic volumes in the area.*

Response: No response required.

Comment 45: *The TIA presents motor vehicle crash data for each of the study area intersections. The crash data indicates the number, type, and severity of crashes at the study area intersections between 2016 and 2020 obtained from MassDOT's IMPACT crash portal. The TIA notes that several study area intersections experience crash rates below statewide and district wide averages with the exception to the intersection of South Main Street / Maple Street which experiences a rate well above those respective averages. The intersection is also designated as HSIP-eligible which represents a top 5 percent crash location in the region. The Applicant has noted commitment to implement safety-related improvements at this location further described in this review letter.*

Response: No response required.

Comment 46: *The TIA references a 1.5% growth rate on traffic volumes per year (compounded) based on the growth of traffic of several roadways in the vicinity from 2009 to 2018 (prior to COVID). TEC generally concurs that the growth rate of 1.5% as used by the TIAS.*

Response: No response required.

Comment 47: *The TIA documents five (5) specific developments by others which are anticipated to contribute additional traffic to the study area which are not accounted for in the March 2022 traffic counts. In addition, the TIA also projects traffic for the abutting subdivided lot as expected to contain a 5,000 square foot (SF) bank and an 8,000 SF coffee shop, restaurant, or pharmacy with drive-through; however, the TIA has projected traffic related to this abutting lot as separate from the subject project described in this TIA and included the traffic in both the No-Build and Build conditions. TEC disagrees that traffic related to Lot 3 should be assessed in the No-Build condition as it is directly related to subject residential project by subdivision. Its inclusion may affect the Build to No-Build comparison of traffic impacts from the subject project. TEC recommends that the Board identify a condition of approval that requires the Applicant, or future Applicant, to assess traffic for Lot 3 in its separate traffic study based on the site's segmentation; thereby, reassessing the residential development in conjunction with the commercial space of Lot 3 for the overall project subdivision's impact.*

Response: As stated previously, the Project is not associated with or dependent upon further development on the abutting property referred to "Lot 3". If and when a development proposal is advanced for "Lot 3", the development will be the subject of a future application to be filed with the Town that will include a TIA prepared for the then proposed development. Accordingly, consideration of the trips associated with a potential future development on "Lot 3" in the 2030 No-Build and 2030 Build condition traffic volumes is appropriate and follows accepted practices. This approach allows for the cumulative impact of the Project and potential future development, including a development on "Lot 3", to be considered and that the improvement measures that are identified as a result of this analysis are defined to address the incremental impact of the Project.

Comment 48: *Site trip generation calculations for the proposed residential development were generated based on standard trip rates published in the Institute of Transportation Engineers (ITE) publication Trip Generation, 11th Edition for Land Use Code (LUC) 220 – Multifamily Housing Low-Rise. Overall, the residential project is anticipated to result in 460 new vehicle trips on a typical weekday with 41 new vehicle trips during the weekday morning peak hour, 46 new vehicle trips during the weekday evening peak hour, and 25 new vehicle trips during the Saturday midday peak hour. The TIA identifies that trips were distributed on the roadway network based on US Census Journey to Work Data. This data is not provided in the TIA Appendix and the trip distribution cannot be verified.*

Response: The Journey-to-Work trip distribution data is attached.

Comment 49: *Values within Table 6 – Peak Hour Traffic Volume Increases appear to be duplicated from 2030 No-Build to 2030 Build along South Main Street, south of Orchard Circle. Please adjust accordingly.*

Response: Table 6 (now Table 6R) has been updated to reflect the correct traffic volumes for South Main Street, south of Orchard Circle, and is attached.

Comment 50: *TEC agrees with the TIA that the projected site-specific traffic volumes are not expected to result in any significant change at the various study area intersections. TEC reiterates the recommendation for assessing traffic for Lot 3 in its separate traffic study based on the site's segmentation.*

Response: See response to Comment 47.

Comment 51: *The capacity and queue analysis indicates that the queues along Boston Street would extend back to the location of the proposed site driveway. This is likely to be exacerbated as the queue for the Boston Street eastbound left-turn lane already exceeds the storage length of the lane provided where the Synchro software is not taking into account the actual storage length of the lane. The blockage of the site driveway may result in vehicles attempting to turn left into the site to be blocked and themselves block westbound traffic along Boston Street. Although a left-turn lane for this location may not be warranted, the Applicant should evaluate the need for a left-turn lane under the full build-out condition with Lot 3 to account for any need for this lane in the future (more through traffic on Boston Street). Furthermore, the Applicant should provide recommendations to reduce the likelihood of driveway blockage along Boston Street.*

Response: A left-turn lane warrants analysis was conducted for the Boston Street westbound approach to the Project site driveway under 2030 Build conditions, which includes trips associated with the potential future "Lot 3" development. The analysis was performed in accordance with the methodology and procedures outlined in *NCHRP Report 457*[1] published by the National Cooperative Highway Research Program (NCHRP).

[1] *NCHRP Report 457 – Evaluating Intersection Improvement: An Engineering Study Guide*, National Cooperative Highway Research Program; 2001.

Determination of the need for a left-turn lane of adequate storage length is a function of the volume of left-turning vehicles at the intersection under study and the magnitude of opposing or conflicting traffic volumes along the roadway. Based on a review of these criteria under 2030 Build traffic volume conditions, provision of a left-turn lane on the Route 62 westbound approach to the Project site driveway is not warranted. As such and to the extent desired by the Town, the Applicant will install "Do Not Block" signs and accompanying pavement marking on Route 62 at the Project site driveway subject to receipt of all necessary rights, permits and approvals. The detailed left-turn lane warrants analysis is attached.

Comment 52: *Similarly, the project projects a significant number of left turns into the South Main Street Driveway from the south. The Applicant should provide a left-turn warrant analysis for this location with and without the full build-out of Lot 3.*

Response: A left-turn lane warrants analysis was conducted for the Route 114 northbound approach to the Project site driveway under 2030 Build conditions with and without the potential future "Lot 3" development. When conducting the requested analysis, it was noted that the traffic volumes that were assigned to the Route 114 Project site driveway included trips associated with the Project only and did not include trips associated with the potential future "Lot 3" development. This oversight only applied to the Route 114 Project site driveway and not to the remaining study area intersections or the roadway segments approaching or departing the intersections. The corrected 2023 Build condition traffic volume networks are attached (Figures 13R, 14R and 15R) and Table 10 (now Table 10R) has been updated to reflect the corrected traffic operations analysis for the Route 114/Project site driveway intersection. Again, this correction did not affect the traffic operations analysis for the remaining study area intersections.

Based on a review of the applicable criteria to establish the need for a left-turn lane of adequate storage length on the Route 114 northbound approach to the Project site driveway, provision of a left-turn lane was found to be warranted under 2030 Build traffic volume conditions with (attached Figures 13R, 14R and 15R) or without (attached Figures 16, 17 and 18) the potential future "Lot 3" development.

As such and subject to receipt of all necessary rights, permits and approvals, the Applicant will restripe the left-turn/through lane on the Route 114 northbound approach to Boston Street to extend the two (2) lane northbound section to the Project site driveway.

Comment 53: *TEC agrees that stopping sight distance (SSD) measurements meet the minimum thresholds for the 85th percentile speeds as identified by the project's ATR counts. Intersection sight distance (ISD) looking east from the Boston Street Driveway is close to the AASHSTO minimum and below the desired sight line. The Applicant shall ensure that the site frontage remains clear of obstructions so that this ISD is maintained following construction.*

Response: The Applicant will accept a Condition of Approval stating that the Project site frontage along Boston Street (Route 62) remains clear of obstructions that would inhibit sight line consistent with the sight line maintenance recommendations of the August 2023 TIA.

Comment 54: *The Applicant has noted that it is committed to the following recommended off-site measures:*

a) Traffic signal timing / phasing adjustments prior to the Certificate of Occupancy and at an 80-percent occupancy level for the South Main Street / Boston Street / Town Hall Driveway intersection, the South Main Street / Maple Street intersection and the North Main Street / South Main Street / Lake Street / Central Street intersection.

b) Facilitation of a Road Safety Audit (RSA) at the intersection of South Main Street / Maple Street. The Applicant should provide information as to what, if any, improvements identified in the RSA would be implemented as part of off-site mitigation.

Response: The Applicant has committed to funding the preparation of the RSA only.

Comment 55: *The Applicant should indicate if additional Transportation Demand Management (TDM) measures will be incorporated into the site, such as electric vehicle charging stations, preferential parking, parking for ride-hailing, or parking for delivery vehicles.*

Response: The Applicant will provide Electric vehicle (EV) charging stations to the extent required under the Zoning Bylaws of the Town.

We trust that this information is responsive to the comments that were identified in the October 12, 2023 letter prepared by TEC concerning their review of the August 2023 TIA. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact me.

Sincerely,

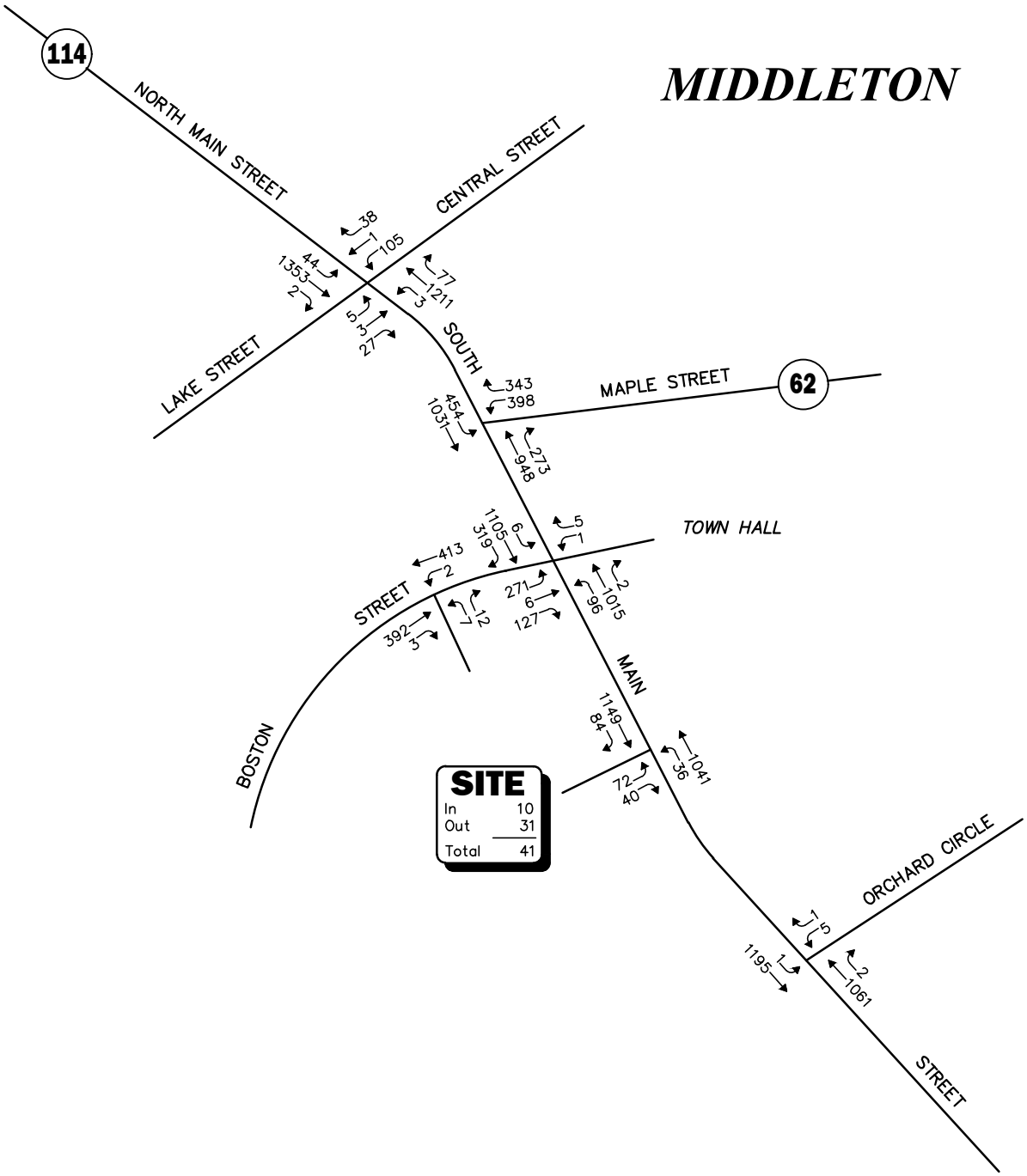
VANASSE & ASSOCIATES, INC.

Jeffrey Dirk

Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

Professional Engineer in CT, MA, ME, NH, RI, and VA

Attachments

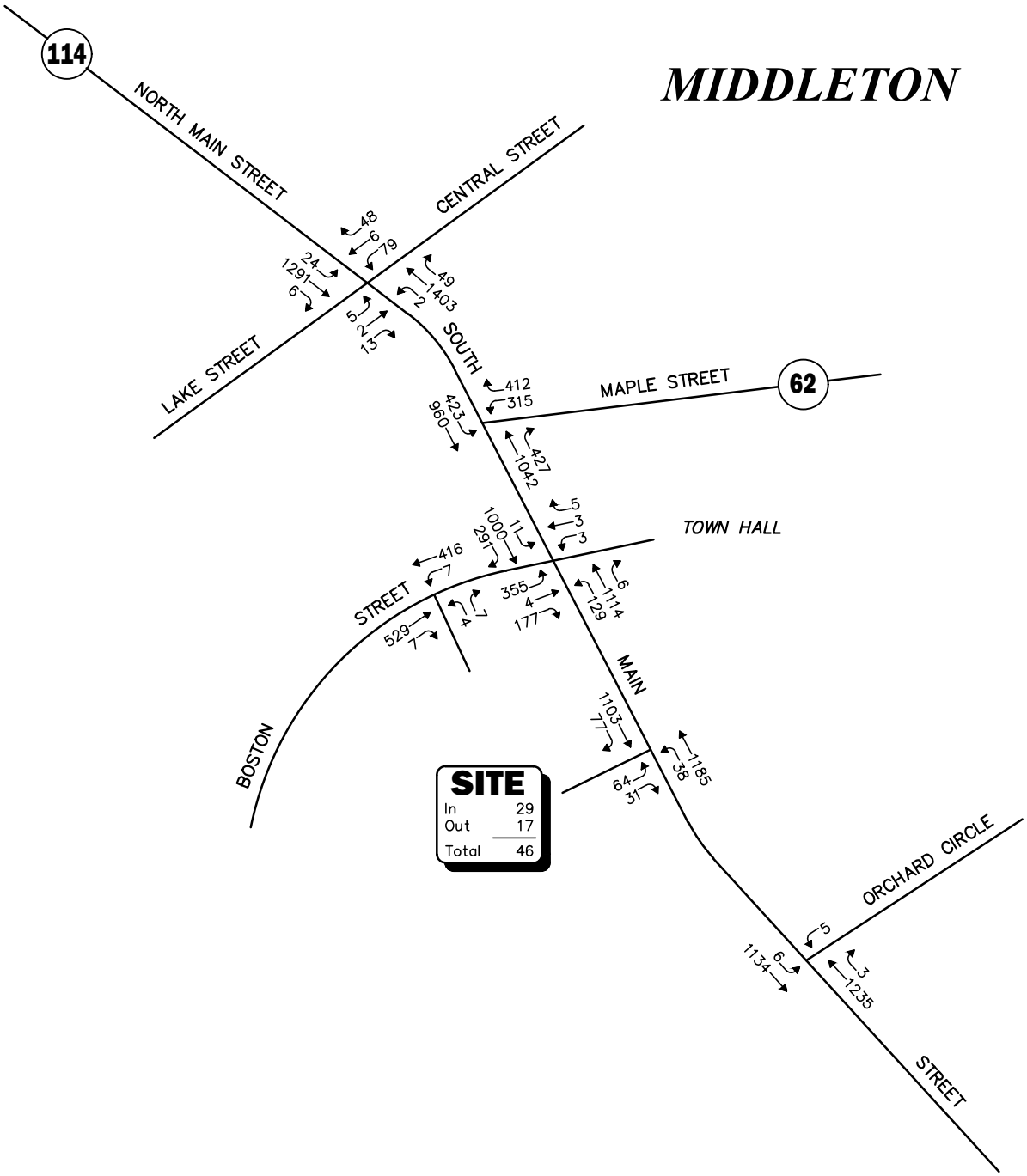


Not To Scale

Figure 13R

2030 Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc

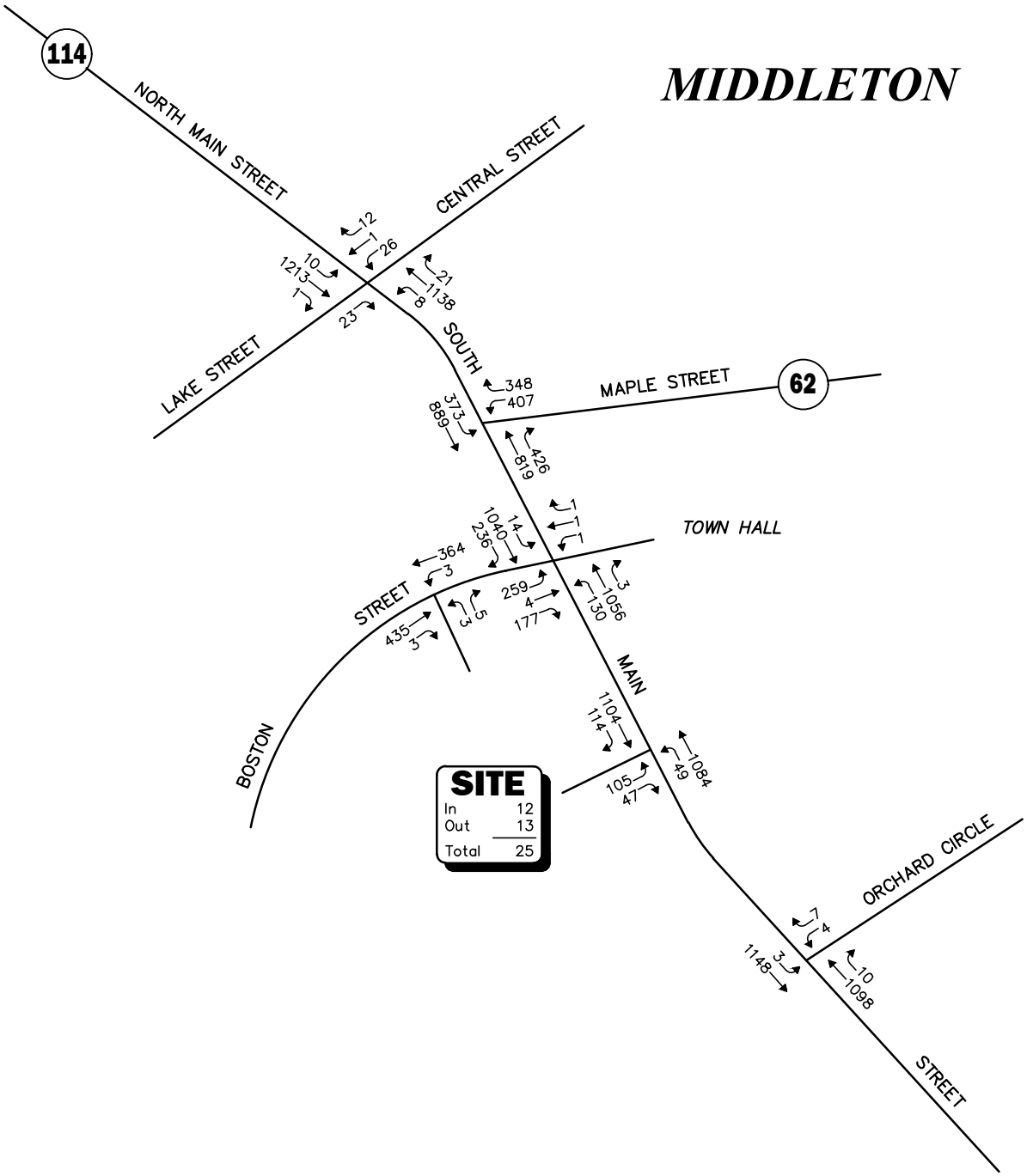


Not To Scale

Figure 14R

2030 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

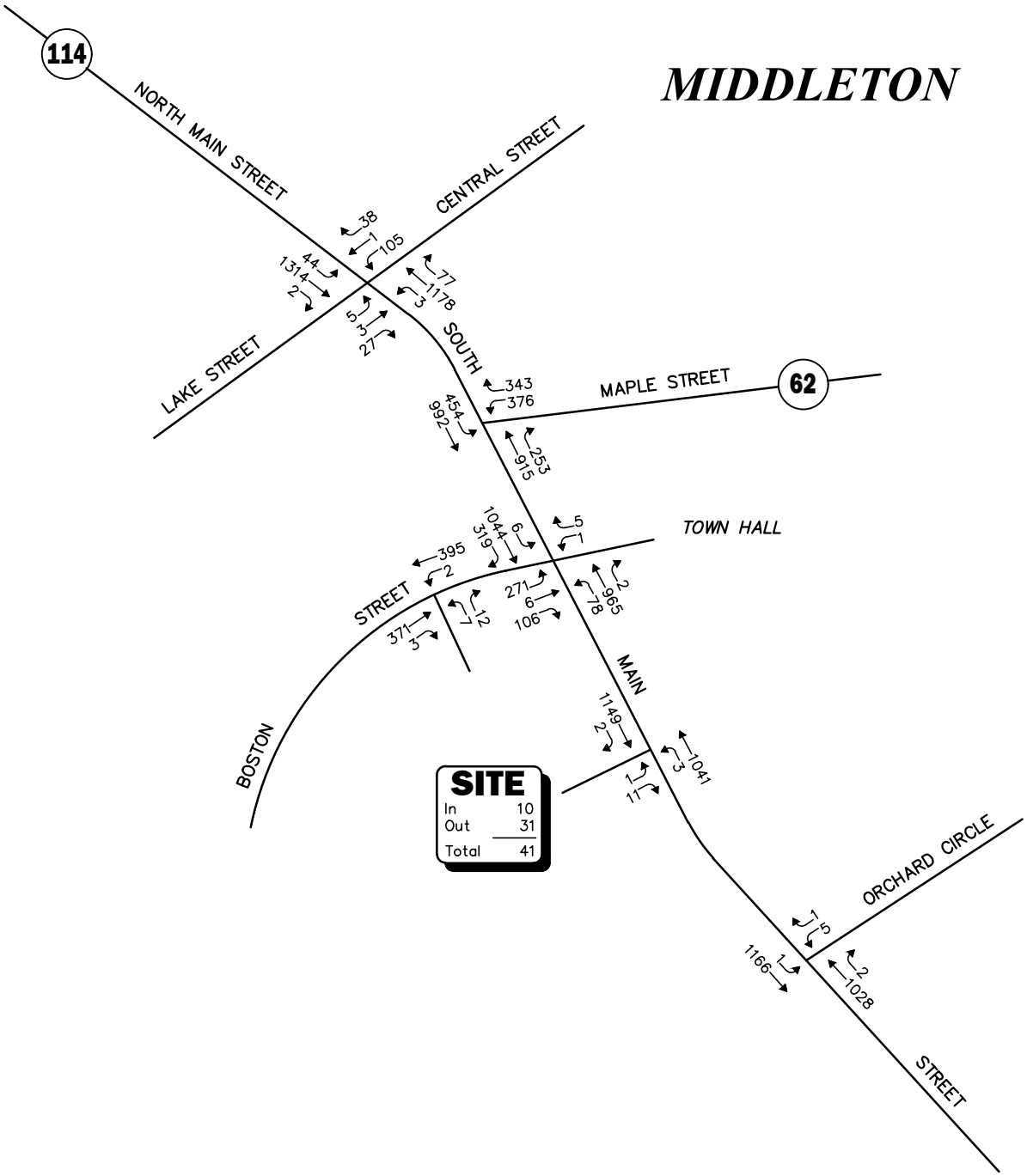


Not To Scale

Figure 15R

2030 Build
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc

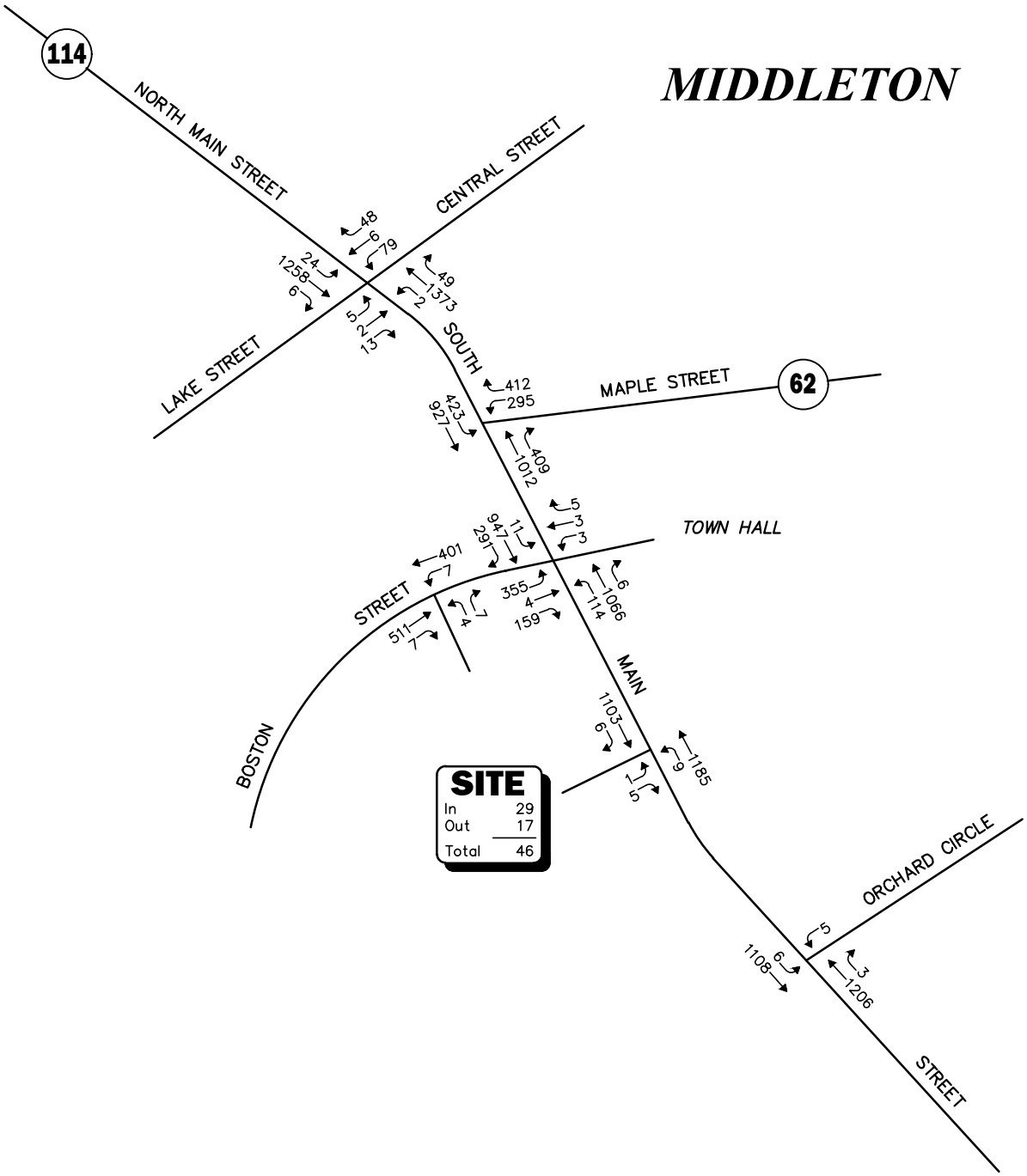


Not To Scale

Figure 16

2030 Build
Weekday Morning
Peak-Hour Traffic Volumes
(Without Lot 3 Traffic)

Vanasse & Associates inc

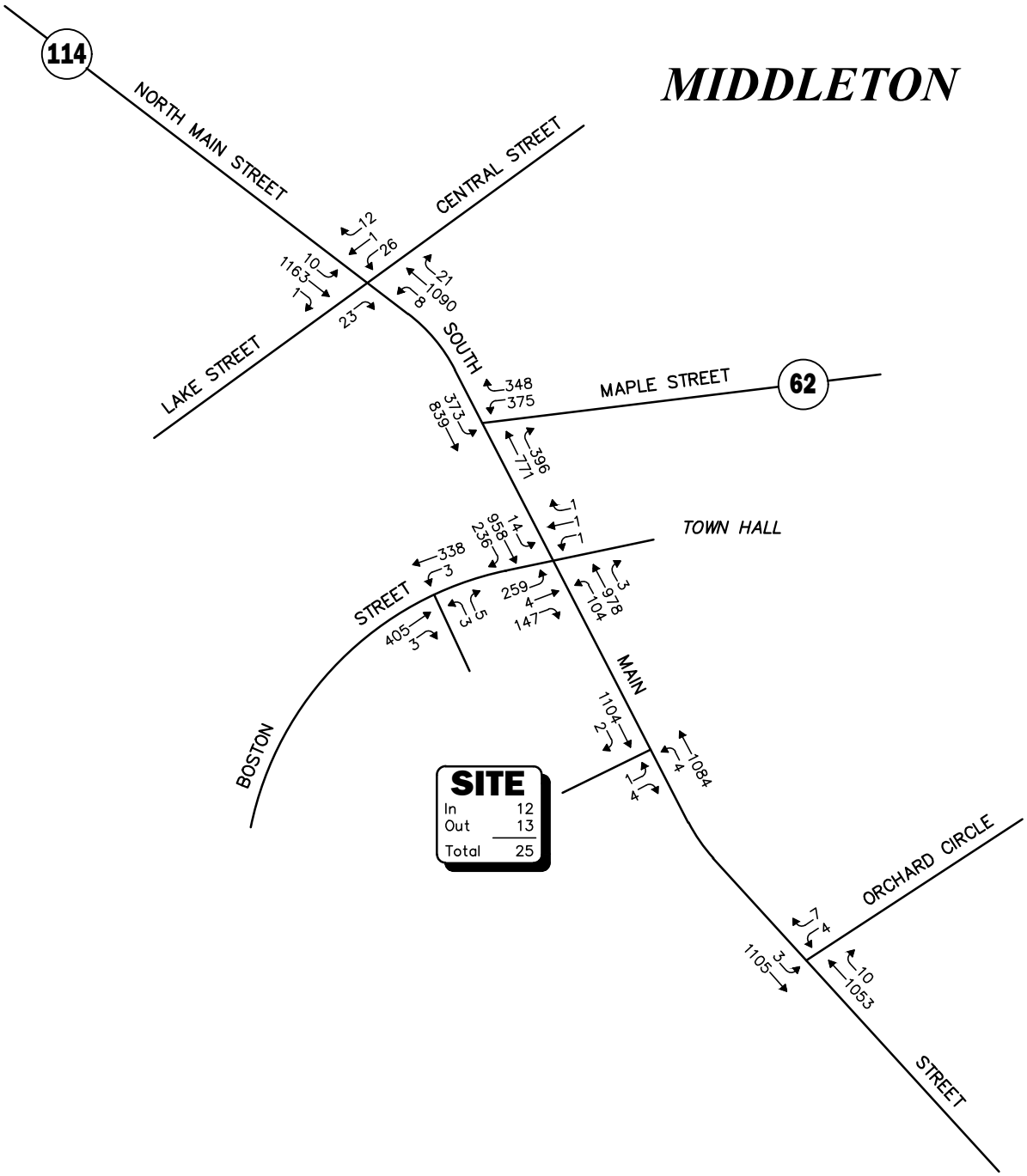


Not To Scale

Figure 17

2030 Build
Weekday Evening
Peak-Hour Traffic Volumes
(Without Lot 3 Traffic)

Vanasse & Associates inc



Not To Scale

Figure 18

2030 Build
Saturday Midday
Peak-Hour Traffic Volumes
(Without Lot 3 Traffic)

Vanasse & Associates inc

ATTACHMENTS

TABLES 6R AND 10R
JOURNEY TO WORK TRIP DISTRIBUTION
CAPACITY ANALYSIS RESULTS
LEFT-TURN LANE WARRANTS ANALYSIS

TABLES 6R AND 10R

Table 6R
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak Hour	2023 Existing	2030 No-Build	2030 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
North Main Street, north of Central Street:					
Weekday Morning	2,250	2,647	2,653	6	0.2
Weekday Evening	2,366	2,769	2,777	8	0.3
Saturday Midday	2,004	2,370	2,374	4	0.2
Maple Street, east of South Main Street:					
Weekday Morning	1,244	1,459	1,468	9	0.6
Weekday Evening	1,353	1,567	1,577	10	0.6
Saturday Midday	1,327	1,549	1,554	5	0.3
South Main Street, south of Orchard Circle:					
Weekday Morning	1,835	2,247	2,263	16	0.7
Weekday Evening	1,959	2,360	2,377	17	0.7
Saturday Midday	1,891	2,250	2,260	10	0.4
Boston Street, west of Project site driveway:					
Weekday Morning	650	805	815	10	1.2
Weekday Evening	776	945	956	11	1.2
Saturday Midday	648	799	805	6	0.8

Table 10R
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

	2023 Existing				2030 No-Build				2030 Build			
Unsignalized Intersection/Peak-hour/Movement	Demand[a]	Delay[b]	LOS[c]	Queue[d] 95th	Demand	Delay	LOS	Queue 95th	Demand	Delay	LOS	Queue 95th
Boston Street at the Project Site Driveway												
Weekday Morning:												
Boston Street EB TH/RT	--	--	--	--	--	--	--	--	395	0.0	A	0
Boston Street WB LT/TH	--	--	--	--	--	--	--	--	415	0.0	A	0
Project Site Driveway NB LT/RT	--	--	--	--	--	--	--	--	19	13.2	B	0
Weekday Evening:												
Boston Street EB TH/RT	--	--	--	--	--	--	--	--	536	0.0	A	0
Boston Street WB LT/TH	--	--	--	--	--	--	--	--	423	0.1	A	0
Project Site Driveway NB LT/RT	--	--	--	--	--	--	--	--	11	15.0	C	0
Saturday Midday:												
Boston Street EB TH/RT	--	--	--	--	--	--	--	--	438	0.0	A	0
Boston Street WB LT/TH	--	--	--	--	--	--	--	--	367	0.1	A	0
Project Site Driveway NB LT/RT	--	--	--	--	--	--	--	--	8	13.2	B	0
South Main Street at the Project Site Driveway												
Weekday Morning:												
Project Site Driveway EB LT/RT	--	--	--	--	--	--	--	--	112	>50.0	F	14
South Main Street NB LT/TH	--	--	--	--	--	--	--	--	1,077	0.4	A	0
South Main Street SB TH/RT	--	--	--	--	--	--	--	--	1,233	0.0	A	0
Weekday Evening:												
Project Site Driveway EB LT/RT	--	--	--	--	--	--	--	--	95	>50.0	F	13
South Main Street NB LT/TH	--	--	--	--	--	--	--	--	1,223	0.4	A	0
South Main Street SB TH/RT	--	--	--	--	--	--	--	--	1,180	0.0	A	0
Saturday Midday:												
Project Site Driveway EB LT/RT	--	--	--	--	--	--	--	--	151	>50.0	F	20
South Main Street NB LT/TH	--	--	--	--	--	--	--	--	1,133	0.5	A	1
South Main Street SB TH/RT	--	--	--	--	--	--	--	--	1,218	0.0	A	0

[a]Volume-to-capacity ratio.
[b]Control (signal) delay per vehicle in seconds.
[c]Level of service.
[d]Queue length in vehicles.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements

JOURNEY TO WORK TRIP DISTRIBUTION

Proposed Mixed-Use Development
Middleton, Massachusetts

Residence	Workplace	Number	Route 114 (North)		Route 114 (South)		Elm Street (West)		Maple Street (East)		Boston Street (South)	
Middleton town	Middleton town, MA	541	28%	151	31%	168	4%	22	19%	103	11%	60
Middleton town	Danvers town, MA	480		0	50%	240		0	50%	240		0
Middleton town	Boston city, MA	265		0	50%	133		0		0	50%	133
Middleton town	Lynn city, MA	253		0	50%	127		0		0	50%	127
Middleton town	Peabody city, MA	215		0	100%	215		0		0		0
Middleton town	Lawrence city, MA	188	100%	188		0		0		0		0
Middleton town	Beverly city, MA	162		0	50%	81		0	50%	81		0
Middleton town	Waltham city, MA	119		0		0		0		0	100%	119
Middleton town	Salem city, MA	108		0	100%	108		0		0		0
Middleton town	Ipswich town, MA	104		0	40%	42		0	60%	62		0
Middleton town	Newburyport city, MA	80		0		0		0	100%	80		0
Middleton town	Wilmington town, MA	76		0		0	100%	76		0		0
Middleton town	Woburn city, MA	75		0		0	40%	30		0	60%	45
Middleton town	Andover town, MA	69	75%	52		0		0		0		0
Middleton town	North Andover town, MA	60	75%	45		0		0		0		0
Middleton town	Malden city, MA	59		0	100%	59		0		0		0
Middleton town	Burlington town, MA	55		0		0	60%	33		0	40%	22
Middleton town	Boxford town, MA	53		0	33%	17		0	34%	18		0
Middleton town	Chelsea city, MA	53		0	75%	40		0		0	25%	13
Middleton town	Everett city, MA	49		0	60%	29		0		0	40%	20
Middleton town	Wakefield town, MA	46		0	25%	12		0		0	75%	35
Middleton town	Framingham town, MA	44		0	30%	13	30%	13		0	40%	18
Middleton town	Westford town, MA	43	50%	22		0	50%	22		0		0
Middleton town	Portsmouth city, NH	38		0		0		0	100%	38		0
Middleton town	North Reading town, MA	35		0		0	40%	14		0	30%	11
Middleton town	Seabrook town, NH	35		0	25%	9		0	75%	26		0
Middleton town	New Bedford city, MA	34		0	45%	15		0		0	55%	19
Middleton town	Georgetown town, MA	31		0		0		0	100%	31		0
Middleton town	Cambridge city, MA	28		0	40%	11		0		0	60%	17
Middleton town	Randolph town, MA	28		0	40%	11		0		0	60%	17
Middleton town	Kittery town, ME	27		0		0		0	100%	27		0
Middleton town	Saugus town, MA	26		0	60%	16		0		0	40%	10
Middleton town	Topsfield town, MA	26		0	50%	13		0	50%	13		0
Middleton town	Newbury town, MA	25		0		0		0	100%	25		0
Middleton town	Wellesley town, MA	25		0	20%	5	30%	8		0	50%	13
Middleton town	Westwood town, MA	25		0		0		0		0	100%	25
		3,580		458		1,363		217		744		700
				12.8%		38.1%		6.1%		20.8%		19.6%
		SAY		13%		38%		5%		21%		19%

CAPACITY ANALYSIS WORKSHEETS

Intersection	
Int Delay, s/veh	60.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	40	36	1041	1149	84
Future Vol, veh/h	72	40	36	1041	1149	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	78	43	39	1132	1249	91

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2505	1295	1340	0	-	0
Stage 1	1295	-	-	-	-	-
Stage 2	1210	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 31	198	514	-	-	-
Stage 1	257	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 25	198	514	-	-	-
Mov Cap-2 Maneuver	~ 25	-	-	-	-	-
Stage 1	205	-	-	-	-	-
Stage 2	282	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	1303.7	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	514	-	36	-	-
HCM Lane V/C Ratio	0.076	-	3.382	-	-
HCM Control Delay (s)	12.6	$	1303.7	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.2	-	14	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	57.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	64	31	38	1185	1103	77
Future Vol, veh/h	64	31	38	1185	1103	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	70	34	41	1288	1199	84

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2611	1241	1283	0	-	0
Stage 1	1241	-	-	-	-	-
Stage 2	1370	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 27	213	541	-	-	-
Stage 1	273	-	-	-	-	-
Stage 2	236	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 20	213	541	-	-	-
Mov Cap-2 Maneuver	~ 20	-	-	-	-	-
Stage 1	200	-	-	-	-	-
Stage 2	236	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	1499.3	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	541	-	28	-	-
HCM Lane V/C Ratio	0.076	-	3.688	-	-
HCM Control Delay (s)	12.2	$	1499.3	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.2	-	12.5	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	143.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	104	47	49	1084	1104	114
Future Vol, veh/h	104	47	49	1084	1104	114
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	51	53	1178	1200	124

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2546	1262	1324	0	-	0
Stage 1	1262	-	-	-	-	-
Stage 2	1284	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 30	207	522	-	-	-
Stage 1	266	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 21	207	522	-	-	-
Mov Cap-2 Maneuver	~ 21	-	-	-	-	-
Stage 1	188	-	-	-	-	-
Stage 2	260	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 2367.3	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	522	-	29	-	-
HCM Lane V/C Ratio	0.102	-	5.66	-	-
HCM Control Delay (s)	12.7	$	2367.3	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.3	-	20	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

LEFT-TURN LANE WARRANTS ANALYSIS

Route 62 at the Project Site Driveway
Route 114 at the Project Site Driveway

Route 62 at the Project Site Driveway

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

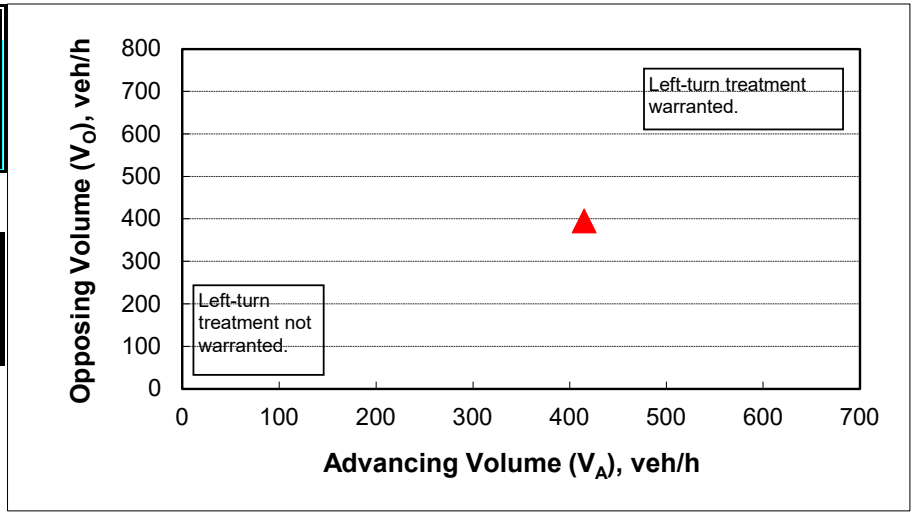
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	34
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	415
Opposing volume (V_O), veh/h:	395

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1718
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

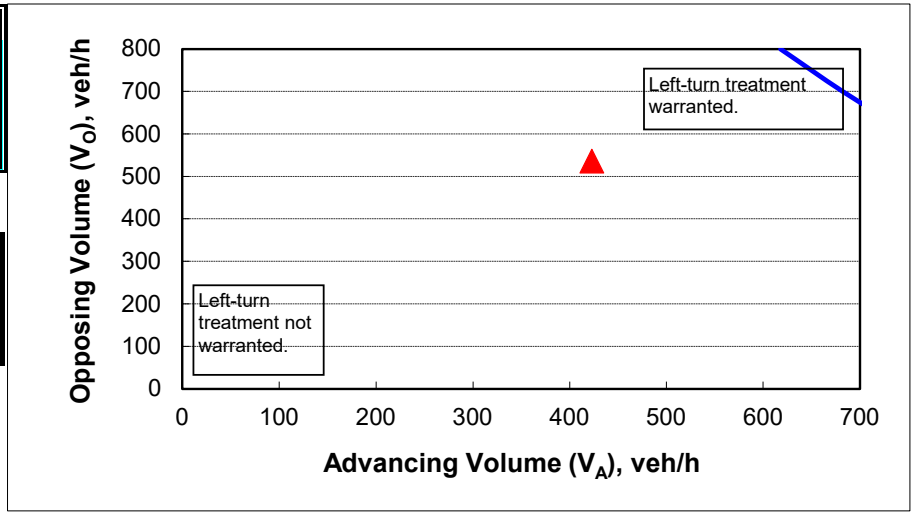
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	34
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	423
Opposing volume (V_O), veh/h:	536

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	805
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

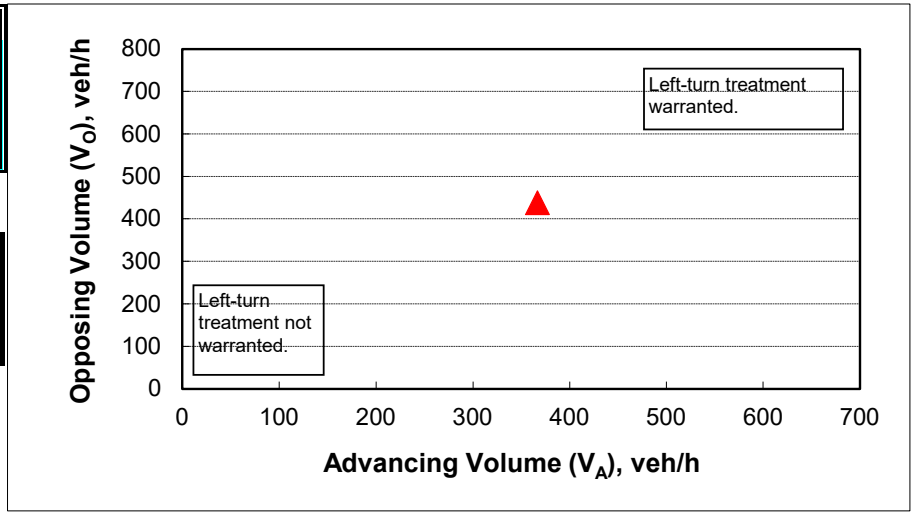
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	34
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	367
Opposing volume (V_O), veh/h:	438

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1258
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

Route 114 at the Project Site Driveway

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

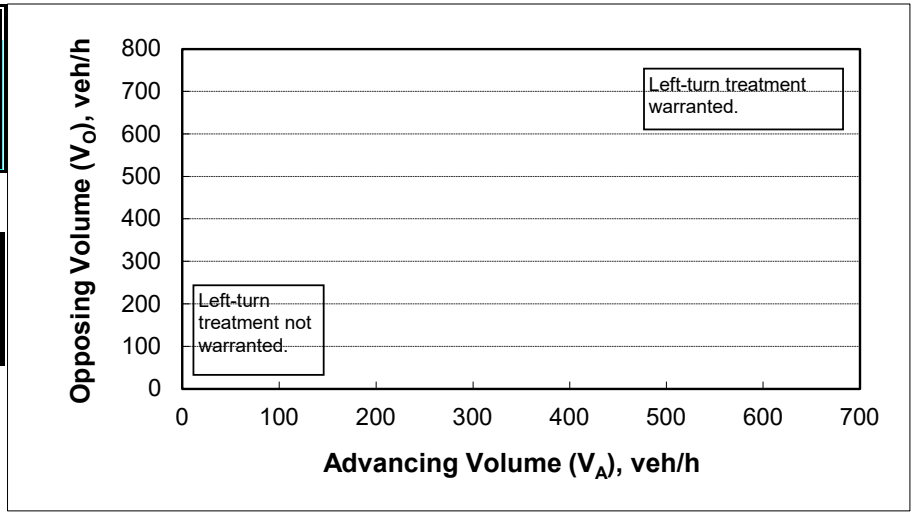
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	42
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	1044
Opposing volume (V_O), veh/h:	1151

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	953
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

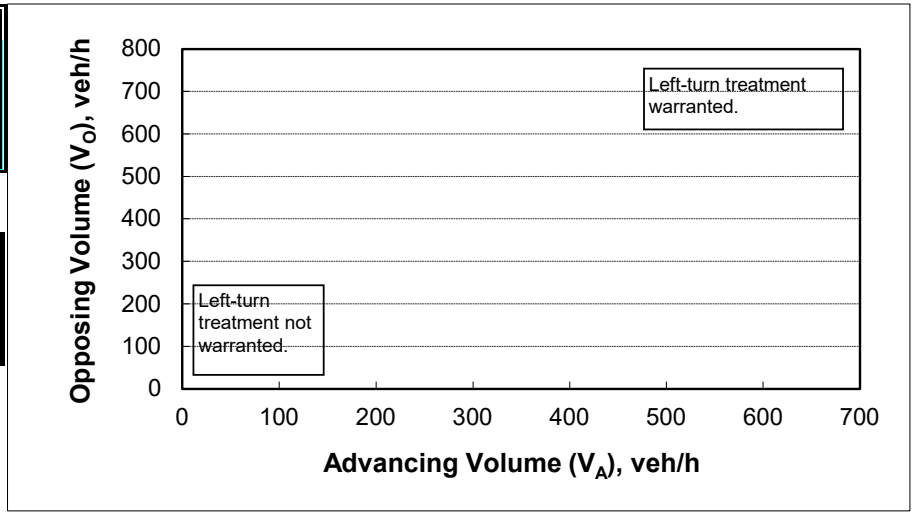
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	42
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	1194
Opposing volume (V_O), veh/h:	1109

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	614
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

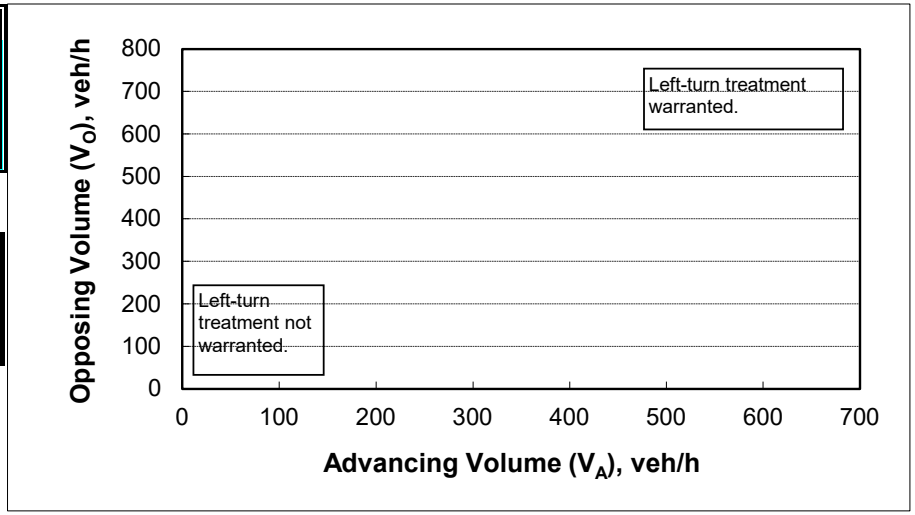
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	42
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	1088
Opposing volume (V_O), veh/h:	1106

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	880
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

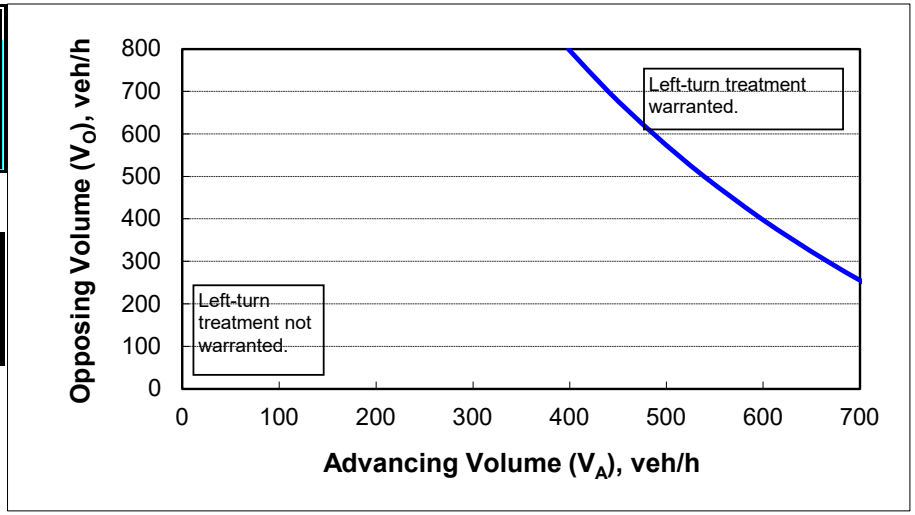
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	42
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	1077
Opposing volume (V_O), veh/h:	1233

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	263
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

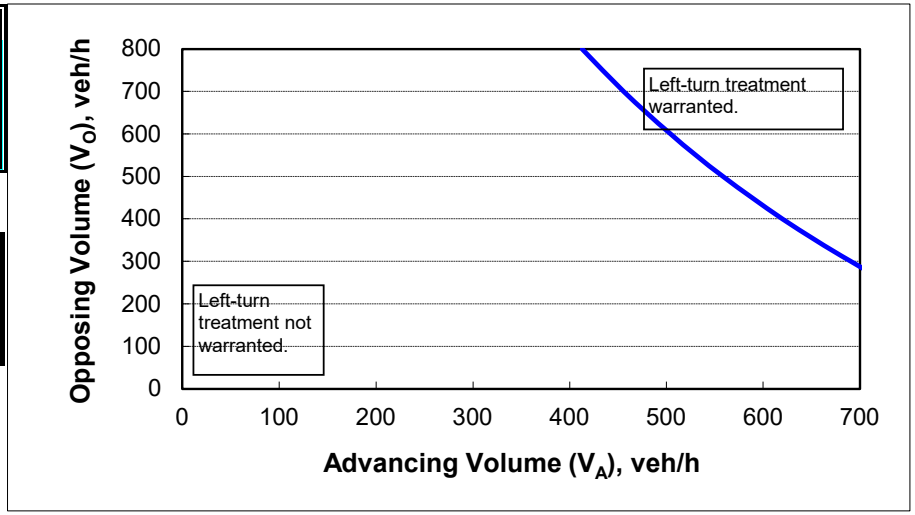
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	42
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	1223
Opposing volume (V_O), veh/h:	1180

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	286
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

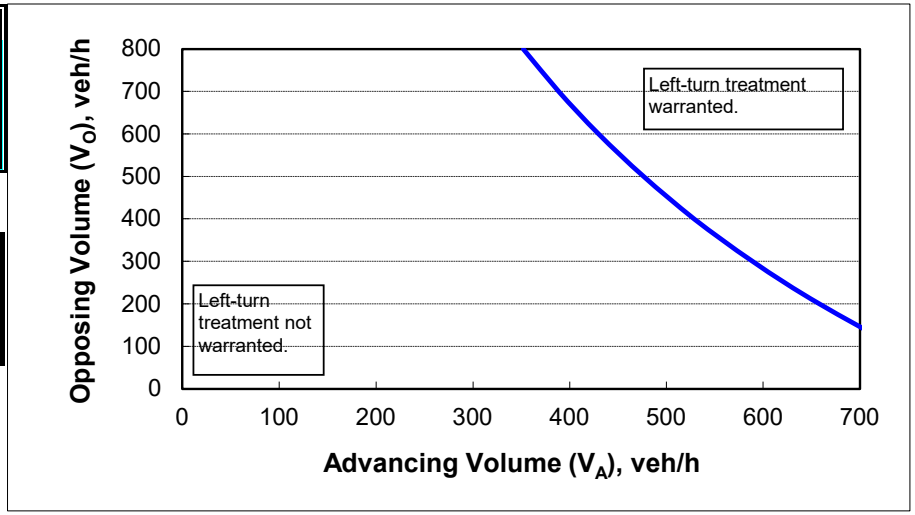
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	42
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	1133
Opposing volume (V_O), veh/h:	1218

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	235
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane , s:	1.9

HANCOCK
ASSOCIATES
Surveyors | Engineers | Scientists

November 9, 2023

Richard Benevento
Zoning Board of Appeals
Town of Middleton
195 N Main Street
Middleton, MA 01949

Re: 10 Boston Street, Middleton, MA
40B Comprehensive Permit Application
Supplemental Response to Civil Engineering and Traffic Engineering Peer Review #1

Dear Mr. Benevento:

Hancock Associates is pleased to offer the following supplemental correspondence in response to the Peer Review memorandum from TEC dated October 12, 2023.

Civil Engineering Site Plan Review

1. Plans as submitted are labeled as "Preliminary", and in the opinion of TEC, do not provide sufficient detail to determine adequacy of the site and stormwater design.

Response: 760 CMR 56.05 requires the submission of preliminary site development plan. We believe we have fully complied with the regulatory provisions but understand TEC's call for additional details as outlined in their memorandum. We commit to work with The Board as the process continues to provide the additional details and information requested.

2. A waiver has been requested for the requirements of Section 9.5 of the Middleton Zoning Bylaws, "Site Plan Review". The plans as submitted do not meet the following requirements:

   a) Plans shall be submitted on twenty-four-by-thirty-six-inches sheets whereas the plans currently are thirty-by-forty-two-inches. TEC defers to the Board.

Response: We feel the larger sheets allow for ease of review at an appropriate scale without having to break the site into separate sheets.

   b) Plans should provide a locus plan at a scale of one-inch equals to 100 feet, showing the entire project and its relation to existing areas, buildings, and roads for a distance of 1,000 feet from the project boundaries.

Response: A 100 scale locus plan will be provided.

The requested 100-scale Locus Plan is included with this submittal.

c) Plans should indicate snow storage areas.

Response: Snow storage area will be added to the plan.

Snow storage areas have been added to Sheet C-1.

3. A waiver for maximum building height is requested. The allowable height is 35ft (3 stories) – the applicant's proposed building height is 42ft (3 stories). TEC defers to the Board.

4. Per the MA Stormwater BMP Handbook, a minimum of (2) test pits should be conducted within the footprint of each subsurface infiltration system. Several test pits are shown on the plans, however none appear to have been conducted within the footprint of the (2) proposed infiltration systems. Additional test pits in the footprint of the proposed infiltration systems should be conducted to confirm soil classification, infiltration rate, and estimated seasonal high groundwater elevation.

Response: Extensive testing has been performed throughout the site. Hancock is confident suitable soils exist within the proposed infiltration areas. We would ask that the Board consider additional testing be required as a condition of approval and performed prior to the submittal of the building permit application.

A note has been added to the plans requiring additional soil testing in the areas of the proposed stormwater infiltration systems prior to preparation of Building Permit Plans.

5. (8) test pit locations are indicated on the plans. It appears that test pit results are only provided for (4) test pits. The locations of (2) of the test pits for which results are provided are not indicated on the plans.

Response: The plans and logs will be updated to address these differences.

The plans have been updated to show just the relevant soil testing locations and logs.

6. The Applicant should provide turning templates showing the ability of fire apparatus to access, circulate, and egress the site through the circulation pattern without leaving the paved surface. This includes a Town of Middleton fire apparatus. The Applicant should coordinate with the Town of Middleton Fire Department for preferred locations of fire lanes (if needed), confirmation of

hydrant locations, and sign requirements for fire lanes within the site. TEC defers to local police and fire.

Response: We have produced a Swept Path Analysis and shared it with the Middleton Fire Department. This plan is attached to complete the Zoning Board record.

7. The site layout plans indicate trash will be stored inside the building and trash pickup access will be through the south side of the building from the adjacent parking lot of "Lot 3". Grading of this access should be confirmed as it appears the first 20' of the access path will be greater than 20% until the parking lot is regraded/reconstructed on "Lot 3". The Applicant should provide turning templates showing the ability of dump trucks to access, circulate, and egress the site through the circulation pattern without leaving the paved surface while accessing the location of the trash room. Adequate access for trash removal should be incorporated into the development of "Lot 2". Should the refuge truck need to access the trash room from Lot 3 as depicted, and common ownership of "Lot 2" and Lot "3" ceases, a cross-access easement may need to be in place to conduct this business.

Response: Hancock will review grading and truck maneuvering to the trash area and revise the plan as necessary.

Regrading of at least a portion of the existing parking lot on Lot 3 will be required when the residential project is constructed. Hancock will prepare a turning template plan for accessing the trash pick-up area as requested.

8. The plan set does not include any construction details.

Response: 760 CMR 56.05 does not require the submission of construction details. As committed above, Hancock will advance plan details as we move through the process adding necessary details to the plan set for review.

Preliminary Detail Sheets are included with this submittal.

9. No construction period erosion and sediment controls are indicated on the plans.

Response: 760 CMR 56.05 does not require the submission of erosion and sediment control plans. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

A Preliminary Site Preparation & Demolition Plan showing erosion and sediment controls is included with this submittal.

10. No drainage conveyance structure inverts are indicated. No drainage conveyance pipe size, material, length, or slope are indicated. Assuming a minimum of 36" from rim to invert for proposed catch basins to the west of the proposed infiltration systems indicate a potential backflow condition (inverts of catch basins approximately elevation 101.2, 101.5; bottom of chambers elevation 101.5).

Response: We feel this level of detail is beyond the submission requirements. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

Hancock will provide the requested information with a comprehensive response to all remaining stormwater management comments.

11. The plan set does not provide for details regarding proposed retaining walls. A DMH is proposed in between the retaining walls and detail on the walls should be provided to ensure constructability.

Response: Due to changes with the building plan and site plan, the eastern walkway/stairway and associated retaining walls are being eliminated. Revised plans reflecting this change will be provided.

The updated plans submitted herewith remove the eastern walkway/stairway and associated retaining walls.

12. Infiltration system construction details should be provided. Isolator row details should be provided. Infiltration system inlet manholes and manifold details should be provided. The outlet control structure call outs indicate weir elevation but do not indicate orifice size and elevation as included in the HydroCAD model. Outlet control structure details should be provided.

Response: We feel this level of detail is beyond the submission requirements. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

Infiltration system construction details are included in the updated plan set submitted herewith.

13. Plans indicate a minimum offset from infiltration system to subsurface soil absorption system of 25', assumed to be taken from Title 5 for the setback from SAS to dry wells. Per the MA Stormwater BMP handbook, the offset from infiltration BMPs (basins and trenches) to soil absorption systems is 50'. TEC defers to

MassDEP as to the superseding regulation. TEC defers to the local Health Department and MassDEP on septic system design.

Response: We feel the requirements of Title 5 prevail as ensuring the proper function of a subsurface sewage disposal system is of a higher regard to environmental and health protection. Title 5 requires the design systems exceeding 2,000 gallons per day consider groundwater mounding which would include the potential for interaction between the stormwater system and the subsurface sewage disposal system. We see this analysis happening as we finish the Zoning Board process prior to submission to the Board of Health.

Hancock is in the process of preparing the mounding analysis and will provide that information when it is completed.

14. Per the standard Stormtech construction details, a minimum of 18" is required from the top of the chambers to the bottom of pavement for adequate structural integrity under parking areas. The current proposed design indicates approximately 16" from the top of the chambers of infiltration system "1P" to the top of pavement along the western side of the system.

Response: The plans will be revised to meet the 18-inch cover requirement.

The updated plans included with this submittal show revised grading to meet the 18-inch cover requirement.

15. The applicant proposes connecting the new drainage system to the existing drainage network on "Lot 3" via a proposed utility easement. The existing drainage network on Lot "3" is connected to the existing drainage system within MassDOT jurisdiction on South Main Steet (Route 114). A DOT Access Permit may be required for the expanded drainage connection. TEC suggests the applicant and DPW engage MassDOT regarding the proposed expanded drainage system interconnection.

Response: We understand the need for a MassDOT access permit which will require submission of drainage calculations to their satisfaction. We are controlling post development rates to pre-development rates.

16. Proposed lighting is indicated on the provided landscape plans, however no photometrics are provided to ensure no light spillage/pollution and conformance with local regulations.

Response: A photometric plan will be supplied to the Board by the Landscape Architect by mid-November. We hope this will provide sufficient time for peer review before the December meeting at which landscaping is scheduled to be reviewed.

17. Lighting plan shows proposed light pole within infiltration system "1P", details on how that would be constructed should be provided.

Response: The system can be interrupted with the use of intermittent end caps. Details will be provided to the Board with the next plan submission.

The updated plans included with this submittal show the proposed site light pole, and the removal of one (1) infiltration chamber. End caps are shown on the abutting chambers on each side.

18. The landscape plan shows a proposed tree within infiltration system "2P." There is also a proposed tree at the southwest corner of the site that is proximate to a proposed area drain and pipe connection.

Response: The tree locations will be adjusted to avoid the infiltration system by the Landscape Architect by mid-November. We hope this will provide sufficient time for peer review before the December meeting at which landscaping is scheduled to be reviewed..

19. The landscape plan proposes plantings within the Boston Street right-of-way adjacent to the proposed entry sign. With regards to ownership of on-going landscape maintenance, TEC suggests proposed landscaping remain outside the public right-of-way.

Response: The planting locations will be adjusted to have all planting within the lot.

20. Is a cross-access easement to be established between the subdivided lots to allow for residential traffic to utilize the South Main Street parking areas and driveway?

Response: Cross easements will be established upon presentation of a recordable subdivision plan to the Zoning Board later in the process.

21. The Applicant should verify the location of bus stops for resident children with the local school district and ensure the location is easily accessible by a school bus.

Response: The bus stop for resident children with the local school district is located less than 200 feet to the west of the site at the intersection of Boston Street and Pleasant Street. The bus stop is serviced by Route # 8 for the Middleton Elementary Schools and Route # 24 for the Masconomet Middle and High Schools."

22. The Applicant shall provide a dedicated plan for all traffic signage and pavement markings to be installed as part of the project. A sign summary shall also be

included which depicts the sign legend, sign size, and sign lettering dimensions in compliance with the *Manual on Uniform Traffic Control Devices (MUTCD)*.

a) This includes the placement of a stop sign and stop lines along the site driveways at its intersection with Boston Street and South Main Street.

b) This includes placement of a stop sign and stop lines along the Boston Street Driveway and its intersection with the main drive aisle leading to Lot 3's surface parking.

c) The Applicant should provide standard details and/or notes that denote the height of traffic signage on-site. Note that the height of some signage will be different than others.

Response: Final plans will include all signage noted above.

A Preliminary Pavement Marking & Signage Plan is included with this submittal.

23. The proposed site provides for 102 off-street parking spaces. The land use is identified in Bylaw Section 5.1.2. The site would require 120 parking spaces to satisfy the Bylaw. The Applicant has noted a need for relief from parking spaces with 1.7 spaces per unit.

a) Parking demand calculations published by the Institute of Transportation Engineers (ITE) in the most recent industry standard *Parking Generation, 5th Edition* for Land Use Code (LUC) 221 – Multifamily Housing Mid-Rise denote an average peak parking demand of seventy-nine (45) parking spaces needed for sixty (60) units or sixty-eight (68) parking spaces for ninety (90) bedrooms. Parking demand calculations also note an 85th percentile peak parking demand of eighty-nine (89) parking spaces needed for sixty (60) units or seventy-eight (78) parking spaces for ninety (90) bedrooms. Even under the most limited parking demand combination from the ITE publication would suggest the Applicant's parking spot count would be sufficient to meet demand.

Response: We concur with TEC's finding that adequate parking has been provided.

24. Dimensions are provided for a typical parking space on-site in compliance with the Bylaw. In addition, dimensions for the accessible spaces on-site are in compliance with 521 CMR 23.4.1. The Applicant should revise the plans to show accessible signage at the head of each accessible parking space with the associated 'Van Accessible' plaque.

Response: Final plans will include the signage noted above. (See response above)

25. The plans should be revised to depict both intersection sight distance and stopping sight distance measurements for both directions at Boston Street and South Main Street. Intersection sight distance measurements should be taken from a point 14.5-feet from the proposed edge of travel way on each mainline roadway. The sheet should denote all areas of clear view and resulting from the sight lines both on the public ROW and land under the control of the Applicant.

Response: Sight distances noted in the Vanasse Associates TIA will be added to the plan as noted with the next plan submission.

Sight Distance Measurements provided by Vanasse & Associates, Inc. are shown on the Preliminary Pavement Marking & Signage Plan included herewith.

26. Concrete sidewalks are provided along Boston Street opposite the site frontage. A proposed sidewalk is shown on-site connecting from the building frontage out to Boston Street and terminating. The location is not ideal for a crosswalk to allow connection to the sidewalk along the northerly side of the roadway. The Applicant should provide a pedestrian connection along the southerly side of Boston Road connecting to the intersection with South Main Street.

Response: Plans will be revised to show a sidewalk along Boston Street. Although not a subject of this application, it is expected that redevelopment of the adjacent commercial property will include extending the sidewalk along the south side of Boston Street, connecting to the existing sidewalks along South Main Street.

A 5-foot wide cement concrete sidewalk has been added along the site's frontage, this walk can be extended to South Main Street as part of the redevelopment of the adjacent commercial property.

27. The Applicant should provide standard details for all accessible ramp types and crosswalks.

Response: Final plans will include these details.

Accessible ramp details are included on the Preliminary Detail Sheets submitted herewith.

28. The plan does not show electric vehicle charging stations on-site. The Applicant should clarify if spaces on-site will be constructed as EV-compatible or EV-ready.

Response: Building permit application plans will comply with the then-applicable building code requirements for EV spaces.

29. The Applicant shall define the location of resident bicycle storage including weather-protection and security.

Response: Outdoor, open-air bike racks will be added to the plans and submitted to the Zoning Board with the next plan submission.

A location for proposed open-air bike racks has been added to the updated plan set submitted herewith.

MassDEP Stormwater Standards

30. Standard 1 (Untreated discharges): No new stormwater conveyance may discharge untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth.

Standard appears to be met. All stormwater runoff from the site is proposed to be discharged to an existing drainage network within South Main Street. See Standard 4 regarding water quality treatment.

Response: We concur with TEC that the standard is met.

31. Standard 2 (Peak rate control and flood prevention): Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

TEC provides the following comments in relation to Standard 2:

a) The existing watershed analysis map indicates (3) analysis points. The proposed watershed analysis indicates (1) analysis point. The majority of the site runoff has been redirected towards the South Main Street drainage network analysis point, however, there appears to still be a small area of the post development condition which drains towards Boston Street. The watershed maps and analysis should be revised to incorporate the Boston Street analysis point. All (3) analysis points should be indicated in the Stormwater Report discharge rate table. It appears peak flows will likely still be met.

Response: The watershed maps and analysis will be revised to reflect three analysis points in the post-development condition.

Hancock is preparing updated watershed maps and HydroCAD analysis as requested and will submit this information upon completion.

b) The HydroCAD analysis indicates the proposed pipe network to an existing drainage manhole will be constructed within 12" reinforced concrete pipe.

The outlet of the existing drainage manhole appears to be an 8" cast iron pipe. The analysis should include the existing pipe to ensure the reduction in flow capacity of the 8" pipe will not negatively impact or cause backflow of the proposed stormwater management system for the development.

Response: The analysis will be revised to reflect the 8-inch outlet pipe. The current analysis demonstrates no increase in flow to this pipe in the post-development condition.

Hancock is preparing updated watershed maps and HydroCAD analysis as requested and will submit this information upon completion.

c) The plans do not indicate size, material, length, slope, or inverts of the proposed pipe network. Some pipes are included in the HydroCAD analysis. All proposed pipes should be modeled to ensure adequate size and flow capacities for the site. TEC recommends adding all structures and pipes to the HydroCAD model.

Response: This information will be added to the plans and submitted to the Zoning Board with the next plan submission.

Hancock is preparing updated watershed maps and HydroCAD analysis and will include the piping network as requested.

d) The HydroCAD model and the plan call outs indicate a total of 192 chambers in infiltration system "1P". It appears there are 191 chambers as (1) chamber appears to have been removed for the inlet of the CB in the northeast corner of the proposed parking area. TEC recommends this CB be directed the system manifold DMH in the northeast corner of the system, allowing for 192 total chambers.

Response: The plans will be revised as noted.

The revised plans redirect the outlet pipe from this CB to the infiltration system manifold as recommended. Due to the site light pole (see Comment 17), the system will have 191 chambers instead of 192. The updated HydroCAD analysis being prepared will account for this reduction on 1 infiltration chamber.

32. Standard 3 (Recharge to Ground water): Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures, including environmentally sensitive site design, low impact development techniques, best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual

recharge from the pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts's Stormwater Handbook.

TEC provides the following comments in relation to Standard 3:

a) Per the plan call out for infiltration system "1P", the bottom of the system is 2' above seasonal high groundwater. The system is also used proposed for peak flow attenuation for storms greater than and equal to the 10-year storm, therefore a mounding analysis should be provided.

Response: A mounding analysis will be provided prior to completion of final plans.

Hancock is in the process of preparing the mounding analysis and will provide that information when it is completed.

b) As mentioned prior, additional test pits should be conducted within the footprint of infiltration systems.

Response: Extensive testing has been performed throughout the site. Hancock is confident suitable soils exist within the proposed infiltration areas. We would ask that the Board consider additional testing be required as a condition of approval and performed prior to the submittal of Final Plan.

A note has been added to the plans requiring additional soil testing in the areas of the proposed stormwater infiltration systems prior to preparation of Building Permit Plans.

c) The checklist indicates that runoff from all impervious areas at the site discharges to infiltration BMPs. There are areas (sidewalks to the north, east, and south of the building; a portion of the driveway draining to Boston Street) which are not conveyed to the proposed infiltration systems. The checklist should be revised.

Response: The recharge calculations will be revised to include capture adjustment for this small area.

Hancock will provide the requested information with a comprehensive response to all remaining stormwater management comments.

d) It appears that required recharge volumes are met.

Response: We concur with TEC' s finding.

33. Standard 4 (80% TSS removal): Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

TEC provides the following comments in relation to Standard 4:

a) It appears that required water quality volumes are met for the (2) infiltration systems.

Response: We concur with TEC' s finding.

b) As mentioned prior, there is a portion of the proposed driveway which discharges to Boston Street. This runoff is not captured and therefore is untreated. The water quality analysis should provide calculations showing that the site averages the required 80% TSS removal for all impervious areas requiring treatment.

Response: We will provide a weighted average of TSS removal of the site to account for this de minimus area that is untreated.

Hancock will provide the requested information with a comprehensive response to all remaining stormwater management comments.

c) The proposed parking area catch basin located in the southwest corner of the site is proposed as an inline structure. Per the Stormwater BMP Handbook, all deep sump catch basins should be off-line structures.

Response: We will revise the plan to correct this issue and provide to the Board with the next plan submission.

The updated plans included herewith show a new drain manhole to take the subject area drain and catch basin off-line.

d) A Long-Term Pollution Prevention Plan should be provided per the stormwater checklist.

Response: A Long-Term Pollution Prevention Plan will be provided with the Final Plans.

34. Standard 5 (Higher Potential Pollutant Loads): For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce

the discharge of stormwater runoff from such land uses to the maximum extent practicable.

Standard does not apply to this proposed project. The checklist should be revised as it indicates the EPA NPDES MSGP covers the land use.

Response: We concur with TEC's finding.

35. Standard 6 (Critical Areas): Stormwater discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or any other critical area require the use of the specific source control and pollution prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters or Special Resource Waters shall be set back from the receiving water and receive the highest and best practical method of treatment. A "stormwater discharge," as defined in 314 CMR 3.04(2)(a)1. or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to Zone I or Zone A are prohibited unless essential to the operation of the public water supply.

    Standard does not apply to this proposed project.

Response: We concur with TEC's finding.

36. Standard 7 (Redevelopment). A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met, and the project shall improve existing conditions.

    Standard does not apply to this proposed project.

Response: We concur with TEC's finding.

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

    TEC provides the following comments in relation to the Standard 8:

    a) No construction period pollution prevention and erosion and sediment control plan is provided with information as required per the stormwater

checklist. The plan should also include any additional information as required by the Middleton local stormwater management regulations.

Response: A SWPPP Plan will be added to the plan set and provided to the Board with the next plan submission.

A Preliminary Site Preparation & Demolition Plan showing erosion and sediment controls is included with this submittal.

b) No construction period controls are indicated on the plans.

Response: A SWPPP Plan with details will be added to the plan set and provided to the Board with the next plan submission.

A Preliminary Site Preparation & Demolition Plan showing erosion and sediment controls is included with this submittal.

c) The project will be required to obtain coverage under the EPA NPDES CGP as it will disturb over an acre. This will require the development of a SWPPP as indicated on the stormwater checklist. If the project were to be approved, TEC recommends this be added as a condition of approval.

Response: We concur with TEC's finding.

38. Standard 9 (Operation and Maintenance): A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed.

Standard appears to be met. The operation and maintenance plan should be revised to indicate that local police and fire will also be notified of any potential spills per the Middleton local stormwater management regulations. Based on the Massachusetts Stormwater Handbook the operation and maintenance plan should include mosquito control for subsurface infiltration systems.

Response: The O & M will be revised as noted.

Hancock will provide the requested information with a comprehensive response to all remaining stormwater management comments.

39. Standard 10 (Illicit Discharges): All illicit discharges to the stormwater management system are prohibited.

Standard appears to be met. Measures for the prevention of illicit discharges are provided within the Long-Term Operation and Maintenance Plan. No illicit discharge compliance statement is provided, and the report indicates one will be

provided prior to discharge of stormwater to post construction BMPs. If the project were to be approved, TEC recommends this be added as a condition of approval.

Response: We concur with TEC's suggestion.

Responses to the Traffic Impact Assessment comments will be provided by VAI under separate cover prior to the November 16th meeting of the ZBA.

We look forward to working with TEC and the Board as the process continues.

Sincerely,

Hancock Associates

Acting On Behalf of Villebridge Acquisitions LLC

Frederick A. Keylor,

Senior Project Manager

282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Richard Benevento
Zoning Board of Appeals
Town of Middleton
195 N Main Street
Middleton, MA 01949

November 9, 2023

Ref. T1404

Re: 10 Boston Street, Middleton, MA
40B Comprehensive Permit Application
Civil Engineering and Traffic Engineering Peer Review #2

Dear Mr. Benevento:

On behalf of the Town of Middleton, TEC, Inc. (TEC) reviewed documents as part of the traffic and civil engineering peer review for a proposed multi-family residential development via a MGL Chapter 40B Comprehensive Permit located at 10 Boston Street (Route 60) in Middleton, Massachusetts ("the Project"). The Project will include the construction of sixty (60) single-family rental units in a single multi-family building.

The following materials were considered as part of our review:

- *Response to Civil Engineering and Traffic Engineering Peer Review #1*; prepared by Hancock Associates, dated October 17, 2023.

TEC completed a review of these documents consistent with the Town of Middleton zoning requirements and other industry standards and offers the following comments. Initial TEC comments in plain text, Hancock Associates response in italics, TEC response in bold:

Civil Engineering Site Plan Review

1. Plans as submitted are labeled as "Preliminary", and in the opinion of TEC, do not provide sufficient detail to determine adequacy of the site and stormwater design.

   Hancock: 760 CMR 56.05 requires the submission of preliminary site development plan. We believe we have fully complied with the regulatory provisions but understand TEC's call for additional details as outlined in their memorandum. We commit to work with The Board as the process continues to provide the additional details and information requested.

   TEC: Acknowledged. TEC defers to the Board but anticipates further review of development plans/documents to ensure compliance with applicable regulations.

2. A waiver has been requested for the requirements of Section 9.5 of the Middleton Zoning Bylaws, "Site Plan Review". The plans as submitted do not meet the following requirements:

   a. Plans shall be submitted on twenty-four-by-thirty-six-inches sheets whereas the plans currently are thirty-by-forty-two-inches. TEC defers to the Board.

Hancock: We feel the larger sheets allow for ease of review at an appropriate scale without having to break the site into separate sheets.

TEC: TEC takes no exception to the sheet size as provided and defers to the Board.

b. Plans should provide a locus plan at a scale of one-inch equals to 100 feet, showing the entire project and its relation to existing areas, buildings, and roads for a distance of 1,000 feet from the project boundaries.

Hancock: A 100 scale locus plan will be provided.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

c. Plans should indicate snow storage areas.

Hancock: Snow storage area will be added to the plan.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

3. A waiver for maximum building height is requested. The allowable height is 35ft (3 stories), the applicant's proposed building height is 42ft (3 stories). TEC defers to the Board.

Hancock: No response.

TEC: Comment not addressed, TEC defers to the Board.

4. Per the MA Stormwater BMP Handbook, a minimum of (2) test pits should be conducted within the footprint of each subsurface infiltration system. Several test pits are shown on the plans, however none appear to have been conducted within the footprint of the (2) proposed infiltration systems. Additional test pits in the footprint of the proposed infiltration systems should be conducted to confirm soil classification, infiltration rate, and estimated seasonal high groundwater elevation.

Hancock: Extensive testing has been performed throughout the site. Hancock is confident suitable soils exist within the proposed infiltration areas. We would ask that the Board consider additional testing be required as a condition of approval and performed prior to the submittal of the building permit application.

TEC: TEC takes no exception to a condition of approval that additional soil test pits be performed prior to construction, however notes that if further soil explorations reveal conditions different than what is assumed to be present for the current design, the project may need to go back to the board for approval of any necessary design changes. TEC defers to the Board.

5. (8) test pit locations are indicated on the plans. It appears that test pit results are only provided for (4) test pits. The locations of (2) of the test pits for which results are provided are not indicated on the plans.

   Hancock: The plans and logs will be updated to address these differences.

   TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

6. The Applicant should provide turning templates showing the ability of fire apparatus to access, circulate, and egress the site through the circulation pattern without leaving the paved surface. This includes a Town of Middleton fire apparatus. The Applicant should coordinate with the Town of Middleton Fire Department for preferred locations of fire lanes (if needed), confirmation of hydrant locations, and sign requirements for fire lanes within the site. TEC defers to local police and fire.

   Hancock: We have produced a Swept Path Analysis and shared it with the Middleton Fire Department. This plan is attached to complete the Zoning Board record.

   TEC: Acknowledged. TEC did not review the Swept Path Analysis, however, defers to the Middleton Fire and Police Departments for emergency response and access requirements.

7. The site layout plans indicate trash will be stored inside the building and trash pickup access will be through the south side of the building from the adjacent parking lot of "Lot 3". Grading of this access should be confirmed as it appears the first 20' of the access path will be greater than 20% until the parking lot is regraded/reconstructed on "Lot 3". The Applicant should provide turning templates showing the ability of dump trucks to access, circulate, and egress the site through the circulation pattern without leaving the paved surface while accessing the location of the trash room. Adequate access for trash removal should be incorporated into the development of "Lot 2". Should the refuge truck need to access the trash room from Lot 3 as depicted, and common ownership of "Lot 2" and Lot "3" ceases, a cross-access easement may need to be in place to conduct this business.

   Hancock: Hancock will review grading and truck maneuvering to the trash area and revise the plan as necessary.

   TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

8. The plan set does not include any construction details.

   Hancock: 760 CMR 56.05 does not require the submission of construction details. As committed above, Hancock will advance plan details as we move through the process adding necessary details to the plan set for review.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents. TEC defers to the Board.

9. No construction period erosion and sediment controls are indicated on the plans.

Hancock: 760 CMR 56.05 does not require the submission of erosion and sediment control plans. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents. TEC defers to the Board.

10. No drainage conveyance structure inverts are indicated. No drainage conveyance pipe size, material, length, or slope are indicated. Assuming a minimum of 36" from rim to invert for proposed catch basins to the west of the proposed infiltration systems indicate a potential backflow condition (inverts of catch basins approximately elevation 101.2, 101.5; bottom of chambers elevation 101.5).

Hancock: We feel this level of detail is beyond the submission requirements. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents. TEC defers to the Board.

11. The plan set does not provide for details regarding proposed retaining walls. A DMH is proposed in between the retaining walls and detail on the walls should be provided to ensure constructability.

Hancock: Due to changes with the building plan and site plan, the eastern walkway/stairway and associated retaining walls are being eliminated. Revised plans reflecting this change will be provided.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

12. Infiltration system construction details should be provided. Isolator row details should be provided. Infiltration system inlet manholes and manifold details should be provided. The outlet control structure call outs indicate weir elevation but do not indicate orifice size and elevation as included in the HydroCAD model. Outlet control structure details should be provided.

Hancock: We feel this level of detail is beyond the submission requirements. As committed above, Hancock will advance plan details as we move through the process adding this information to the plan set for review.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents. TEC defers to the Board.

13. Plans indicate a minimum offset from infiltration system to subsurface soil absorption system of 25', assumed to be taken from Title 5 for the setback from SAS to dry wells. Per the MA Stormwater BMP handbook, the offset from infiltration BMPs (basins and trenches) to soil absorption systems is 50'. TEC defers to MassDEP as to the superseding regulation. TEC defers to the local Health Department and MassDEP on septic system design.

Hancock: We feel the requirements of Title 5 prevail as ensuring the proper function of a subsurface sewage disposal system is of a higher regard to environmental and health protection. Title 5 requires the design systems exceeding 2,000 gallons per day consider groundwater mounding which would include the potential for interaction between the stormwater system and the subsurface sewage disposal system. We see this analysis happening as we finish the Zoning Board process prior to submission to the Board of Health.

TEC: Acknowledged. TEC recommends the Board, or the Applicant verify with MassDEP on the superseding regulation as it related to setbacks between the subsurface sewerage disposal system and stormwater infiltration BMPs. TEC defers to the Board, MassDEP, and local Board of Health.

14. Per the standard Stormtech construction details, a minimum of 18" is required from the top of the chambers to the bottom of pavement for adequate structural integrity under parking areas. The current proposed design indicates approximately 16" from the top of the chambers of infiltration system "1P" to the top of pavement along the western side of the system.

Hancock: The plans will be revised to meet the 18-inch cover requirement.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

15. The applicant proposes connecting the new drainage system to the existing drainage network on "Lot 3" via a proposed utility easement. The existing drainage network on Lot "3" is connected to the existing drainage system within MassDOT jurisdiction on South Main Steet (Route 114). A DOT Access Permit may be required for the expanded drainage connection. TEC suggests the applicant and DPW engage MassDOT regarding the proposed expanded drainage system interconnection.

Hancock: We understand the need for a MassDOT access permit which will require submission of drainage calculations to their satisfaction. We are controlling post development rates to pre-development rates.

TEC: Acknowledged. TEC defers to MassDOT for the proposed connection to the jurisdictional drainage network within South Main Street.

16. Proposed lighting is indicated on the provided landscape plans, however no photometrics are provided to ensure no light spillage/pollution and conformance with local regulations.

Hancock: A photometric plan will be supplied to the Board by the Landscape Architect by mid-November. We hope this will provide sufficient time for peer review before the December meeting at which landscaping is scheduled to be reviewed.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

17. Lighting plan shows proposed light pole within infiltration system "1P", details on how that would be constructed should be provided.

Hancock: The system can be interrupted with the use of intermittent end caps. Details will be provided to the Board with the next plan submission.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

18. The landscape plan shows a proposed tree within infiltration system "2P." There is also a proposed tree at the southwest corner of the site that is proximate to a proposed area drain and pipe connection.

Hancock: The tree locations will be adjusted to avoid the infiltration system by the Landscape Architect by mid-November. We hope this will provide sufficient time for peer review before the December meeting at which landscaping is scheduled to be reviewed.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

19. The landscape plan proposes plantings within the Boston Street right-of-way adjacent to the proposed entry sign. With regards to ownership of on-going landscape maintenance, TEC suggests proposed landscaping remain outside the public right-of-way.

Hancock: The planting locations will be adjusted to have all planting within the lot.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

20. Is a cross-access easement to be established between the subdivided lots to allow for residential traffic to utilize the South Main Street parking areas and driveway?

Hancock: Cross easements will be established upon presentation of a recordable subdivision plan to the Zoning Board later in the process.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

21. The Applicant should verify the location of bus stops for resident children with the local school district and ensure the location is easily accessible by a school bus.

Hancock: The bus stop for resident children with the local school district is located less than 200 feet to the west of the site at the intersection of Boston Street and Pleasant Street. The bus stop is serviced by Route # 8 for the Middleton Elementary Schools and Route # 24 for the Masconomet Middle and High Schools."

TEC: TEC: Acknowledged. TEC defers to the Board and local school district.

22. The Applicant shall provide a dedicated plan for all traffic signage and pavement markings to be installed as part of the project. A sign summary shall also be included which depicts the sign legend, sign size, and sign lettering dimensions in compliance with the *Manual on Uniform Traffic Control Devices* (*MUTCD*).
    a. This includes the placement of a stop sign and stop lines along the site driveways at its intersection with Boston Street and South Main Street.
    b. This includes placement of a stop sign and stop lines along the Boston Street Driveway and its intersection with the main drive aisle leading to Lot 3's surface parking.
    c. The Applicant should provide standard details and/or notes that denote the height of traffic signage on-site. Note that the height of some signage will be different than others.

Hancock: Final plans will include all signage noted above.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

23. The proposed site provides for 102 off-street parking spaces. The land use is identified in Bylaw Section 5.1.2. The site would require 120 parking spaces to satisfy the Bylaw. The Applicant has noted a need for relief from parking spaces with 1.7 spaces per unit.
    a. Parking demand calculations published by the Institute of Transportation Engineers (ITE) in the most recent industry standard *Parking Generation, 5th Edition* for Land Use Code (LUC) 221 – Multifamily Housing Mid-Rise denote an average peak parking demand of seventy-nine (45) parking spaces needed for sixty (60) units or sixty-eight (68) parking spaces for ninety (90) bedrooms. Parking demand calculations also note an 85th percentile peak parking demand of eighty-nine (89) parking spaces needed for sixty (60) units or seventy-eight (78) parking spaces for ninety (90) bedrooms. Even under the most limited parking demand combination from the ITE publication would suggest the Applicant's parking spot count would be sufficient to meet demand.

Hancock: We concur with TEC's finding that adequate parking has been provided.

TEC: No further comment. TEC defers to the Board.

24. Dimensions are provided for a typical parking space on-site in compliance with the Bylaw. In addition, dimensions for the accessible spaces on-site are in compliance with 521 CMR 23.4.1. The Applicant should revise the plans to show accessible signage at the head of each accessible parking space with the associated 'Van Accessible' plaque.

    Hancock: Final plans will include the signage noted above.

    TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

25. The plans should be revised to depict both intersection sight distance and stopping sight distance measurements for both directions at Boston Street and South Main Street. Intersection sight distance measurements should be taken from a point 14.5-feet from the proposed edge of travel way on each mainline roadway. The sheet should denote all areas of clear view and resulting from the sight lines both on the public ROW and land under the control of the Applicant.

    Hancock: Sight distances noted in the Vanasse Associates TIA will be added to the plan as noted with the next plan submission.

    TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

26. Concrete sidewalks are provided along Boston Street opposite the site frontage. A proposed sidewalk is shown on-site connecting from the building frontage out to Boston Street and terminating. The location is not ideal for a crosswalk to allow connection to the sidewalk along the northerly side of the roadway. The Applicant should provide a pedestrian connection along the southerly side of Boston Road connecting to the intersection with South Main Street.

    Hancock: Plans will be revised to show a sidewalk along Boston Street. Although not a subject of this application, it is expected that redevelopment of the adjacent commercial property will include extending the sidewalk along the south side of Boston Street, connecting to the existing sidewalks along South Main Street.

    TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

27. The Applicant should provide standard details for all accessible ramp types and crosswalks.

    Hancock: Final plans will include these details.

    TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

28. The plan does not show electric vehicle charging stations on-site. The Applicant should clarify if spaces on-site will be constructed as EV-compatible or EV-ready.

Hancock: Building permit application plans will comply with the then-applicable building code requirements for EV spaces.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents. TEC defers to the Board and Building Department.

29. The Applicant shall define the location of resident bicycle storage including weather-protection and security.

Hancock: Outdoor, open-air bike racks will be added to the plans and submitted to the Zoning Board with the next plan submission.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

MassDEP Stormwater Standards

30. Standard 1 (Untreated discharges): No new stormwater conveyance may discharge untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth.

Standard appears to be met. All stormwater runoff from the site is proposed to be discharged to an existing drainage network within South Main Street. See Standard 4 regarding water quality treatment.

Hancock: We concur with TEC that the standard is met.

TEC: No further comment. TEC assumes this Standard will continue to be met in forthcoming revised documents.

31. Standard 2 (Peak rate control and flood prevention): Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

TEC provides the following comments in relation to Standard 2:

a) The existing watershed analysis map indicates (3) analysis points. The proposed watershed analysis indicates (1) analysis point. The majority of the site runoff has been redirected towards the South Main Street drainage network analysis point, however, there appears to still be a small area of the post development condition which drains towards Boston Street. The watershed maps and analysis should be revised to incorporate the Boston Street analysis point. All (3) analysis points should be indicated in the Stormwater Report discharge rate table. It appears peak flows will likely still be met.

Hancock: The watershed maps and analysis will be revised to reflect three analysis points in the post-development condition.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

b) The HydroCAD analysis indicates the proposed pipe network to an existing drainage manhole will be constructed within 12" reinforced concrete pipe. The outlet of the existing drainage manhole appears to be an 8" cast iron pipe. The analysis should include the existing pipe to ensure the reduction in flow capacity of the 8" pipe will not negatively impact or cause backflow of the proposed stormwater management system for the development.

Hancock: The analysis will be revised to reflect the 8-inch outlet pipe. The current analysis demonstrates no increase in flow to this pipe in the post-development condition.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

c) The plans do not indicate size, material, length, slope, or inverts of the proposed pipe network. Some pipes are included in the HydroCAD analysis. All proposed pipes should be modeled to ensure adequate size and flow capacities for the site. TEC recommends adding all structures and pipes to the HydroCAD model.

Hancock: This information will be added to the plans and submitted to the Zoning Board with the next plan submission.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

d) The HydroCAD model and the plan call outs indicate a total of 192 chambers in infiltration system "1P". It appears there are 191 chambers as (1) chamber appears to have been removed for the inlet of the CB in the northeast corner of the proposed parking area. TEC recommends this CB be directed the system manifold DMH in the northeast corner of the system, allowing for 192 total chambers.

Hancock: The plans will be revised as noted.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

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

TEC provides the following comments in relation to Standard 3:

a) Per the plan call out for infiltration system "1P", the bottom of the system is 2' above seasonal high groundwater. The system is also used proposed for peak flow attenuation for storms greater than and equal to the 10-year storm, therefore a mounding analysis should be provided.

Hancock: A mounding analysis will be provided prior to completion of final plans.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

b) As mentioned prior, additional test pits should be conducted within the footprint of infiltration systems.

Hancock: Extensive testing has been performed throughout the site. Hancock is confident suitable soils exist within the proposed infiltration areas. We would ask that the Board consider additional testing be required as a condition of approval and performed prior to the submittal of Final Plan.

TEC: TEC takes no exception to a condition of approval that additional soil test pits be performed prior to construction, however notes that if further soil explorations reveal conditions different than what is assumed to be present for the current design, the project may need to go back to the board for approval of any necessary design changes. TEC defers to the Board.

c) The checklist indicates that runoff from all impervious areas at the site discharges to infiltration BMPs. There are areas (sidewalks to the north, east, and south of the building; a portion of the driveway draining to Boston Street) which are not conveyed to the proposed infiltration systems. The checklist should be revised.

Hancock: The recharge calculations will be revised to include capture adjustment for this small area.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

d) It appears that required recharge volumes are met.

Hancock: We concur with TEC's finding.

TEC: No further comment. TEC defers to the Board. TEC assumes this Standard will continue to be met in forthcoming revised documents.

33. Standard 4 (80% TSS removal): Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

TEC provides the following comments in relation to Standard 4:

a) It appears that required water quality volumes are met for the (2) infiltration systems.

Hancock: We concur with TEC's finding.

TEC: No further comment. TEC assumes this Standard will continue to be met in forthcoming revised documents.

b) As mentioned prior, there is a portion of the proposed driveway which discharges to Boston Street. This runoff is not captured and therefore is untreated. The water quality analysis should provide calculations showing that the site averages the required 80% TSS removal for all impervious areas requiring treatment.

Hancock: We will provide a weighted average of TSS removal of the site to account for this de minimus area that is untreated.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

c) The proposed parking area catch basin located in the southwest corner of the site is proposed as an inline structure. Per the Stormwater BMP Handbook, all deep sump catch basins should be off-line structures.

Hancock: We will revise the plan to correct this issue and provide to the Board with the next plan submission.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

d) A Long-Term Pollution Prevention Plan should be provided per the stormwater checklist.

Hancock: A Long-Term Pollution Prevention Plan will be provided with the Final Plans.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

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

Standard does not apply to this proposed project. The checklist should be revised as it indicates the EPA NPDES MSGP covers the land use.

Hancock: We concur with TEC's finding.

TEC: Acknowledged. TEC anticipates the checklist will be revised and will confirm upon review of forthcoming revised documents.

35. Standard 6 (Critical Areas): Stormwater discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or any other critical area require the use of the specific source control and pollution prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters or Special Resource Waters shall be set back from the receiving water and receive the highest and best practical method of treatment. A "stormwater discharge," as defined in 314 CMR 3.04(2)(a)1. or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to Zone I or Zone A are prohibited unless essential to the operation of the public water supply.

    Standard does not apply to this proposed project.

    Hancock: We concur with TEC's finding.

    TEC: No further comment.

36. Standard 7 (Redevelopment). A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met, and the project shall improve existing conditions.

    Standard does not apply to this proposed project.

    Hancock: We concur with TEC's finding.

    TEC: No further comment.

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

    TEC provides the following comments in relation to the Standard 8:

    a) No construction period pollution prevention and erosion and sediment control plan is provided with information as required per the stormwater checklist. The plan should also include any additional information as required by the Middleton local stormwater management regulations.

Hancock: A SWPPP Plan will be added to the plan set and provided to the Board with the next plan submission.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

b) No construction period controls are indicated on the plans.

Hancock: A SWPPP Plan with details will be added to the plan set and provided to the Board with the next plan submission.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

c) The project will be required to obtain coverage under the EPA NPDES CGP as it will disturb over an acre. This will require the development of a SWPPP as indicated on the stormwater checklist. If the project were to be approved, TEC recommends this be added as a condition of approval.

Hancock: We concur with TEC's finding.

TEC: No further comment. TEC defers to the Board.

38. Standard 9 (Operation and Maintenance): A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed.

Standard appears to be met. The operation and maintenance plan should be revised to indicate that local police and fire will also be notified of any potential spills per the Middleton local stormwater management regulations. Based on the Massachusetts Stormwater Handbook the operation and maintenance plan should include mosquito control for subsurface infiltration systems.

Hancock: The O & M will be revised as noted.

TEC: Acknowledged. TEC anticipates the comment will be addressed upon review of forthcoming revised documents.

39. Standard 10 (Illicit Discharges): All illicit discharges to the stormwater management system are prohibited**.**

Standard appears to be met. Measures for the prevention of illicit discharges are provided within the Long-Term Operation and Maintenance Plan. No illicit discharge compliance statement is provided, and the report indicates one will be provided prior to discharge of stormwater to post construction BMPs. If the project were to be approved, TEC recommends this be added as a condition of approval.

Hancock: We concur with TEC's suggestion.

TEC: No further comment. TEC defers to the Board.

Traffic Impact Assessment Comments

Hancock: Responses to the Traffic Impact Assessment comments will be provided by VAI under separate cover prior to the November 16th meeting of the ZBA.

TEC: Acknowledged. TEC looks forward to reviewing the responses to the TIA comments by VAI and providing feedback for consideration by the Board.

TEC looks forward to reviewing forthcoming revised design documents to ensure all comments have been adequately addressed and compliance with applicable regulations if and when the Board so requests. Please do not hesitate to contact me directly if you have any questions concerning our comments at 774-670-3569.

Thank you for your attention to these matters.

Respectfully,
TEC, Inc.
*"**T**he **E**ngineering **C**orporation"*

Jared M. Duval, P.E.
Worcester Regional Director

282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Richard Benevento
Zoning Board of Appeals
Town of Middleton
195 N Main Street
Middleton, MA 01949

October 12, 2023

Ref. T1404

Re: 10 Boston Street, Middleton, MA
40B Comprehensive Permit Application
Civil Engineering and Traffic Engineering Peer Review #1

Dear Mr. Benevento:

On behalf of the Town of Middleton, TEC, Inc. (TEC) has reviewed documents as part of the traffic and civil engineering peer review for a proposed multi-family residential development via a MGL Chapter 40B Comprehensive Permit located at 10 Boston Street (Route 60) in Middleton, Massachusetts ("the Project"). The Project will include the construction of sixty (60) single-family rental units in a single multi-family building.

The following materials were considered as part of our review:

- *Comprehensive Permit Application Package – Villebridge Middleton – 10 Boston Street – Middleton, MA*; prepared by Villebridge Real Estate Development, dated August 22, 2023.
- *Traffic Impact Assessment – Villebridge – 10 Boston Street – Middleton, MA*; prepared by Vanasse & Associates, Inc., dated August 2023.
- *Comprehensive Permit Plans – Villebridge – 10 Boston Street – Middleton, MA*; prepared by The Architectural Team, Inc., dated August 2023.
- *Preliminary Stormwater Report – 10 Boston Street – Middleton, MA*; prepared by Hancock Associates, dated August 22, 2023.

TEC completed a review of these documents consistent with Town of Middleton zoning requirements and other industry standards and offers the following comments:

Civil Engineering Site Plan Review

1. Plans as submitted are labeled as "Preliminary", and in the opinion of TEC, do not provide sufficient detail to determine adequacy of the site and stormwater design.
2. A waiver has been requested for the requirements of Section 9.5 of the Middleton Zoning Bylaws, "Site Plan Review". The plans as submitted do not meet the following requirements:
   a. Plans shall be submitted on twenty-four-by-thirty-six-inches sheets whereas the plans currently are thirty-by-forty-two-inches. TEC defers to the Board.

b. Plans should provide a locus plan at a scale of one-inch equals to 100 feet, showing the entire project and its relation to existing areas, buildings, and roads for a distance of 1,000 feet from the project boundaries.
c. Plans should indicate snow storage areas.

3. A waiver for maximum building height is requested. The allowable height is 35ft (3 stories) – the applicant's proposed building height is 42ft (3 stories). TEC defers to the Board.

4. Per the MA Stormwater BMP Handbook, a minimum of (2) test pits should be conducted within the footprint of each subsurface infiltration system. Several test pits are shown on the plans, however none appear to have been conducted within the footprint of the (2) proposed infiltration systems. Additional test pits in the footprint of the proposed infiltration systems should be conducted to confirm soil classification, infiltration rate, and estimated seasonal high groundwater elevation.

5. (8) test pit locations are indicated on the plans. It appears that test pit results are only provided for (4) test pits. The locations of (2) of the test pits for which results are provided are not indicated on the plans.

6. The Applicant should provide turning templates showing the ability of fire apparatus to access, circulate, and egress the site through the circulation pattern without leaving the paved surface. This includes a Town of Middleton fire apparatus. The Applicant should coordinate with the Town of Middleton Fire Department for preferred locations of fire lanes (if needed), confirmation of hydrant locations, and sign requirements for fire lanes within the site. TEC defers to local police and fire.

7. The site layout plans indicate trash will be stored inside the building and trash pickup access will be through the south side of the building from the adjacent parking lot of "Lot 3". Grading of this access should be confirmed as it appears the first 20' of the access path will be greater than 20% until the parking lot is regraded/reconstructed on "Lot 3". The Applicant should provide turning templates showing the ability of dump trucks to access, circulate, and egress the site through the circulation pattern without leaving the paved surface while accessing the location of the trash room. Adequate access for trash removal should be incorporated into the development of "Lot 2". Should the refuge truck need to access the trash room from Lot 3 as depicted, and common ownership of "Lot 2" and Lot "3" ceases, a cross-access easement may need to be in place to conduct this business.

8. The plan set does not include any construction details.

9. No construction period erosion and sediment controls are indicated on the plans.

10. No drainage conveyance structure inverts are indicated. No drainage conveyance pipe size, material, length, or slope are indicated. Assuming a minimum of 36" from rim to invert for proposed catch basins to the west of the proposed infiltration systems indicate a potential backflow condition (inverts of catch basins approximately elevation 101.2, 101.5; bottom of chambers elevation 101.5).

11. The plan set does not provide for details regarding proposed retaining walls. A DMH is proposed in between the retaining walls and detail on the walls should be provided to ensure constructability.

12. Infiltration system construction details should be provided. Isolator row details should be provided. Infiltration system inlet manholes and manifold details should be provided. The outlet control structure call outs indicate weir elevation but do not indicate orifice size and elevation as included in the HydroCAD model. Outlet control structure details should be provided.

13. Plans indicate a minimum offset from infiltration system to subsurface soil absorption system of 25', assumed to be taken from Title 5 for the setback from SAS to dry wells. Per the MA Stormwater BMP handbook, the offset from infiltration BMPs (basins and trenches) to soil absorption systems is 50'. TEC defers to MassDEP as to the superseding regulation. TEC defers to the local Health Department and MassDEP on septic system design.

14. Per the standard Stormtech construction details, a minimum of 18" is required from the top of the chambers to the bottom of pavement for adequate structural integrity under parking areas. The current proposed design indicates approximately 16" from the top of the chambers of infiltration system "1P" to the top of pavement along the western side of the system.

15. The applicant proposes connecting the new drainage system to the existing drainage network on "Lot 3" via a proposed utility easement. The existing drainage network on Lot "3" is connected to the existing drainage system within MassDOT jurisdiction on South Main Steet (Route 114). A DOT Access Permit may be required for the expanded drainage connection. TEC suggests the applicant and DPW engage MassDOT regarding the proposed expanded drainage system interconnection.

16. Proposed lighting is indicated on the provided landscape plans, however no photometrics are provided to ensure no light spillage/pollution and conformance with local regulations.

17. Lighting plan shows proposed light pole within infiltration system "1P", details on how that would be constructed should be provided.

18. The landscape plan shows a proposed tree within infiltration system "2P." There is also a proposed tree at the southwest corner of the site that is proximate to a proposed area drain and pipe connection.

19. The landscape plan proposes plantings within the Boston Street right-of-way adjacent to the proposed entry sign. With regards to ownership of on-going landscape maintenance, TEC suggests proposed landscaping remain outside the public right-of-way.

20. Is a cross-access easement to be established between the subdivided lots to allow for residential traffic to utilize the South Main Street parking areas and driveway?

21. The Applicant should verify the location of bus stops for resident children with the local school district and ensure the location is easily accessible by a school bus.

22. The Applicant shall provide a dedicated plan for all traffic signage and pavement markings to be installed as part of the project. A sign summary shall also be included which depicts the sign legend, sign size, and sign lettering dimensions in compliance with the *Manual on Uniform Traffic Control Devices* (*MUTCD*).

    a. This includes the placement of a stop sign and stop lines along the site driveways at its intersection with Boston Street and South Main Street.

b. This includes placement of a stop sign and stop lines along the Boston Street Driveway and its intersection with the main drive aisle leading to Lot 3's surface parking.

c. The Applicant should provide standard details and/or notes that denote the height of traffic signage on-site. Note that the height of some signage will be different than others.

23. The proposed site provides for 102 off-street parking spaces. The land use is identified in Bylaw Section 5.1.2. The site would require 120 parking spaces to satisfy the Bylaw. The Applicant has noted a need for relief from parking spaces with 1.7 spaces per unit.

a. Parking demand calculations published by the Institute of Transportation Engineers (ITE) in the most recent industry standard *Parking Generation, 5th Edition* for Land Use Code (LUC) 221 – Multifamily Housing Mid-Rise denote an average peak parking demand of seventy-nine (45) parking spaces needed for sixty (60) units or sixty-eight (68) parking spaces for ninety (90) bedrooms. Parking demand calculations also note an 85th percentile peak parking demand of eighty-nine (89) parking spaces needed for sixty (60) units or seventy-eight (78) parking spaces for ninety (90) bedrooms. Even under the most limited parking demand combination from the ITE publication would suggest the Applicant's parking spot count would be sufficient to meet demand.

24. Dimensions are provided for a typical parking space on-site in compliance with the Bylaw. In addition, dimensions for the accessible spaces on-site are in compliance with 521 CMR 23.4.1. The Applicant should revise the plans to show accessible signage at the head of each accessible parking space with the associated 'Van Accessible' plaque.

25. The plans should be revised to depict both intersection sight distance and stopping sight distance measurements for both directions at Boston Street and South Main Street. Intersection sight distance measurements should be taken from a point 14.5-feet from the proposed edge of travel way on each mainline roadway. The sheet should denote all areas of clear view and resulting from the sight lines both on the public ROW and land under the control of the Applicant.

26. Concrete sidewalks are provided along Boston Street opposite the site frontage. A proposed sidewalk is shown on-site connecting from the building frontage out to Boston Street and terminating. The location is not ideal for a crosswalk to allow connection to the sidewalk along the northerly side of the roadway. The Applicant should provide a pedestrian connection along the southerly side of Boston Road connecting to the intersection with South Main Street.

27. The Applicant should provide standard details for all accessible ramp types and crosswalks.

28. The plan does not show electric vehicle charging stations on-site. The Applicant should clarify if spaces on-site will be constructed as EV-compatible or EV-ready.

29. The Applicant shall define the location of resident bicycle storage including weather-protection and security.

MassDEP Stormwater Standards

30. Standard 1 (Untreated discharges): *No new stormwater conveyance may discharge untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth.*

Standard appears to be met. All stormwater runoff from the site is proposed to be discharged to an existing drainage network within South Main Street. See Standard 4 regarding water quality treatment.

31. Standard 2 (Peak rate control and flood prevention): *Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.*

TEC provides the following comments in relation to Standard 2:

a) The existing watershed analysis map indicates (3) analysis points. The proposed watershed analysis indicates (1) analysis point. The majority of the site runoff has been redirected towards the South Main Street drainage network analysis point, however, there appears to still be a small area of the post development condition which drains towards Boston Street. The watershed maps and analysis should be revised to incorporate the Boston Street analysis point. All (3) analysis points should be indicated in the Stormwater Report discharge rate table. It appears peak flows will likely still be met.

b) The HydroCAD analysis indicates the proposed pipe network to an existing drainage manhole will be constructed within 12" reinforced concrete pipe. The outlet of the existing drainage manhole appears to be an 8" cast iron pipe. The analysis should include the existing pipe to ensure the reduction in flow capacity of the 8" pipe will not negatively impact or cause backflow of the proposed stormwater management system for the development.

c) The plans do not indicate size, material, length, slope, or inverts of the proposed pipe network. Some pipes are included in the HydroCAD analysis. All proposed pipes should be modeled to ensure adequate size and flow capacities for the site. TEC recommends adding all structures and pipes to the HydroCAD model.

d) The HydroCAD model and the plan call outs indicate a total of 192 chambers in infiltration system "1P". It appears there are 191 chambers as (1) chamber appears to have been removed for the inlet of the CB in the northeast corner of the proposed parking area. TEC recommends this CB be directed the system manifold DMH in the northeast corner of the system, allowing for 192 total chambers.

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

TEC provides the following comments in relation to Standard 3:

a) Per the plan call out for infiltration system "1P", the bottom of the system is 2' above seasonal high groundwater. The system is also used proposed for peak flow attenuation for storms greater than and equal to the 10-year storm, therefore a mounding analysis should be provided.

b) As mentioned prior, additional test pits should be conducted within the footprint of infiltration systems.

c) The checklist indicates that runoff from all impervious areas at the site discharges to infiltration BMPs. There are areas (sidewalks to the north, east, and south of the building; a portion of the driveway draining to Boston Street) which are not conveyed to the proposed infiltration systems. The checklist should be revised.

d) It appears that required recharge volumes are met.

33. Standard 4 (80% TSS removal): *Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).*

TEC provides the following comments in relation to Standard 4:

a) It appears that required water quality volumes are met for the (2) infiltration systems.

b) As mentioned prior, there is a portion of the proposed driveway which discharges to Boston Street. This runoff is not captured and therefore is untreated. The water quality analysis should provide calculations showing that the site averages the required 80% TSS removal for all impervious areas requiring treatment.

c) The proposed parking area catch basin located in the southwest corner of the site is proposed as an inline structure. Per the Stormwater BMP Handbook, all deep sump catch basins should be off-line structures.

d) A Long-Term Pollution Prevention Plan should be provided per the stormwater checklist.

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

Standard does not apply to this proposed project. The checklist should be revised as it indicates the EPA NPDES MSGP covers the land use.

35. Standard 6 (Critical Areas): *Stormwater discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or any other critical area require the use of the specific source control and pollution prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters or Special Resource Waters shall be set back from the receiving water and receive the highest and best practical method of treatment. A "stormwater discharge," as defined in 314 CMR 3.04(2)(a)1. or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to Zone I or Zone A are prohibited unless essential to the operation of the public water supply.*

Standard does not apply to this proposed project.

36. Standard 7 (Redevelopment*). A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met, and the project shall improve existing conditions.*

    Standard does not apply to this proposed project.

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

    TEC provides the following comments in relation to the Standard 8:

    a) No construction period pollution prevention and erosion and sediment control plan is provided with information as required per the stormwater checklist. The plan should also include any additional information as required by the Middleton local stormwater management regulations.

    b) No construction period controls are indicated on the plans.

    c) The project will be required to obtain coverage under the EPA NPDES CGP as it will disturb over an acre. This will require the development of a SWPPP as indicated on the stormwater checklist. If the project were to be approved, TEC recommends this be added as a condition of approval.

38. Standard 9 (Operation and Maintenance): *A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed.*

    Standard appears to be met. The operation and maintenance plan should be revised to indicate that local police and fire will also be notified of any potential spills per the Middleton local stormwater management regulations. Based on the Massachusetts Stormwater Handbook the operation and maintenance plan should include mosquito control for subsurface infiltration systems.

39. Standard 10 (Illicit Discharges): *All illicit discharges to the stormwater management system are prohibited.*

    Standard appears to be met. Measures for the prevention of illicit discharges are provided within the Long-Term Operation and Maintenance Plan. No illicit discharge compliance statement is provided, and the report indicates one will be provided prior to discharge of stormwater to post construction BMPs. If the project were to be approved, TEC recommends this be added as a condition of approval.

Traffic Impact Assessment Comments

40. The Transportation Impact Assessment (TIA) indicates driveway related trips accessing directly to/from South Main Street, signed as Route 114, which is under the jurisdiction of the Massachusetts Department of Transportation (MassDOT). The Applicant should consult with MassDOT for the Permit to Access State Highway.

41. The TIA indicates that the overall subdivision project is directly associated with an abutting commercial development on “Lot 3” of the subdivision at the South Main Street / Boston

Street / Town Hall Driveways intersection corner. TEC notes that the Board should take this into consideration for conditions on any approval that the overall traffic impact of the several lots should be evaluated without segmentation as traffic impacts will be compounded with each part of the development process. This may result in any off-site mitigation being pushed to a subsequent development phase once the compounded impact, if any, becomes a further hinderance to traffic operations and safety.

42. The TIA included the following intersections within the study area:

- South Main Street (Route 114) / Boston Street (Route 62) / Town Hall Driveways
- South Main Street (Route 114) / Maple Street (Route 62)
- North Main Street (Route 114) / South Main Street (Route 114) / Central Street / Lake Street
- South Main Street (Route 114) / Orchard Circle

TEC generally concurs with the scope of the study area intersections based on the Massachusetts Department of Transportation (MassDOT) *Traffic Impact Assessment (TIA) Guidelines* (Section 3.I.C) to evaluate intersections in which the site-generated trips increase the peak hour traffic volume by more than 5 percent and/or by more than 100 new vehicles per hour. Note that based on the compounding of development area with Lot 3, the study area in subsequent traffic studies for Lot 3 may need to the expanded.

43. Existing traffic volumes at the study area intersections were collected May 2022 while area schools were in general session. TEC concurs with the usage of existing traffic volumes.

44. The TIA evaluates traffic volumes for a COVID adjustment comparing May 2022 traffic volumes at the nearest permanent count station along Interstate 95. The TIA does note, with which TEC agrees, that MassDOT no longer requires COVID adjustments following March 2022 unless the predominant land uses in the area is office. The COVID adjustment institutes an 8.8 percent upward increase in traffic volumes from May 2022 taking into account that seasonally, traffic volumes in May 2022 are 5.3 percent higher than average-month conditions. Existing traffic volumes were further increased to a 2023 condition utilizing a year-over-year background growth rate. TEC generally concurs that this methodology results in a conservative scenario for traffic volumes in the area.

45. The TIA presents motor vehicle crash data for each of the study area intersections. The crash data indicates the number, type, and severity of crashes at the study area intersections between 2016 and 2020 obtained from MassDOT's IMPACT crash portal. The TIA notes that several study area intersections experience crash rates below statewide and district wide averages with the exception to the intersection of South Main Street / Maple Street which experiences a rate well above those respective averages. The intersection is also designated as HSIP-eligible which represents a top 5 percent crash location in the region. The Applicant has noted commitment to implement safety-related improvements at this location further described in this review letter.

46. The TIA references a 1.5% growth rate on traffic volumes per year (compounded) based on the growth of traffic of several roadways in the vicinity from 2009 to 2018 (prior to COVID). TEC generally concurs that the growth rate of 1.5% as used by the TIAS.

47. The TIA documents five (5) specific developments by others which are anticipated to contribute additional traffic to the study area which are not accounted for in the March 2022 traffic counts. In addition, the TIA also projects traffic for the abutting subdivided lot as expected to contain a 5,000 square foot (SF) bank and an 8,000 SF coffee shop, restaurant, or pharmacy with drive-through; however, the TIA has projected traffic related to this abutting lot as separate from the subject project described in this TIA and included the traffic in both the No-Build and Build conditions. TEC disagrees that traffic related to Lot 3 should be assessed in the No-Build condition as it is directly related to subject residential project by subdivision. Its inclusion may affect the Build to No-Build comparison of traffic impacts from the subject project. TEC recommends that the Board identify a condition of approval that requires the Applicant, or future Applicant, to assess traffic for Lot 3 in its separate traffic study based on the site's segmentation; thereby, reassessing the residential development in conjunction with the commercial space of Lot 3 for the overall project subdivision's impact.

48. Site trip generation calculations for the proposed residential development were generated based on standard trip rates published in the Institute of Transportation Engineers (ITE) publication *Trip Generation, 11th Edition* for Land Use Code (LUC) 220 – Multifamily Housing Low-Rise. Overall, the residential project is anticipated to result in 460 new vehicle trips on a typical weekday with 41 new vehicle trips during the weekday morning peak hour, 46 new vehicle trips during the weekday evening peak hour, and 25 new vehicle trips during the Saturday midday peak hour. The TIA identifies that trips were distributed on the roadway network based on US Census Journey to Work Data. This data is not provided in the TIA Appendix and the trip distribution cannot be verified.

49. Values within Table 6 – Peak Hour Traffic Volume Increases appear to be duplicated from 2030 No-Build to 2030 Build along South Main Street, south of Orchard Circle. Please adjust accordingly.

50. TEC agrees with the TIA that the projected site-specific traffic volumes are not expected to result in any significant change at the various study area intersections. TEC reiterates the recommendation for assessing traffic for Lot 3 in its separate traffic study based on the site's segmentation.

51. The capacity and queue analysis indicates that the queues along Boston Street would extend back to the location of the proposed site driveway. This is likely to be exacerbated as the queue for the Boston Street eastbound left-turn lane already exceeds the storage length of the lane provided where the Synchro software is not taking into account the actual storage length of the lane. The blockage of the site driveway may result in vehicles attempting to turn left into the site to be blocked and themselves block westbound traffic along Boston Street. Although a left-turn lane for this location may not be warranted, the Applicant should evaluate the need for a left-turn lane under the full build-out condition with Lot 3 to account for any need for this lane in the future (more through traffic on Boston Street). Furthermore, the Applicant should provide recommendations to reduce the likelihood of driveway blockage along Boston Street.

52. Similarly, the project projects a significant number of left turns into the South Main Street Driveway from the south. The Applicant should provide a left-turn warrant analysis for this location with and without the full build-out of Lot 3.

53. TEC agrees that stopping sight distance (SSD) measurements meet the minimum thresholds for the 85th percentile speeds as identified by the project's ATR counts. Intersection sight distance (ISD) looking east from the Boston Street Driveway is close to

the AASHSTO minimum and below the desired sight line. The Applicant shall ensure that the site frontage remains clear of obstructions so that this ISD is maintained following construction.

54. The Applicant has noted that it is committed to the following recommended off-site measures:

a) Traffic signal timing / phasing adjustments prior to the Certificate of Occupancy and at an 80-percent occupancy level for the South Main Street / Boston Stret / Town Hall Driveway intersection, the South Main Street / Maple Street intersection and the North Main Street / South Main Street / Lake Street / Central Street intersection.

b) Facilitation of a Road Safety Audit (RSA) at the intersection of South Main Street / Maple Street. The Applicant should provide information as to what, if any, improvements identified in the RSA would be implemented as part of off-site mitigation.

55. The Applicant should indicate if additional Transportation Demand Management (TDM) measures will be incorporated into the site, such as electric vehicle charging stations, preferential parking, parking for ride-hailing, or parking for delivery vehicles.

Please do not hesitate to contact me directly if you have any questions concerning our comments at 774-670-3569. Thank you for your attention to these matters.

Sincerely,
TEC, Inc.
*"**T**he **E**ngineering **C**orporation"*

Jared M. Duval, P.E.
Worcester Regional Director

Samuel W. Gregorio, PE, PTOE, RSP_1
Senior Traffic Engineer