146 Dascomb Road
Andover, MA 01810
978.794.1792

169 Ocean Blvd., Unit 101
PO Box 249
Hampton, NH 03842
603.601.8154

TheEngineeringCorp.com

Mr. Bob Gambale, Chair
Zoning Board of Appeals
Town of Ipswich
25 Green Street
Ipswich, MA 01938

October 16, 2018

Attn: Marie Rodgers

Ref. T0801

Re: Essex Road - Essex Pastures Comprehensive Permit Application
Traffic and Civil Engineering Peer Review Letter #2

Dear Mr. Gambale and Zoning Board Members:

On behalf of the Town of Ipswich, TEC, Inc. reviewed documents as part of the traffic and civil engineering peer review for the proposed project located on an undeveloped lot on Essex Road (Route 133) (Map 54A, Parcel 14A and Map 54C, Parcels 22, 22A, 23, 24).

The following documents were received as part of our review:

- *Essex Pastures Response to Comments Letter*, prepared by Bayside Engineering, Inc., dated October 9, 2108;
- *Traffic Impact and Access Study*, prepared by Bayside Engineering, Inc., dated February 21, 2017;
- *Memorandum for Essex Pastures*, prepared by Bayside Engineering, Inc., dated July 9, 2018;
- *Memorandum for Essex Pastures – Lakeman's Lane*, prepared by Bayside Engineering, Inc., dated August 22, 2018;
- *Plan set*, prepared by Bayside Engineering, Inc., dated August 9, 2018; Revised September 29. 2018
- *Essex Pastures Site Development Stormwater Report,* prepared by Bayside Engineering, Inc. date August 9, 2018; Revised September 29, 2018

The original comments have been retained from the most recent TEC review letter dated September 11, 2018, originally issued as part of the project review. The Applicants response to comments is shown as **bold**; TEC responses are shown as *italic*:

Transportation Impact Evaluation

1. The Traffic Impact and Access Study (TIAS) and the updated memorandum (July 9 Memo) present a study area along Essex Road (Route 133) including County Road (Route 1A) to the west and Heartbreak Road to the east. The second memorandum (Lakeman's Memo) expands the study area to include the intersections of Lakeman's Lane with Essex Road and County Road. TEC concurs with the scope of the expanded study area and does not find that additional intersections are warranted based upon the documented trip generation levels.

   Applicant Response: Bayside concurs with this statement.

   TEC: No response required.

2. Traffic counts utilized within the three traffic reports were conducted in June 2015 and August 2018. The July 9 Memo indicates that the June 2015 counts were increased 6% to a seasonal peak. The Lakeman's Memo indicates that the August 2018 volumes remained unadjusted as August represents the seasonal peak condition. The Applicant conducted automatic traffic recorder counts along the site frontage in June of 2015, April 2018, and August 2018. The April 2018 and August 2018 daily traffic volumes along Essex Road are approximately 5% less than the June 2015 daily traffic volumes. Therefore, the June 2015 counts used in the TIAS and July 9 Memo are conservative for analysis.

   TEC notes that the June 2015 counts are not within the two-year time frame required by MassDOT within their *TIA Guidelines*. MassDOT may require new traffic counts be performed upon submission of an Application for Permit to Access State Highway.

   The weekday morning and weekday evening peak commuter hours were studied to determine the project's overall effect on the roadway. TEC concurs that these selected time periods are appropriate for a residential land use as the peak hours of the dwelling units will typically overlap with the peak hours of the adjacent street system.

   Applicant Response: Bayside concurs with this statement.

   TEC: No response required.

3. To properly assess roadway operations and safety, including sight distance, the Applicant utilized a conservative 85th percentile travel speed along Essex Road (45 mph westbound and 47 mph eastbound) instead of the posted speed limit of 35 mph along the site frontage. These travel speeds were measured by the automatic traffic recorders in June 2015. TEC concurs with this speed assessment.

   Applicant Response: Bayside concurs with this statement.

   TEC: No response required.

4. The Applicant utilized an annual traffic volume growth adjustment factor of 1.0 percent per year based on data provided by MassDOT. The TIAS concurrently overlaid projected traffic volumes associated with the redevelopment of the former O'Keefe automobile dealership site on County Road as this site was not operational at the time of the 2015 counts. TEC concurs with the use of these traffic volumes and adjustment factors based on the MassDOT *TIA Guidelines*.

   Applicant Response: Bayside concurs with this statement.

   TEC: No response required.

5. The TIAS 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 2010 and 2014. Upon review of MassDOT's online crash portal, some crashes, although limited, may not be represented in the TIAS for intersections in the study area. The Applicant should review the crash data for the study area intersections and update as necessary; including the potential to include 2015 and 2016 data which is currently available from MassDOT. TEC also requests that a crash analysis be conducted for the expanded study area intersections of Lakeman's Lane / Essex Road and Lakeman's Lane / County Road.

   Applicant Response: Motor vehicle crash data for the study area intersections and roadways were obtained from the Massachusetts Department of Transportation (MassDOT) for 2010 through 2016, the most recent seven (7) year period for which crash data is available. This data updates and supplements the Motor Vehicle Cr4ash Summary table (Table 2) from the February 21, 2017 TIAS. The motor vehicle crash data was reviewed to determine crash trends in the area. Table 1 presents the updated summary…

   TEC: Upon review of the additional crash data provided, TEC concurs that there are no identifiable crash trends at the study intersections. No further response required.

6. Upon review of MassDOT's online crash portal and the data provided, TEC concurs that an identifiable crash issue and/or trend does not exist at the study area intersections. Although a specific crash trend does not exist, the Applicant should provide documentation of other traffic safety related issues/deficiencies at the intersections and subject roadways, if applicable.

   Applicant Response: Bayside concurs with this statement.

   TEC: No response required.

7. The TIAS uses the standard fitted curve equations published in the ITE publication *Trip Generation, 9th Edition* for land use code (LUC) 220 – Apartment to estimate the traffic generated by the 194 apartment and townhouse units. The July 9 Memo updates the traffic generation projection using the ITE publication *Trip Generation, 10th Edition* for land use code

(LUC) 221 – Multifamily Housing (Mid-Rise), reducing the traffic generation projections for the proposed site by 30%. Because the proposed development is on the lower side of the ITE Mid-Rise Multifamily Housing height spectrum (3-10 floors is considered Mid-Rise), does not have direct access to public transportation, and partially consists of townhouse units; the Applicant should revise the trip generation estimates to use the ITE publication *Trip Generation, 10th Edition* for land use code (LUC) 220 – Multifamily Housing (Low-Rise), which may reflect the traffic anticipated to be generated by the subject site more accurately.

For the purposes of determining the proposed project's impact on the immediately adjacent Essex Road roadway system and the improvements necessary to mitigate any impact, the analyses within the original TIAS remain the most conservative. The analyses within the Lakeman's Memo are appropriate to provide a sensitivity analysis for any potential cut-through traffic on this residential roadway.

Applicant Response: Bayside concurs with this statement. Bayside has prepared a trip generation comparison using ITE LUC 220 from the Tenth Edition of *Trip Generation Manual* and is summarized in Table 2. The trip generation calculations are attached. As shown in Table 2, using LUC 220 – Multi-family Housing (Low-Rise) yields a daily traffic generation slightly higher than that identified in the original TIAS. However, the peak hour traffic generation is lower.

TEC: TEC maintains that the analyses within the original TIAS remain the most conservative for the determination of the improvements necessary to mitigate any impact and were reviewed as such. No further response required.

8. The vehicular traffic generated by the proposed project was distributed onto the adjacent roadway system based upon available Journey-to-Work data published by the US Census Bureau for persons residing in the Town of Ipswich. This form of trip distribution is consistent with industry standards for residential developments, and therefore, TEC concurs with the methodology.

   TEC notes that a portion of the site generated traffic (27%) is distributed to the east via Essex Road. The volumes are shown in the Site Generated Trip Figures 7 and 8 in the TIAS and the July 9 Memo. However, these volumes are not carried through the intersection of Essex Road / Lakeman's Lane in the Lakeman's Memo. The Applicant should review the site distributions and revise the analyses at the intersection of Essex Road / Lakeman's Lane as necessary.

   Applicant Response: Included in the Appendix to this letter are the revised traffic flow networks, capacity analyses calculations and revised level of service summary table. The level of service results are not significantly changed.

   TEC: TEC concurs with the revised distributions and capacity analyses. No further response required.

9. TEC generally concurs with the results of the capacity and queue analysis provided as part of the TIAS utilizing the Highway Capacity Manual 2010 (HCM 2010) methodology.

Applicant Response: Bayside concurs with this statement.

TEC: No response required.

10. Overall, TEC concurs that the general impact of the project on the control delay, queue, and level of service along the approaches to the study area intersections is anticipated to be nominal in terms of 'vehicular' traffic.

    Applicant Response: Bayside concurs with this statement.

    TEC: No response required.

11. The Lakeman's Memo performed a sensitivity analysis of the operation of the intersections of Lakeman's Lane with Essex Road and County Road should up to 50% of the site traffic to/from the south on County Road (Route 1A) use this roadway as a cut-through. TEC performed travel time runs on the two routes to the site – via Lakeman's Lane and via County Road. TEC concurs with the findings within the Lakeman's Memo that the average time to/from the site via Lakeman's Lane is approximately one minute longer than the route via County Road. The two intersections studied continue to operate at acceptable levels of service within the sensitivity analysis with the addition of site generated traffic.

    Applicant Response: Bayside concurs with this statement.

    TEC: No response required.

12. The Applicant proposes to monitor the operations of the Essex Road / County Road intersection 12 and 24 months after full occupancy of the development and commits to providing design plans for the signalization of the intersection if the intersection level of service is poor due to the subject project traffic. TEC recommends that the Board consider the monitoring program as a condition of approval. At a minimum, the monitoring program should include daily and peak hour traffic volume counts at the site driveways to confirm traffic generation of the site and the peak hour operations of the intersections of Essex Road / County Road and Essex Road / Lakeman's Lane. Alternatively, the Applicant should coordinate with the Town's DPW for a scaled contribution to current or future infrastructure improvements near the project site to account for the project's tertiary impacts.

    Applicant Response: As identified in the TIAS, The Applicant shall, in consultation with the Town of Ipswich, conduct a traffic monitoring and reporting program which will include a survey or residents and employees participating in the TDM program. The traffic monitoring program will include measuring traffic volumes at the access point to the project over a continuous 7-day, week-long period and will be conducted at 12 and 24 months after issuance of the Final Certificate of Occupancy for the Project. This monitoring will also include the intersection of Essex Road and County Road.

TEC: TEC concurs with this proposed monitoring program and recommends that it be included as a condition of any Board approval. No additional response required.

13. The sight distances reported in Table 10 of the TIAS are measured in accordance with the American Association of State Highway and Transportation Officials (AASHTO) requirements and correspond with measurements TEC performed in the field. It is TEC's understanding that 12 feet of the existing retail building at #34 Essex Road will be removed to provide adequate sight distances at the intersection of the West Site Driveway / Essex Road. The site plans should be revised to show this building removal and any sight lines along the property frontage along Essex Road. The Applicant shall provide a plan within the set that depicts the AASHTO minimum sight distance to/from each of the new access driveways onto Essex Road. The sight line clear areas should be compared against future proposed Landscaping Plans to confirm that the sight lines will remain clear as reported in the traffic study. The Applicant should commit to remove and maintain vegetation along the site frontage consistently to ensure that sight lines remain unobstructed at the site driveway intersections with Essex Road.

    Applicant Response: The site plans will be changed to show the removal of the 12 (12) feet of the existing retail building. Sight lines will be shown. The Proponent is committed to removing and maintain vegetation along the site frontage consistently to ensure that sight lines remain unobstructed at the site driveway intersections with Essex Road.

    TEC: The site plan revisions are ongoing. TEC recommends that the commitment to remove and maintain vegetation along the site frontage consistently to ensure that sight lines remain unobstructed at the site driveway intersections with Essex Road be a condition of any approval.

14. Access to the project is proposed via two full movement driveways onto Essex Road. The West Site Driveway is in the approximate location of the existing driveway into #28 Essex Road, and the East Driveway is a new driveway located east of the Bruni Market Place. Due to the roadway speed, the applicant should consider the implementation of left turn lanes along Essex Road to remove these conflicting movements from the through traffic along the roadway. MassDOT has exclusive jurisdiction over all curb cuts that intersect with State Highway Layout (SHLO). TEC recommends the Applicant and the Town discuss the sight distances proposed at the West Site Driveway and the provision of left turn lanes at both site driveways with MassDOT's District 4 office as part of the Application for Permit to Access State Highway.

    The Town should consider including a condition to any approval of the site plan requiring completion of an approved MassDOT Permit to Access State Highway prior to the issuance of a Building Permit.

    Applicant Response: Bayside concurs with this statement.

    TEC: No further response required.

15. As provided, the Site Layout Plan depicts an on-site sidewalk network along one side of each access driveway and throughout the parking areas. The on-site sidewalk connects with the

existing sidewalk along the north side of Essex Road. The Applicant should consider, if possible, the construction of sidewalk along both sides of each access road within the development. A crosswalk should be added within the parking area between the two buildings on the southeast corner of the site. The Applicant should provide further detail on the plan to the location and type of accessible ramps within the site and at the site driveway crossings along Essex Road. Details for each ramp configuration type and crosswalk type and material should be added to the Site Development Plans.

Applicant Response: A sidewalk was considered for both sides of the site access roadways. However, this would significantly increase the impervious area. As such, it was decided to have a sidewalk on one side of each access roadway.

TEC: TEC concurs. No further response required.

Applicant Response: A crosswalk will be added within the parking area between the two buildings on the southeast corner of the site.

TEC: Comment ongoing.

Applicant Response: The final site plans will provide the necessary details relative to the location and type of accessible ramps within the site and at the site driveway crossings along Essex Road.

TEC: Comment ongoing.

16. The Site Development Plans should depict any proposed accommodations for a school bus pick-up and drop-off location along the site frontage. This could include some sections of new granite curbing and a cement concrete sidewalk surface to provide a visual difference for the pedestrian space adjacent to internal circulation areas.

    Applicant Response: An area has been suggested at the back of sidewalk at the easternmost site driveway. This will be reflected on the site plan.

    TEC: Comment ongoing.

17. The Town of Ipswich Zoning Bylaw requires 1.5 parking spaces per dwelling unit. For the 20 townhouse units, each unit appears to have two parking spaces – one garage space and one driveway space. For the 174 apartment units, 266 parking spaces are provided at a ratio of 1.5 spaces per unit. TEC concurs that this bylaw requirement is met.

    Applicant Response: Bayside concurs with this statement.

    TEC: No response required.

Site Plan Characteristics

Note that aspects of the site plans that enter State Highway Layout (SHLO) are under the purview of MassDOT. Although many of the following comments relate to the overall site and driveway locations, TEC has provided specific recommendations and comments for areas within SHLO that MassDOT are anticipated to ask as part of their Permit to Access State Highway review.

1. The Applicant should provide turning templates showing the ability of refuse vehicles to access, circulate, and egress the site through the circulation pattern without leaving the paved surface. The refuse vehicle shall be able to access the site without encroachment over the double yellow line on Essex Road (Route 133).

   Applicant Response: Refuse containers have been placed for easy access at the end of the site circulation roads. Swept-path turning movements will be provided for refuse equipment as part of a future submittal.

   TEC: Comment ongoing.

2. 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).

   Applicant Response: A sign and pavement marking plan will be provided as part of a future submittal.

   TEC: Comment ongoing.

3. The Applicant should coordinate with the Town of Ipswich Fire Department for preferred locations and sign requirements for fire lanes within the site (if needed) and confirmation of hydrant locations.

   Applicant Response: Bayside will coordinate and incorporate fire department requirements into the site plan.

   TEC: TEC defers to the Town of Ipswich Fire Department with regard to locations and sign requirements for fire lanes within the site.

4. The Applicant should provide vehicle turning templates to verify that a Town of Ipswich fire apparatus can circulate freely throughout the site in the event of an emergency.

   Applicant Response: Swept-path turning movements have been presented at the September 20, 2018 meeting. Access to all sides of the buildings was achievable using no reverse movements.

   TEC: The Applicant should provide this plan within the final plan set for review by TEC.

5. The Applicant should consider relocating the maintenance building on the southeast corner of the site to ensure access to all sides of the 24-unit building.

   Applicant Response: The fire department commented that it would be ideal to have full access, but did not require it. Swept-path turning movements have shown access to all sides of the structure are possible.

TEC: TEC defers to the Town of Ipswich Fire Department with regard their needs for accessing the buildings.

6. The Applicant should indicate the vertical datum that the existing conditions survey is based on.

   Applicant Response: The datum has been added to the plans.

   TEC: Comment addressed, however the vertical datum should also be added to the existing conditions survey (sheet 2).

7. The Applicant should provide a list of requested waivers on the site development plans.

   Applicant Response: A complete list of waivers is included in a separate document that has been submitted to the ZBA as part of the application.

   TEC: Comment Addressed.

8. The Applicant should provide dimensions to the proposed parking spaces and drive aisles on the Site Layout plan.

   Applicant Response: These dimensions have been added to the plans.

   TEC: Comment partially addressed; the smaller spaces (8'x18') should be dimensioned (northeast of 36 Essex).

9. The Applicant should provide a parking summary table that displays the number of required/proposed parking spaces, and the number of required/proposed accessible spaces on the Site Layout plan.

   Applicant Response: The details of the parking spaces have been added to the plans.

   TEC: Comment Addressed.

10. The Applicant should provide the *proposed* Building Area and Open Space along with the already provided Required Max Building Area, and Min. Open Space.

    Applicant Response: These measurements will have been added to the plans.

    TEC: Comment Addressed.

11. The Applicant should correct total sheet number, on sheets numbered 2 through 4.

    Applicant Response: The sheet numbers have been updated.

TEC: Comment Addressed.

12. The Applicant should provide an Erosion Control Plan for proposed construction per Section X.C.7 of the Ipswich Protective Zoning Bylaws.

    Applicant Response: The Erosion Control Plan and Erosion Control details have been added to the plan set. It should be noted that before construction, the contractor is required to prepare a Storm Water Pollution Prevention Plan (SWPPP) for construction operations and file with the US EPA. This document will provide in great detail measures that will adequately protect resource areas.

    TEC: Comment Addressed.

13. The Erosion Control Plan should show proposed locations of stockpiles; all stockpiles shall be outside the wetland buffers.

    Applicant Response: The erosion control plan shows the proposed location of stockpiles.

    TEC: Comment Addressed.

14. The Applicant should provide the following per Section X.E.2 of the Ipswich Protective Zoning Bylaws:

    a: Owner's address and signature;

    b: Addresses in addition to the names of all abutting property owners;

    g: Existing building setbacks;

    h: The location, size, and type of all signs and exterior lighting;

    i: The lot area of the parcel;

    k: The approximate location of all buildings within 200 feet of the parcel;

    Applicant Response: The missing items will be added to the plans. Exterior lighting and signs will be included as part of a future submission.

    TEC: Comment Ongoing.

15. The Applicant should specify if the interior zoning district line is a property line, and provide the Bearing and Distances of it.

Applicant Response: The zoning district line/property line has been clarified on the plan.

TEC: Comment Addressed.

16. Further clarification on the proposed sewer system is needed; including detailed sewer inverts, and a detail for the force main tie-in. The Applicant should provide a sewer design (pump station) stamped by a professional engineer.

    Applicant Response: A full sewer design will be included as part of the contract drawings after the site plan layout is confirmed. The design will include determination of the suitability of the existing pump station for the increased flow, and redesign if necessary.

    TEC: Comment Ongoing.

17. The project is proposing 194 units of new housing, it is unclear if the existing utility infrastructure is capable of handling the new use. The Applicant should coordinate with the Ipswich Utilities department to determine if adequate capacity exists for all town-owned utilities.

    Applicant Response: Bayside has reviewed the letter provided by the Town of Ipswich Utilities Department dated June 14, 2018 and has determined that additional information is required to assess the suitability of the existing utilities capacity for the increase in demand. Bayside has attempted to contract the Utilities Department via email on June 20th. The department responded that they will send us the materials the following week. Bayside has not received any information form the department. A letter was sent by U.S. Mail to the Utilities Department on September 7, 2018 requesting a meeting. We have received historical flow data for the adjacent development. Bayside will prepare a water and sewer system impact analysis and submit it at a later date.

    TEC: Comment Ongoing.

18. The Applicant should provide an estimate for water usage and sewer flows so the Town can determine if there will be any implications to downstream infrastructure.

    Applicant Response: Flow estimates will be provided as part of the water and sewer system impact analysis.

    TEC: Comment Ongoing.

19. The Town may benefit from a third party review by a Registered Landscape Architect to determine if the proposed plantings are adequate for screening and meet the intent of the Ipswich Zoning ByLaw.

Applicant Response: The Zoning Board is coordinating review of the plans by a registered landscape architect.

TEC: Comment Addressed.

20. The Applicant should indicate if an irrigation system will be installed for the extensive landscaping. An irrigation system could add to the demand on the Town's water system.

    Applicant Response: The landscape will include drought-tolerant species to minimize the irrigation demand requirements. Rainwater harvesting is being investigated to capture the roof runoff of the northern-most building for irrigation purposes.

    TEC: Comment Ongoing.

21. The proposed subdivision line will result in several decks/stairs within the setback of the new property line. The Town Building Inspector should review and determine if the proposed property line is allowed by right.

    Applicant Response: The proposed subdivision (commercial) lot lines will be located such that the commercial lot will comply with current zoning controls. And approval not required (ANR) plan will be submitted.

    TEC: Comment Ongoing.

22. It is unclear if the new buildings will be serviced by underground or overhead electrical wiring. The proposed electrical connections and equipment should be shown on the site plans.

    Applicant Response: The building will be serviced with underground utilities (electric, communication, television). Connection and equipment will be added to the plans as part of a future submittal.

    TEC: Comment Ongoing.

23. The project is proposing two new buildings totaling 64 units that will directly abut a single family home in the Rural Residential zoning district. These two buildings are located within the Rural Residential district.

    Applicant Response: Bayside concurs with this statement.

    TEC: No further action is required.

24. The Town may benefit from a third party review by a Registered Architect to determine if the scale and massing of the proposed buildings is appropriate in comparison to the current neighborhood.

Applicant Response: The Zoning Board is coordinating review of the plans by a registered landscape architect.

TEC: TEC is recommending that the plans be reviewed by a Registered Architect for building scale/massing. Plantings should also be reviewed by a separate, Registered Landscape Architecture firm.

25. The vegetated buffer between the new development and existing single family home should be revised to a minimum of 20-feet in width, exclusive of the proposed retaining wall.

    Applicant Response: The proposed vegetated buffer is greater than 20 feet in this location. However, it should be noted that this area contains an access easement for benefit of 48 Essex Road. Should access be necessary in the future, all vegetation will be removed at the option of the easement holder.

    TEC: Comment Addressed.

26. The site plans should be revised to call out snow storage areas.

    Applicant Response: Snow storage areas have been added to the plans. The owner has plans to remove snow and dispose of off-site should it become necessary to maintain the required parking spaces.

    TEC: Comment partially addressed; snow storage areas should be graded to drain towards the proposed stormwater management BMPs for treatment.

27. Further detail is required to properly review the proposed retaining walls. TEC suggests that a "top-of-wall" and "bottom-of-wall" elevation is provided every 50-feet along the proposed walls.

    Applicant Response: The proposed retaining walls have additional elevation data for each wall location.

    TEC: Comment Addressed.

28. The site plans should be revised to display the existing and proposed tree line (limit of clearing).

    Applicant Response: The existing tree line has been added to the plans.

    TEC: Comment Addressed.

29. The Applicant should submit a subdivision plan that shows that all of the zoning requirements are being met for the newly created lots.

Applicant Response: Bayside will submit an approval not required (ANR) plan showing that current zoning dimensional controls are met.

TEC: Comment Ongoing.

30. Several zoning setbacks are not being met by the proposed plan. The front-yard setback to the townhouses and maintenance building should be 50-feet minimum, and the rear-yard setback at the townhouse should be 30-feet minimum.

Applicant Response: The proposed and required setbacks are included on Sheet 3.

Townhomes (front)	**10′**	**(Required in Zone HB)**
	25′	**(Proposed)**
Townhomes (rear)	**20′**	**(Required in Zone HB)**
	12′	**(Proposed)**
Maint. Building (front)	**50′**	**(Required in Zone RRA)**
	52′	**(Proposed)**

TEC: The Zoning Board should determine if the proposed 12-foot rear set back is acceptable.

31. Several townhouses are proposed within the 65-foot no-build buffer zone to wetlands. The site plans should be revised to shift these buildings outside of the buffer zone.

Applicant Response: These townhouses have been moved outside of the 65 foot no-build zone.

TEC: Comment Addressed.

32. The Site Plans should be revised to provide loading zones as required for each new building. It is unclear if each new building will receive deliveries directly to the building or if a centralized delivery location is proposed.

Applicant Response: All deliveries will be delivered to the proposed automated mail and parcel building centrally located on the lot. Deliveries will not be made directly to the buildings.

TEC: This building should be labeled on the plan and the appropriate loading zones should be provided and labeled.

33. The site plans do not address trash removal or dumpster locations. It is unclear if a centralized dumpster location will be utilized or if each building will have its own dumpster.

Applicant Response: Trash/dumpster locations are labeled on the plans. These locations as well as receptacle size requirements will be evaluated and the plans revised as needed. There will be one (1) refuse and one (1) recycling dumpster per every two (2) buildings (the plans have been updated to reflect this requirement).

TEC: Comment Addressed.

34. The proposed lighting plan does not meet the requirements of the International Building Code. Section 1008.2 indicates that a minimum illumination of 1 foot-candle must be provided along all egress paths from the building to a public way.

    Applicant Response: Lighting plans will be included as required by code as part of a future submittal.

    TEC: Comment Ongoing.

Stormwater Management Plan

1. The Stormwater Report should include a section to address the 10 standards identified in the Massachusetts Stormwater Handbook. This section should include calculations to show that the required recharge volume and water quality volumes are being provided.

    Applicant Response: The site meetings required stormwater standards. The stormwater report has been revised to include a section describing how the project complies with the standards applicability.

    TEC: Comment Addressed.

2. The Site Plans should be revised to properly label (numbering) the proposed subsurface infiltration basins.

    Applicant Response: The infiltration basins have been labeled appropriately.

    TEC: Comment Addressed.

3. A detail should be provided for the proposed vegetative filter strips that meets the requirements of Volume 2 Chapter 2 of the Massachusetts Stormwater Handbook.

    Applicant Response: The vegetated strips include a detail for each location. The requirements have been met or exceeded according to the chard provided in the Massachusetts Stormwater Handbook:

    Max. allowed inflow length = 75' (paved)(max length provided <65')

    Max allowed slope = 6% (slope provided equal to or flatter than 6%)

Minimum allowed length = 25' (all areas exceed 30 feet)

TEC: Comment Addressed.

4. The project is considered a Land Use with Higher Potential Pollutant Load based on the trip generation summary in the submitted traffic report (>1,000 trips per day). All proposed Best Management Practices (BMPs) must be designed to meet the standards for LUHPPLs.

   Applicant Response: The current stormwater treatment CMPs include impermeable liners or impervious soil borrow to bring them into compliance with this requirement.

   TEC: Comment Addressed.

5. A detail should be provided for the proposed stone for pipe ends, and calculations should be submitted to show that the stone is adequately sized to dissipate the stormwater flows from the site.

   Applicant Response: Details and Calculations have been provided for the stone for pipe ends to show stone size suitability for the expected runoff velocity.

   TEC: Comment Addressed.

6. The bio-retention details should be revised to accurately show the bottom of stone elevation associated with the proposed underdrain. There are currently several elevations shown (37.23, 37.5, 38.5).

   Applicant Response: The elevations are shown correctly. The bottom of the stone bed is purposedly pitched to ensure the beds can fully drain between each storm.

   TEC: Comment Addressed.

7. Although it is not required, TEC recommends that an emergency overflow pipe be provided for the subsurface infiltration basins.

   Applicant Response: Bayside typically includes overflow devices as part of the downspout details and will include them on this project. Overflow pipes have been added for both locations.

   TEC: Comment Addressed.

8. For LUHPPLs, the bioretention systems should be lined until a minimum of 44% TSS removal is achieved. For the current layout, the entire bioretention system should be lined with an impermeable fabric.

Applicant Response: Impermeable fabric or impervious soil borrow has been added to meet this requirement.

TEC: Comment Addressed.

9. The pre-development watershed map should be revised to clearly define the proposed watersheds. The Time of Concentration path for each watershed should be labeled on the maps.

   Applicant Response: Proposed watersheds are shown accurately with the exception of the northeast corner of the site which will require minor adjustments to reflect the topography beyond the property line in that location. The watersheds have been updated.

   TEC: Comment Addressed.

10. It appears that the area northeast of the site may flow towards the site. If this is the case, this area should be accounted for in the design of the proposed stormwater BMPs.

    Applicant Response: This condition has been confirmed during a site visit. The northeast area has been adjusted to include this.

    TEC: Comment Addressed.

11. The Site Plans do not currently show any upgrades to the existing stormwater system within the subdivision Lot H, however it appears that the entire parking area is drained through a 6" pipe.

    Applicant Response: Bayside concurs with this statement.

    TEC: Calculations should be prepared to show that the 6" pipe is adequate to convey all design storms. As part of the subdivision required for this project, the stormwater system should be upgraded to meet industry standards.

12. The existing outlet from the stormwater system on Lot H is located right at the edge of the wetland system. If upgrades to the existing stormwater system are required, the stormwater outfall should be pulled back as far away from the edge of wetlands as possible.

    Applicant Response: The property owner has confirmed the existing wetland is a trench excavated many years ago as part of farming operations. The location of the wetland has been defined by the location of the outfall. Bayside does not recommend removal of the outfall if upgrades are not proposed to the system, as it would require extensive excavation within the local 'no disturb zone'. If the existing stormwater system is upgraded, the new outfall will be located in accordance with current practices and guidelines.

TEC: Comment ongoing.

13. The HydroCAD analysis of bioretention system #2 currently shows two primary outlet devices which may be causing incorrect calculations. The rectangular weir should be modeled as a Device 2 to the 18-inch culvert (same routing as pond BIO-1).

    Applicant Response: This has been corrected. Since the final discharge point and quantity of runoff has not changed, the analysis results have not changed as a result.

    TEC: Comment Addressed.

14. Based on the provided detail for the subsurface infiltration basin #1, the minimum cover requirement is not being met. It appears that a minimum grade of 46.33-feet is required to meet minimum cover.

    Applicant Response: Additional test pits have been performed to better understand the subsurface soils in this location. The layout of the infiltration system and associated grading will be revised as a result. Installation elevation, cover and grading has been updated.

    TEC: Comment Addressed.

15. The groundwater elevation at pond BIO-2 is incorrectly labeled as elevation 36.9-feet. Based on the test pit information, the groundwater should be at 38.9-feet. The Stormwater Report and BMP should be revised based on this information.

    Applicant Response: This test pit was originally located using 'swing' ties and the elevation was determined by the existing survey. The test pit location has been located by survey and updated. The groundwater elevation for test pit BEI-3 is 37.8. Also, additional test bits within the limits of BIO-2 have been performed to further define the groundwater elevation.

    TEC: Comment Addressed.

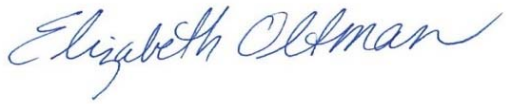
16. The deep observation hole #13 indicates that a layer of silt loam is located within the proposed subsurface infiltration basin. The HydroCAD modeling indicates an infiltration rate of 2.41 inches per hour, which is associated with a loamy sand soil type. The engineer should submit documentation or references that show that using a higher infiltration rate is acceptable although there is a more restrictive layer present below it.

    Applicant Response: Additional test pits have been performed to better understand the subsurface soils in this location. The layout of the infiltration system and associated grading has been revised as a result.

    TEC: Comment Addressed.

If you have any questions regarding the peer review, please do not hesitate to contact us at (978) 794-1792. Thank you for your consideration.

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



Elizabeth Oltman, PE
Senior Traffic Engineer

Peter F. Ellison, PE
Senior Civil Engineer