



January 12, 2023

Southfield Redevelopment Authority
c/o Jim Young
223 Shea Drive
Weymouth, MA 02190

**Re: Proposed 99-Unit Hotel Development
Intersection of Main Street & Shea Drive
Development Plan & Site Plan Approval – Peer Review #2**

Members of the Southfield Redevelopment Authority (SRA),

BETA Group, Inc. (BETA) has completed a second peer review of the proposed 99-unit hotel development (the Project) located at the intersection of **Main Street and Shea Drive in Weymouth, Massachusetts** (the Site). Proposed Site development includes the following activities (collectively “the Project”):

- Demolition of existing onsite features;
- Construction of entrance/egress to and from Shea Drive;
- Construction of bituminous surfaces and 101 parking spaces;
- Installation of stormwater best management practices (BMPs) including two (2) subsurface infiltration structures and modifications to the existing stormwater system;
- Installation of utilities;
- Site grading;
- Mitigation in support of the Project (i.e., wetland replication and compensatory flood storage); and
- Modifications to/integration with mitigation permitted for the MassDOT Route 18 Improvements Project.

As the SRA is aware, the Applicant has submitted a Joint Application for a Development Plan and Site Plan Approval to commence local permitting associated with the Project. To support the SRA in their deliberations, BETA’s review continues to include technical comments on the Project design as they relate to traffic operations and management, compliance with the stormwater management standards, compliance with the applicable state and local environmental regulations, and general engineering practices. BETA understands that the SRA has retained a separate consultant for the review of the Project’s compliance with the applicable zoning regulations as well as constructability and hydraulics associated with the proposed stormwater management system.

BASIS OF REVIEW

BETA received the following items via email:

- Stormwater Report entitled: ***Drainage Report for Endeavor Capital, Proposed Hotel, Main Street & Shea Drive, City of Weymouth, Massachusetts, Norfolk County***; prepared by Bohler; dated July 14, 2022 and revised October 25, 2022; stamped and signed by Joshua S. Swerling, MA P.E. No. 41697.
- Site Plan set entitled: ***Proposed Site Plan Documents for CP Endeavor Holdings 18 LLC, Proposed Hotel Development***; prepared by Bohler; dated July 14, 2022 and revised November 4, 2022;

stamped and signed Joshua S. Swerling, MA P.E. No. 41697 & John K. Holmgren, MA P.E. No. 30848; 11 sheets.

- Architectural Plan set entitled: **Townplace Suites**; prepared by Opechee Construction Corporation; dated July 15, 2022 and revised October 26, 2022; stamped and signed by David L. Sherborne, MA R.L.A. No. 952700; 8 sheets.
- Plan entitled: **Easement Exhibit**; prepared by Bohler; dated July 14, 2022.
- Plan entitled: **Fire Truck Turning Exhibit**; prepared by Bohler; dated July 14, 2022.
- Site Rendering entitled: **Townplace Suites Marriott, Main Street (Route 18) & Shea Drive, South Weymouth, Massachusetts**; prepared by Annino Incorporated; not dated.
- Application entitled: **Joint Application for Development Plan and Site Plan Approval to the Southfield Redevelopment Authority, 99 Room Hotel at Intersection of Shea Drive and Main Street (RTE 18)**; dated July 19, 2022.
- Memorandum entitled: **Professional Wetland Peer Review Services**; prepared by Wetland Strategies, Inc.; dated August 11, 2022.
- Document entitled: **Request for Amendment to Order of Conditions DEP File No. SE 353-1**; prepared by Tetra Tech; dated January 17, 2017.
- Letter entitled: **RE: Route 18 Widening and Reconstruction Project Special Conditions 18a and 18d, No Flood Rise Analysis**; prepared by the Massachusetts Department of Environmental Protection; dated May 5, 2017.
- Letter and associated documents entitled: **RE: Wetlands Variance**; prepared by the Massachusetts Department of Environmental Protection; dated September 8, 2016.
- Letter entitled: **Comment Responses**; Prepared by Bohler; dated November 4, 2022; signed by Nick Dewhurst.
- Letter entitled: **Amory Engineering Comment Responses**; prepared by Bohler; dated November 2, 2022; signed by Nick Dewhurst.
- Plan entitled: **SVCD Open Space Exhibit**; prepared by Bohler; dated October 25, 2022.
- Plan Entitled: **Shea Drive Pavement Stripping Plan**; prepared by Ron Müller & Associates; dated October 18, 2022.
- Geotechnical engineering report entitled: **Proposed Endeavor Hotel Main Street & Shea Drive Weymouth, Massachusetts**; McArdle Gannon Associates, Inc.; September 13, 2022; Signed by Sherry L. Holmes MA P.E. No. not provided and Wayne A. McArdle, MA P.E. No. 41835; 86 sheets.
- Letter entitled: **Response to Traffic Engineer Comments**; prepared by Ron Müller & Associates; dated November 17, 2022; signed by Kirsten Braun, MA P.E.

Review by BETA included the above items along with the following, as applicable:

- **Massachusetts Wetlands Protection Act (M.G.L. ch.131 s.40) and associated regulations (310 CMR 10.00), effective October 4, 2017.**
(collectively “the Act”)
- **Massachusetts 401 Water Quality Certification Regulations; effective October 24, 2014.**
(the 401 WQC Regulations)
- **Massachusetts Stormwater Handbook; effective January 2, 2008.**
(the Handbook)
- **Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas**
(the ESC Guidelines)
- **Subdivision Rules & Regulations, for NAS South Weymouth; effective December 16, 2014.**

- (the NAS Subdivision Regulations)
- ***Wetlands Protection Rules and Regulations for NAS South Weymouth; effective December 16, 2014.***
(the NAS Wetlands Regulations)
- ***Zoning and Land Use By-Laws for NAS South Weymouth; effective August 31, 2017.***
(the NAS Zoning Bylaw)

PEER REVIEW UPDATE—1/12/2023

Comments provided in BETA's August 26, 2022 peer review letter are included below in plain text. Since the issuance of BETA's August 26, 2022 letter, Bohler Engineering and Ron Müller & Associates have submitted revised project plans and documents, as well as responses to BETA's comments. Responses from the design team are detailed below in *italics*, with Bohler Engineering's November 4, 2022 responses prefaced with "*BOHLER:*", and Ron Müller & Associates' November 17, 2022 responses prefaced with "*RMA:*". BETA's January 12, 2023 responses/review comments are included in **bold**, prefaced by "**BETA2:**".

Based on BETA's multidisciplinary review of revised materials, the Applicant has largely addressed comments related to traffic management. However, the Project plans and comment responses provided by the Applicant fail to adequately demonstrate that the Project is permissible under state and local wetlands regulations. It is recommended that the Applicant consider the comment responses provided herein and commence with the Project's permitting under the Massachusetts Wetlands Protection Act and the Wetlands Protection Rules and Regulations for NAS South Weymouth prior to advancing the Development Plan and Site Plan Approval process in the interest of providing the SRA with updated plans that represent a permissible and constructable project for their consideration. As detailed below, significant design changes will be required for the Project to comply with Resource Area Performance Standards and the Massachusetts Stormwater Management Standards/Regulations.

SITE AND PROJECT DESCRIPTION

The Site consists of an approximately 2.234-acre collection of parcels located within the Central Redevelopment Area of Union Point. Further identified as Weymouth Assessor Parcels 58-597-27 and 58-597-147, the Site is situated within the southeast quadrant of the Shea Drive and Main Street (Route 18) intersection in Weymouth, Massachusetts. The Site is bounded to the north by Shea Drive, to the west by residential properties, and to the south and east by undeveloped land. The Site's current land uses are unknown; the Site appears to be vacant and consists of cleared areas, vegetated areas, entrance signage, mitigation constructed as part of the Route 18 reconstruction project, drainage associated with Shea Drive and Route 18, and gravel paths. Several Areas Subject to Protection and Jurisdiction under the Act and the NAS Wetlands Regulations exist at the Site including Bordering Vegetated Wetland (BVW), Bank, Land Under Water (LUW), and Bordering Land Subject to Flooding (BLSF). A network of intermittent streams exists at the Site, portions of which appear to have been historically dredged and culverted.

The Main Street (Route 18) and Shea Drive intersection is signalized and a full access unsignalized driveway is proposed approximately 500 feet from the intersection to the east on Shea Drive. The Site is located within two (2) zoning districts; the northern portion of the lot is zoned as the Shea Village Commercial District within the Mixed-Use Neighborhood Overlay District and the rear of the parcel is zoned as the Open Space-Corporation District. Both the Site and the proposed work are located entirely

within the SRA-defined Central Redevelopment Area; accordingly, BETA understands that work at the Site is subject to review by SRA but not the local boards and commissions of Weymouth.

Based on a review of MassGIS data, there are no mapped Outstanding Resource Waters (ORWs), Areas of Critical Environmental Concern (ACECs), Wellhead Protection Areas, Surface Water Protection Areas, or Natural Heritage and Endangered Species Program (NHESP)-mapped habitats at the Site. However, based on an assessment of the surrounding watershed via the United States Geological Survey (USGS) StreamStats application, the intermittent stream/BVW situated parallel with Route 18 appears to drain to the northwest to Resource Areas associated with the Mill River and ultimately Whitmans Pond, a Public Water Supply. Therefore, as noted in the Route 18 Variance document and per the definition provided in the 401 WQC Regulations, the intermittent stream/BVW along Route 18 is an ORW¹. As depicted on the most recent Federal Emergency Management Agency (FEMA) mapping, the Site is within a FEMA Zone AE Flood Hazard with an associated Regulatory Floodway. As discussed further in the comments below, more recent engineering data on the extent of the floodplain at the Site was developed through the MassDOT Route 18 project Variance and will require review by the Applicant.

The Project requires integration with existing drainage infrastructure, stream/wetland complexes altered through the reconstruction of Route 18 under a MassDEP Variance, roadway geometry, and traffic management devices. As detailed further in this letter, it is recommended that the Applicant provide additional information to demonstrate to the SRA that the Project will not have an adverse impact on the environment, stormwater management, and traffic patterns. However, prior to submission of these documents pursuant to the Site Development and Site Approval process, BETA encourages the Applicant to commence other permitting processes noted in this letter to receive feedback from the relevant regulatory entities and ensure that the SRA is reviewing a project that is constructable in light of local and state requirements. At this time, the SRA has not been presented with sufficient information to demonstrate that the Project represents a permissible design.

WETLANDS/ENVIRONMENTAL REGULATORY REVIEW

The proposed Project will impact Areas Subject to Protection and Jurisdiction under the Act and the NAS Wetland Regulations; specifically, 875 square feet of BVW/ORW and an unquantified volume/area of BLSF, Bank, and LUW. In addition, work will occur in the local 50-foot and the state/local 100-foot Buffer Zones to BVW and Bank that include clearing, grading, and construction of impervious surfaces. The Project currently does not meet General Performance Standards under the Act/NAS Wetlands Regulations for BVW, Bank, LUW, and BLSF.

In addition to providing the comments and recommendations below, BETA concurs with the subjects raised in Wetland Strategies, Inc. (WSI)'s August 11, 2022 memorandum. WSI notes that the submission of a Notice of Intent (NOI) will be required, at which point the Applicant will be required to demonstrate full compliance with the Act, the NAS Wetlands Regulations, and the Massachusetts Stormwater Management Regulations and Standards. In addition, WSI notes a conflict resulting from the Applicant proposing work within an easement previously granted to the Massachusetts Department of

¹ This conclusion was set forth in the findings of the Variance issued by MassDEP for the Route 18 reconstruction project. Further, BETA reviewed StreamStats watershed mapping on August 22, 2022, which indicates that the Site is within a subwatershed tributary to Whitmans Pond.

Transportation (MassDOT) for compensatory flood storage associated with the Route 18 reconstruction project, as well as work being proposed within 50 feet of the onsite BVW and Bank.

BETA is providing the following comments to apprise the SRA of conflicts that exist between the Project and the Act/NAS Wetland Regulations which are anticipated to have significant implications for the design and the SRA's ability to review a constructable and permissible project. BETA is of the opinion that the Project, as proposed, will require numerous revisions to comply with various local and state regulations, thereby resulting in the Applicant eventually revising and/or resubmitting their Site Development and Site Approval application. As noted in greater detail below, BETA recommends that the Applicant address the comments herein and submit an NOI prior to advancing the SRA's current review.

BETA2: The proposed Project will impact Areas Subject to Protection and Jurisdiction under the Act and the NAS Wetland Regulations including BVW, Bank, LUW, and BLSF. As noted below, the Applicant has not provided sufficient information to demonstrate that the current design/Site layout is permissible under the Act and the NAS Regulations due to conflicts with the requirements of Resource Area Performance Standards, particularly as it relates to the wetland replication area and the compensatory flood storage area. Information has been provided by the Applicant stating that MassDEP has been contacted to confirm permitting requirements under the 401 WQC program; however, the Project as proposed appears to require a Variance under the 401 WQC regulations.

BETA is providing the following comments to apprise the SRA of conflicts that exist between the Project and the Act/NAS Wetland Regulations which are anticipated to have significant implications for the design and the SRA's ability to review a constructable and permissible project. BETA is of the opinion that the Project, as proposed, will require numerous revisions to comply with various local and state regulations, thereby resulting in the Applicant eventually revising and/or resubmitting their Site Development and Site Approval application. As noted in greater detail below, BETA recommends that the Applicant address the comments herein and submit an NOI prior to the SRA advancing their review of the Project under the local Development Plan and Site Plan Review process.

- W1. The Resource Area flagging on the Project Plans is not consistent with the ALTA survey provided with the Project Plans. If additional and or revised Resource Area boundaries have been established, a Massachusetts Professional Land Surveyor should stamp and certify an up-to-date Existing Conditions Plan to demonstrate that the Project design is based on accurate existing conditions data.

BOHLER: The Site Plans and survey have been updated to include resource area flaggings placed and surveyed by the wetland consultant.

BETA2: The revised Existing Conditions plan now appears consistent with the ALTA survey. Any additional flagging required to delineate resource area boundaries at the Site (see Comment W2-BETA2) should be certified by a Massachusetts Professional Land Surveyor.

- W2. The Resource Area boundaries depicted on the Project Plans are not qualified (e.g., Bank vs. BVW associated with the culverted stream along Route 18, etc.). The Applicant will be required to accurately qualify each Resource Area at the Site to ensure that impacts are quantified correctly, and all applicable Performance Standards are met. The Applicant will be required to provide this information in order to permit the Project under the Act/NAS Wetlands Regulations and demonstrate to the SRA that the Project is permissible and constructable.

BOHLER: The resource area disturbances have been clarified and quantified as follows: the Bank disturbance associated with filling the intermittent stream totals 183 linear feet. The Land Under Water (LUW) disturbance associated with stream totals 319 square feet. The BVW located along the stream to be filled totals 594 square feet. The property also contains Bordering Land Subject to Flooding (BLSF) and the project will result in filling 7,065 square feet of BLSF and displacing 210 cubic feet of BLSF. Mitigation is provided for each of these wetland impacts as described below.

BETA2: The BVW impacts described above are inconsistent with the revised plans, which presently note that 875 square feet (sf) of BVW will be filled at the culverted stream along Route 18 (not 594 sf). In addition, Resource Area flagging depicting the interior Bank boundaries are not shown on the plans at this location. It is recommended that impacts be clarified and shown on the plan, and that the Bank boundary be field-delineated and survey-located to corroborate reported impacts. This will be required to determine the applicability of, and compliance with, the Performance Standards under the Act.

The plans continue to be ambiguous in qualifying the types of Resource Areas across the Site. In some cases, areas labeled as “Wetland Area” along the southern portion of the Site were observed in the field to consist of Inland Bank with no adjacent wetlands. This impacts the Applicant’s assumptions for the location of the wetland replication area, as the proposed replication area may not actually border on a vegetated wetland as noted in the Applicant’s response under Comment W5.

Comment remains.

- W3. Portions of the Project including grading, tree clearing, and construction of impervious areas will occur within an additional area of BVW/ORW identified by BETA during a Site visit on August 10, 2022, near Proposed Test Pit #5. Hydrophytic vegetation including cattail (*Typha latifolia*) was observed, as well as soil indicators of hydrology within 12 inches of the surface.

BETA recommends that the Applicant reassess this area concurrently with the recommendations provided above in Comment W2. As of this writing, the Applicant has not provided the SRA with accurate existing conditions information related to Wetland Resource Areas at the Site.

BOHLER: LEC will assess this area and provide the SRA with an update at the November 16 Public Hearing. It is important to note that this area is within the recently constructed BLSF compensatory storage area associated with the Route 18 project and was not identified as a wetland on any previous plans for the property.

BETA2: BETA has not received any updates on the Applicant’s response to comment W3 regarding additional Resource Areas at the Site. Previous compensatory storage work may have resulted in hydrologic conditions that support the establishment of jurisdictional wetlands that meet the definition of a vegetated wetland under the Act. The presence/absence of a vegetated wetland on historic plans does not preclude a wetland from being jurisdictional. Comment remains.

- W4. The BVW along Route 18 that is proposed to be filled is also the location of an intermittent stream with jurisdictional Bank and LUW. The Project, as proposed, will fill/re-route this intermittent stream and therefore cannot meet the Performance Standards under 310 CMR 10.54(4) and 310 CMR 10.56(4) for Bank and LUW, respectively.

Further, this stream/BVW meets the definition of an ORW due to it being a tributary to Mill River, which appears to ultimately discharge to Whitmans Pond, a Public Water Supply. The 401 WQC Regulations strictly regulate discharge of fill and dredged materials to ORW. BETA recommends that the Applicant demonstrate that the proposed work is permissible under the 401 WQC Regulations and does not require a Variance, as the proposed stormwater and development design relies on filling onsite ORW for purposes of stormwater management.

BOHLER: The project will result in filling the Bank and associated BVW and Land Under Water associated with the on-site intermittent stream system. While this stream is technically a resource area and is protected as an ORW, it is important to note that it is a recently constructed, man-made ditch designed to provide compensatory flood storage. Prior to the Route 18 Widening project, and within the MassDOT plan set, this feature was labeled as a nonjurisdictional "ditch" (see Attachment A). The Route 18 project relocated the ditch and presumably widened it to provide comp storage for BLSF disturbance. The ditch was filled and the new channel constructed in 2019. The features relative functions and values are severely degraded as a result of its location adjacent to Route 18 and lack of direct surficial connection to any larger contiguous wetland systems. This stream is an approximately 100-foot long segment of stream that flows within long culverts both upstream and downstream of the open channel section. Upstream, the stream flows west from the wetland system off-site located off-site to the east via a 200-foot long 24" pipe extending along the southern property line. From this pipes outlet into the existing channel, the stream flows north in and is again piped for another 350-feet within a 24" pipe extending under Route 18 to an outlet into a wetland system on the west side of Route 18. Due to its location approximately 20-feet from the edge of Route 18, the stream is likely subject to significant water quality impacts from snow plowing and other runoff from surrounding development. The NOI for the project will address the Performance Standards for the impacted resource areas. The mitigation shown on the Site Plans provides mitigation that is of higher relative function and value than the existing degraded resource areas.

As noted above, the team is in the process of discussing permitting with DEP and will update the SRA with additional information as it is obtained.

BETA2: BETA recommends that the SRA be provided with an update on permitting discussions with MassDEP as noted above. Historic conditions of this stream do not warrant a disregard of Performance Standards, as this area consists of jurisdictional BVW, Bank, and LUW under existing conditions. Although the stream/BVW is in an urban area, the Applicant has failed to note several interests of the Act that these Resource Areas provide, including:

- **Wildlife habitat (dense vegetative cover);**
- **Storm damage prevention (attenuation of stormwater flow by dense vegetation and granular soils);**
- **Pollution prevention (uptake of pollutant by vegetation); and**
- **Flood control (static storage during and after rain events).**

BETA recommends that the Applicant consider these functions and values when drafting the NOI and encourages the Applicant to provide sufficient information demonstrating full compliance with the Bank, BVW, and LUW Performance Standards. As stated in BETA's original

comment, this work will likely require a variance under the 401 WQC Regulations due to fill being proposed within an ORW. Comment remains.

- W5. As noted in the above-referenced Covenant and in WSI's memorandum, 2:1 wetland mitigation is required for impacts to BVW at the Site. The Project as proposed does not adhere to this requirement.

Based on the information provided, the proposed mitigation area will not meet the Performance Standards under 310 CMR 10.55(4), as it does not appear that the mitigation area will be constructed at the same elevation and within the same reach of the adjacent waterbody as the impacted area. Further, the Applicant is proposed a flared-end section along the western portion of the replication area that has been designed to drain the replication area, thereby removing sources of hydrology required to establish a wetland.

BETA recommends that the Applicant seek an alternative area/layout for wetland replication that meets local and state Performance Standards and does not interface with the stormwater management system. This revision will require the construction of a larger wetland replication area and will likely result in proposed stormwater management BMPs being located within 50 feet of a surface water, which is not permissible under the Massachusetts Stormwater Regulations and Standards.

BOHLER: The proposed Wetland Replication Area can be modified to achieve the required 2:1 ratio and to comply with the BVW Performance Standards. As noted above, the stream system to be impacted is hydrologically connected the wetland system to the east, which includes the location of the wetland replication area. Mitigating the wetland impacts in the proposed location will create a significantly more valuable and functional resources since they will be located adjacent to, and become part of the existing wetland system. This will be an improvement when compared to the low-quality, man-made wetlands to be filled.

BETA2: Per the BETA2 response to Comment W2, sufficient existing conditions information (i.e., qualification of Resource Areas) to determine the Project's compliance with the BVW Performance Standards has not been provided.

Under the current design, standing water within the wetland replication area would likely backup into the adjacent 18-inch reinforced concrete pipe (RCP). The drainage design would no longer drain the replication area; rather, the proposed RCP and flared end section will discharge roadway runoff from a catch basin and other drainage infrastructure within Shea Memorial Drive to the replication area. In addition, this wetland replication area will function as overflow storage for Underground Infiltration System No. 2.

- W6. The extent of BLSF on the Project Plans conflicts with the information provided as part of the MassDOT Route 18 Variance proceedings, and the proposed compensatory flood storage does not meet the Performance Standards listed under 310 CMR 10.57(4)(a). BETA offers the following comments regarding the onsite floodplain:
- a. As noted by the Applicant, the published FEMA base flood elevation for the Site is 151.2 feet (NAVD88). Although FEMA has published a base flood elevation for the Site, Special Condition 18a and 18d of the MassDOT Variance required MassDOT to assess the floodplain via a HEC-RAS analysis to ensure that there would not be a rise in flood stage following construction of the roadway improvements, as fill was proposed within a

Regulatory Floodway. MassDEP's May 5, 2017 letter documented agreement with the analysis performed by Tetra Tech that established a base flood elevation of 153.83 feet (NAVD88). MassDEP's letter also indicates that MassDOT is required to submit a Letter of Map Revision (LOMR) to FEMA. No LOMR appears to have been submitted at the time of this writing.

BETA recommends that the Applicant be required to consider the results of the HEC-RAS analysis in determining the boundary of BLSF at the Site. Although the Act notes that FEMA mapping is presumed accurate for determining the boundary of BLSF, 310 CMR 10.57(2)(a) indicates that presumption is rebuttable based on credible evidence by a Professional Engineer or another competent professional. Use of the most up-to-date floodplain data will result in a majority of the Site being below the floodplain elevation and the Project not being permissible as proposed.

- b. The proposed compensatory storage area is effectively a stormwater basin receiving onsite stormwater discharge and features a hydraulic restriction (i.e., a "pinch point") in the center of the area; therefore, the Performance Standards under 310 CMR 10.57(4)(a) are not met. BETA recommends that the Applicant consider this Performance Standard in any subsequent design revisions.

BOHLER: Since MassDOT's LOMR has not yet been acted on by FEMA, the design plans have been prepared to provide compensatory flood storage based off the flood elevation currently listed by FEMA (151.30) rather than the elevation listed in MassDOT's LOMR (153.86). However, the building elevation has been set at 154.00 to be above the flood elevation listed in MassDOT's LOMR.

Per review of the HEC-RAS model prepared by MassDOT's consultant, the existing grades do not account for the existing compensatory flood storage areas within the site and are essentially blind to changes in grading within the site. Although the proposed site plan does provide compensatory flood storage, given how the site is modeled in HEC-RAS, it is Bohler's opinion that the proposed project would not have an adverse effect in flooding within the project area.

BETA2: As noted in BETA's original comment, the presumption of base flood elevations established by FEMA mapping being accurate is rebuttable based on credible evidence. The Tetra Tech HEC-RAS model is the most up-to-date credible evidence on this matter; therefore, the burden of proof to dispute this is on the Applicant and will need to be addressed upon filing the NOI. The broad statement provided by the Applicant is not sufficient in disputing this data. BETA understands that this HEC-RAS is required to be submitted to FEMA per the conditions of the Variance issued for the Route 18 Reconstruction Project.

Should the Applicant elect to not consider the HEC-RAS analysis developed during the construction of the MassDOT project, BETA recommends that a Professional Engineer specializing in hydraulics analyze the HEC-RAS and provide specific details justifying this approach for the NOI. Regardless of the base flood elevation used, a compensatory storage area that meets the Performance Standards of the Act has not been provided. Comment remains.

- W7. BETA understands that due to the Site's land use history, polyfluoroalkyl substances (PFAS) have resulted in groundwater contamination. During the August 10, 2022 Site visit, BETA observed an

environmental consultant working with a driller to collect soil samples. Numerous groundwater monitoring wells are present at the Site.

Given the nature of the Project and its use of stormwater best management practices (BMPs) that will infiltrate onsite runoff into the groundwater table, the Applicant should provide a full analysis of the PFAS risks at the Site and how work at the Site will comply with the Massachusetts Contingency Plan. It is recommended that full disclosure of contaminants and any potentially required remediation be disclosed to the SRA to determine what constraints, if any, exist for development at the Site.

BOHLER: An Environmental consultant has been engaged and is currently preparing a Phase I Environmental Site Assessment (ESA) to determine the presence of any potential contaminants on the site. This information will be forwarded to the SRA once available.

BETA2: Acknowledged. Given the potential for contamination at the Site and proposed development layout, BETA recommends that the Phase I ESA and any subsequent recommended ESAs (if applicable) be completed prior to further review of the development. PFAS contamination within groundwater has the potential to significantly constrain development of the Site, particularly with grading and the design of stormwater management BMPs.

STORMWATER MANAGEMENT REVIEW

The Project proposes a stormwater management system design consisting of catch basins, subsurface infiltration structures, and drainage manholes. Based on a review of the revised plans and documents provided, it appears that sufficient soils assessments have not been completed at the Site. Accordingly, until the onsite soil types and the depth to groundwater are accurately determined, there is insufficient data available to determine if the system as designed will meet Massachusetts Stormwater Management Standards (the Standards) 1, 2, 3 & 4. In addition, and as described in the Wetlands/Environmental Review above, the floodplain at the size does not appear to be accurately depicted or characterized. Until these issues are resolved, documentation of compliance with the Standards cannot be accomplished. The following responses provide further review of the Project stormwater management system design and offer recommendations for the Applicant's consideration when filing their NOI.

SW1. There are no test pit logs to verify the soil conditions at the Site. Since there is no Natural Resources Conservation Service (NRCS) soils determination in the upland portion of the Site, the entirety of the design is based upon assumptions relative to the curve number (CN) values, infiltration rates, and most importantly, depth to groundwater.

BOHLER: Test pit and soil boring have been conducted and are included within the Geotechnical Engineering Report included in this submission and the proposed drainage design has been revised accordingly.

BETA2: There is only one (1) test pit located in Infiltration System 1 and there are no test pits located in Infiltration System 2. Each system will require two (2) test pits to confirm suitability of soils in accordance with the Standards. Comment remains.

SW2. As noted above, the Site is located within an area tributary to a public water supply (Whitmans Pond) and the wetlands at the Site are therefore considered ORWs. The Project design presently does not provide sufficient setbacks for stormwater BMPs from surface waters, nor does it

provide the required level of treatment for stormwater discharging to an ORW. Therefore, the stormwater design is not in compliance with the Standards.

BOHLER: The drainage design has been revised such that the proposed underground infiltration systems provide 50 feet of separation from all wetland resource areas/surface waters. Should additional water quality be required within the site prior to discharge to the wetland resource areas, additional measures will be introduced.

BETA2: The pretreatment measures provided for the two (2) infiltration systems, as currently designed, are adequate. However, there is no proposed treatment for the existing discharge through the Site from Shea Boulevard. BETA recommends that the Applicant review the possibility of providing treatment for this discharge.

SW3. The design of the two (2) proposed subsurface infiltration systems are based upon test pits to be conducted in the future. The bottom elevation of each of these systems is 147 feet (NAVD88). The adjacent wetlands and streams are depicted at or around elevation 152 feet (NAVD88); therefore, the proposed systems are currently proposed to be five (5) feet lower than the adjacent wetlands. According to the Handbook, the bottom of these systems should be a minimum of two (2) feet above seasonal high groundwater. It is BETA's opinion that it is not reasonable to assume that the groundwater elevation adjacent to the wetlands will be a minimum of seven (7) feet lower than the delineated boundary.

BOHLER: Test pit and soil boring have been conducted and are included within the Geotechnical Engineering Report included in this submission and the proposed drainage design has been revised accordingly.

BETA2: The Infiltration Systems are not proposed 2 feet above estimated seasonal high groundwater (ESHGW) as required by the Handbook. Comment remains.

Within Infiltration System 1, test pit #15 indicates that the groundwater level is at elevation 146.2±, and the bottom of the system is at elevation 147.0. No soil colors were provided in the logs; however, based on the soil descriptions provided, BETA's opinion is that ESHGW is at elevation 147.9. Therefore, Infiltration System 1 would be located within the groundwater table.

No test pits were provided within Infiltration System 2. Test pits #'s 1 and 4 are close by, but soil colors were not provided in the logs. Based on the soil descriptions provided, it is BETA's opinion that the ESHGW is at elevation 148.5 & 148.8 at test pits #1 & #4 respectively. The bottom of stone at Infiltration System 2 is at elevation 148.8; therefore, Infiltration System 2 would be located within 2 feet of ESHGW.

SW4. Proposed Underground Infiltration System No. 1 is located within the wetlands that have been flagged along Main Street, and Underground Infiltration System No. 2 will be only 18 feet from the replicated wetlands area. Neither location will meet the Handbook requirement for an infiltration system to be located a minimum of 50 feet from the surface waters.

BOHLER: The project proposed to fill the existing wetland resource area where Proposed Underground Infiltration System-1 and replicated within the site. Proposed Underground Infiltration System-2 has been revised to provide 50 feet of separation from all wetland resource areas/surface waters.

BETA2: Infiltration System 2 has been relocated to provide the 50-foot setback from the wetland replication area; however, it is now within the required 10-foot setback from the property line.

SW5. As noted above, additional consideration should be given to the onsite floodplain. If the proposed Project were to be constructed, the Site would act as a dam to restrict flood flows towards the north. This would result the Resource Areas at the rear of the site to detain flood flows and effectively act as a stormwater control structure.

BOHLER: As previously stated, per review of the HEC-RAS model prepared by MassDOT's consultant, the existing grades do not account for the existing compensatory flood storage areas within the site and are essentially blind to changes in grading within the site. Although the proposed site plan does provide compensatory flood storage, given how the site is modeled in HEC-RAS, it is Bohler's opinion that the proposed project would not have an adverse effect in flooding within the project area.

BETA2: This response cannot be verified without reviewing Bohler's analysis of the HEC-RAS. Comment remains.

SW6. As proposed, the grades along the southerly property line would be raised by approximately one (1) foot. There is insufficient survey data on the plans to determine if this would result in any additional localized ponding on the adjacent site. At a minimum, it will divert additional flood flows onto the adjacent lot, particularly during events less than a 100-year frequency event.

BOHLER: Additional survey data will be gathered and the Site Plans will be adjusted as necessary as to not divert flows towards the adjacent lot.

BETA2: Comment remains until further data is provided.

SW7. The design of the proposed flared end section at the wetland replication area and the connection with the Main Street collection system is associated with the following design issues:

- a. During low flows, it will divert runoff away from the wetlands beyond the existing outfall and essentially act to dewater the wetlands.
- b. The angle of the inlet into the proposed DMH to be set along Main Street at a significantly acute angle to the direction of flow.
- c. During high intensity storm events, a reverse flow may occur within the culvert and allow untreated stormwater flow from the MS4 into the Resource Areas.

BOHLER:

a. The design has been revised to remove the existing headwall and its associated pipe. The existing flows directed to the headwall will now be transferred to a new flared end section that directs flows towards the proposed wetland replication and compensatory flood storage area. In the existing condition, there is a depression at the headwall that results in ponding of stormwater up to approximately elevation 151.10. The proposed wetland replication area has been designed to provide a spillway at elevation 149.67 that leads to a small depression where the existing headwall is located. Stormwater will then pond within this depression up to approximately elevation 151.10 prior to discharge to the existing wetlands, as it does in the

existing condition. This spillway will continue to water the existing wetlands during low flow storm events in a similar manner as the existing headwall does in the existing condition.

b. The design of the inlet to the existing Main Street drainage system has been revised to connect via a doghouse manhole north of the previous connection location. The proposed connection is now at 90 degrees.

c. The design has been revised to remove the flat portion of pipe from the existing Main Street drainage system to the proposed wetland/compensatory flood storage area. The updated design includes converting the existing catch basin within the site to a drain manhole. This manhole will essentially act as an outlet control structure to send low flows to the wetlands and higher flows directly to the Main Street drainage system to reduce the potential for erosion of the existing wetlands during higher intensity storms. During high intensity storm events in the existing condition, the existing Main Street drainage system backs up and ultimately begins to discharge out of the 24" RCP pipe at the southerly property corner towards the wetland resource area beginning at elevation 149.40. In the proposed condition, no backup towards the proposed wetland resource area would occur prior to elevation 151.50 (outlet elevation from converted catch basin to manhole towards the Main Street system).

BETA2: BETA questions the requirement for the installation of the overflow from the converted catch basin to DMH 7. This connection is not accounted for in the analysis. Since all the flow through this outlet is from a non-analyzed watershed area outside of the Site, the purpose and intent of this overflow cannot be confirmed.

SW8. As noted above in Comment W7, the Applicant should demonstrate that the proposed stormwater design accounts for PFAS contamination if found to be present. Should infiltration (as currently proposed) not be feasible due to groundwater contamination concerns, alternative stormwater BMPs will be required and may significantly decrease the developable area at the Site.

BOHLER: An Environmental consultant has been engaged and is currently preparing a Phase I Environmental Site Assessment (ESA) to determine the presence of any potential contaminants on the site. This information will be forwarded to the SRA once available.

BETA2: See Comment W7-BETA2.

Based on a review of revised materials, BETA offers the following additional comments:

SW9. **The Existing Conditions plan provided in the plan set is incomplete. Invert data is missing on several of the existing drainage structures. Complete utility and topographic data should be included on the plan.**

SW10. **The submitted plans and documents do not confirm whether the existing Resource Areas at the southeast of the Site are in fact connected to the stormwater drainage system in Route 18, or if they contribute flow to the east away from the Site. The 24-inch RCP culvert at the southern end of the parcel is connected to the existing drainage system in Route 18. If the flow from this culvert is directed towards Route 18, then the HEC-RAS analysis accounts for this flow and the floodplain levels would therefore be established by the inlet capacity of the culvert and the water surface elevations in the drainage system developed by the program. This data is critical to the stormwater design and should be incorporated into the analysis.**

TRAFFIC ENGINEERING REVIEW

The proposed development consists of a 101-room hotel. Access to the site would be provided by one full access driveway located on Shea Drive approximately 500 feet east of Main Street (Route 18).

The study area does not include the Main Street (Route 18) and Shea Drive signalized intersection in the vicinity of the site.

- T1. Clarify why the Main Street (Route 18) and Shea Drive intersection was not included in the study area. Including adjacent intersections is standard practice for a traffic study.

RMA: The intersection of Main Street and Shea Memorial Drive has been included within the study area. See responses to specific comments regarding this intersection below.

BETA2: Information provided. No further comment.

Traffic volume data were collected via automatic traffic recorder (ATR) on Shea Drive over a 72-hour period from Thursday, September 16th, 2021, through Saturday, September 18th, 2021. The weekday daily volume is 3,640 vehicles per day with a morning peak of 155 vehicles and an evening peak of 520 vehicles. The Saturday daily volume is 4,095 vehicles per day with a peak of 300 vehicles.

Permanent count station data from Route 3 north of Route 18 (Station 6255) were reviewed to determine the need for seasonal adjustment. Traffic volumes in September were found to be above average-month conditions, but the volumes were not adjusted downward, to provide conservative volumes.

To account for the difference in traffic patterns due to the pandemic, permanent count station data from September 2018 was compared to the September 2021 data. The existing 2021 volumes were found to be comparable, so no adjustment was made.

Manual turning movement counts (TMCs) were not collected at the adjacent intersection.

- T2. BETA recommends manual turning movement counts (TMCs) be conducted from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on a weekday to capture peak hour traffic volumes at the Main Street (Route 18) and Shea Drive intersection.

RMA: Manual turning movement counts (TMCs) were conducted at the intersection of Main Street and Shea Memorial Drive. Counts were conducted in November 2022 during the weekday AM peak period (7:00 to 9:00 AM) and the weekday PM peak period (4:00 to 6:00 PM). All traffic count data are attached.

To determine if the count data needed to be adjusted to represent annual average month conditions consistent with Massachusetts Department of Transportation (MassDOT) guidelines for traffic impact assessment, historical traffic volume data were obtained from MassDOT's Seasonal Weekday Adjustment Factor file. This document provides a monthly adjustment factor based on the roadway classification of the study roadways. Main Street is classified as a rural minor arterial (R3). This roadway classification has an adjustment factor of 1.09 for the month of November, meaning November represents a lower-than-average traffic condition month. Therefore, the counts were adjusted upward by nine percent. The MassDOT Seasonal Adjustment Factor file is attached.

The MassDOT Traffic and Safety Engineering 25% Design Submission Guidelines were recently updated on 5/31/2022. These new directives note that traffic volume data collected after March

1, 2022 are no longer subject to any adjustments to represent pre-pandemic traffic volume conditions, except in areas where land use is predominantly office. Therefore, since the traffic volume data were collected in November 2022 and land use in the area is predominantly commercial and residential, COVID adjustments were not applied to the counts. The 2022 Existing peak hour traffic flow networks are attached on Figure 1.

BETA2: Information provided. The roadway is classified as "Rural Minor Arterial or Urban Principal Arterial," the applicant assessed seasonal adjustment assuming Rural. BETA finds the roadway to be Urban. The Urban seasonal adjustment factor is lower than the rural, thereby resulting in a conservative assessment by the Applicant. No further comment.

Vehicle speeds were collected via ATR along Shea Drive in the vicinity of the proposed driveway. The posted speed limit is 25 miles per hour (mph). **The 85th percentile speeds were 37 mph in both the eastbound and westbound directions which are significantly higher than expected for a 25-mph roadway.**

Shea Drive has a straight alignment in the vicinity of the proposed driveway. The available stopping sight distance (SSD) at the proposed site driveway would exceed the 270 feet minimum based on the 37-mph 85th percentile speed.

Project-generated traffic volumes were determined by utilizing trip-generation statistics published by the Institute of Transportation Engineers (ITE) for Land Use Code 310 (Hotel). The land use and methodology chosen are accurate and consistent with industry standards. Based on the *10th Edition* of the *ITE Trip Generation Manual*, the project site is estimated to generate 710 new trips on an average weekday. New peak hour trips are estimated to be 45 (27 entering, 18 exiting) in the weekday morning peak hour, 50 (26 entering, 24 exiting) in the weekday afternoon peak hour, and 74 (41 entering, 33 exiting) in the Saturday midday peak hour.

The 11th Edition of the ITE Trip Generation Manual indicates slightly higher peak hour trips, however, the difference is generally deemed not significant.

New trips were noted to be distributed through the study area based on existing travel patterns which with equate to a 50/50 distribution to and from the east and west of the driveway.

T3. While trip distribution based on existing travel patterns is typically appropriate, BETA recommends the Assessment apply all Site trips to the adjacent intersection of Main Street. When reviewed, online mapping services generally do not route trips to travel along Shea Drive to access the Site unless they begin/end within the Union Point area to the south and east. All exterior trips generally are routed via Main Street from the north or south.

RMA: To provide a conservative assessment, all site traffic was assumed to utilize the intersection of Main Street and Shea Memorial Drive. No site traffic was assigned to/from the east on Shea Memorial Drive as requested. Based on this information traffic volume increases on Main Street north and south of Shea Memorial Drive are expected in the range of 22 to 25 additional vehicles during peak hours, or one additional vehicle every two and a half to three minutes.

BETA2: Information provided. No further comment.

The study states that based on the trip generation and distribution assumptions, the impact to the Shea Drive during the peak periods would be approximately one vehicle every 1.5 to 2.5 minutes in either direction.

- T4. Due to the close proximity of the proposed driveway to the intersection of Main Street (Route 18) and Shea Drive, provide data/analysis to verify that the intersection operations would not negatively impact each other.

RMA: Capacity analyses were performed at the site driveway as well as at the intersection of Main Street and Shea Memorial Drive during the weekday AM and PM peak hours. Existing conditions as well as future conditions without (No-Build) and with (Build) the proposed development in place were reviewed.

Future traffic conditions were projected to the year 2029, representing a 7-year design horizon consistent with MassDOT requirements for traffic impact analysis and functional design reports for highway improvement projects. To project traffic conditions within this design horizon, two components of traffic growth were included. First, an annual average traffic growth rate was determined to account for general socio-economic growth and smaller development projects (i.e. residential subdivisions) that may impact traffic in the site vicinity. Based on MassDOT Transportation Data Management System information, the closest permanent traffic count station to the site with the most complete data is Station No. 6255 located on Route 3 north of Route 18 in Weymouth. This counting station shows that traffic in the area has actually decreased by about 0.1 percent per year between 2010 and 2019, however between 2015 and 2019 traffic volumes have increased by about 0.6 percent per year. Therefore, based on the data, a 0.5 percent per year growth rate was used to bring the 2022 Existing volumes to 2029 (7-year growth). The MassDOT historical traffic data are attached.

Second, any planned or approved specific developments in the area that would generate a significant volume of traffic on study area roadways within the next seven years were included. Based on discussions with the Town of Weymouth, it was determined that there are no planned or approved developments that would significantly impact traffic within the study area. While smaller developments projects such as the congregate care facility currently under construction at 1449 Main Street will increase traffic through the study area, these increases are expected to be negligible and accounted for in the annual traffic growth rate.

Furthermore, given the proximity of the site to Abington, officials in the town were contacted to determine if there were any specific developments in the area that would generate a significant volume of traffic on study area roadways within the next seven years. Based on discussions with the Town of Abington, it was determined that there are no planned or approved developments that would significantly impact traffic within the study area.

The 2029 No-Build conditions were accordingly developed by applying a compounded 0.5 percent annual growth rate (3.6 percent over seven years) to the existing traffic on the adjacent streets. The 2029 No-Build peak-hour traffic volumes are shown on Figure 2.

Based on the traffic generation and distribution estimates for this project, the traffic volumes generated by the proposed project were assigned to the roadway network as shown on Figure 3 and were added to the 2029 No-Build traffic volumes to develop the 2029 Build traffic volumes. The 2029 Build peak hour traffic volumes are graphically depicted on Figure 4.

Level-of-service (LOS) analyses were conducted at the intersection of Main Street and Shea Memorial Drive as well as at the site driveway intersection with Shea Memorial Drive under existing and projected volume conditions to determine the effect that the additional site-

generated traffic will have on traffic operations. The capacity analysis methodology is based on the concepts and procedures in the Highway Capacity Manual² (HCM). The capacity and queue analysis results for the signalized intersection of Main Street and Shea Memorial Drive are summarized in Table 1 and the analysis results of the unsignalized intersection of Shea Memorial Drive and the site driveway are summarized in Table 2. All analysis worksheets are attached.

As shown in Table 1, the intersection of Main Street and Shea Memorial Drive currently operates at an overall acceptable LOS B or better during peak hours. All movements currently operate at LOS C or better. Under future No-Build conditions, this intersection is expected to continue to operate at an overall LOS B or better during peak hours with all movements operating at LOS C or better. Under future Build conditions, minimal increases in delay are expected with no changes to the LOS. Queue lengths on the westbound approach to the intersection are not expected to impact the proposed site driveway.

The proposed site driveway on Shea Memorial Drive is expected to operate at a desirable LOS A with minimal delays and queue lengths, as shown in Table 2. Queue lengths on the site driveway are not expected to exceed one vehicle.

Note: Images of Tables 1 and 2 are included below the comments.

BETA2: Information provided. No further comment.

- T5. The existing Shea Drive provides a wide landscaped median island separating eastbound and westbound traffic that extends approximately 500 feet east of Main Street. Within this area, Shea Drive utilizes a four-lane section that tapers to a two-lane section east of the proposed site driveway. Consider whether the median island and roadway striping should be altered to accommodate the driveway.

RMA: Under existing conditions, there is a striped median along Shea Memorial Drive at the location of the proposed site driveway which legally prevents left turns. The existing striping will be modified to create a break in the median island thereby allowing left turns into and out of the site. Please see the attached "Proposed Hotel Development, Site Circulation" plan for the proposed pavement striping improvements within Shea Memorial Drive.

BETA2: Information provided. No further comment.

- T6. Discuss and include any additional development-related growth for other known proposed developments in the area which would impact the intersections.

RMA: As noted in Response No. 4, based on discussions with the town of Weymouth and the town of Abington, it was determined that there are no planned or approved developments that would significantly impact traffic within the study area.

BETA2: Information provided. No further comment.

- T7. In addition, a Traffic Assessment should include a safety analysis. Provide a crash data analysis for the intersection of Main Street (Route 18) and Shea Drive in addition to the segment of Shea Drive adjacent to the proposed driveway.

RMA: Crash data for the study area intersections were obtained from MassDOT for the period between 2015 and 2019, the latest five years of available data. A summary of the MassDOT crash data at the intersection of Shea Memorial Drive and Main Street is provided in Table 3. In addition

to the summary, crash occurrence should also be compared to the volume of traffic through a particular intersection to determine any significance. Accordingly, a crash rate was calculated for each intersection and compared with the statewide and district-wide averages. An intersection crash rate is a measure of the frequency of crashes compared to the volume of traffic through an intersection and is presented in crashes per million entering vehicles (crashes/MEV). For signalized intersections, the statewide average crash rate is 0.78 crashes/MEV and the district-wide (MassDOT District 6) crash rate is 0.71 crashes/MEV. A comparison of the calculated crash rate to the statewide and district-wide averages can be used to establish the significance of crash occurrence and whether or not potential safety problems exist. The crash rate worksheets are attached.

As shown in the table, the intersection of Main Street at Shea Memorial Drive experienced 18 crashes over the three-year period, averaging less than four crashes per year. Of the 18 total collisions, most (61 percent) resulted in property damage only. Four of the crashes were angle type collisions, seven were rear-end type collisions, three were sideswipe type collisions, two were head-on collisions and two were single vehicle type collisions. The calculated crash rate of 0.35 is lower than both the statewide and district wide averages.

There were no crashes reported on Shea Memorial Drive near the location of the proposed site driveway.

Note: Image of Table 3 is included below the comments.

BETA2: Information provided. No further comment.

- T8. Recommend the Applicant provide a fire truck turning diagram showing how the fire truck will access the rear of the building.

RMA: As noted in the response to comments letter by Bohler dated November 4, 2022, a Fire Truck Turning Exhibit was included in the original application submission.

BETA2: Understood, but the exhibit did not show a fire truck accessing the rear of the building. Please provide for reference.

SUMMARY

Based on our review of the revised/supplemental Project documents and plans, the Applicant has not provided the SRA with adequate information to demonstrate that the proposed Project is currently constructable or permissible with regards to the applicable local and state environmental/stormwater regulations. However, sufficient information has been provided to confirm that traffic-related issues have been accounted for in the Project design, subject to the submission of the requested confirmatory information

BETA recommends that the Applicant address the comments in this letter to demonstrate that the SRA is reviewing a constructable and permissible Project that will not require significant redesign throughout the forthcoming permitting processes. In order to confirm that the Project is constructable and permissible, the aforementioned Conservation Commission and MassDEP permitting processes should be completed. If the SRA elects to approve the Project under the Application for Development Plan and Site Plan Approval process, it is likely that an amended filing would be required after review by the Conservation Commission and MassDEP.

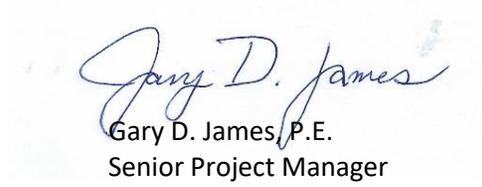
Southfield Redevelopment Authority
c/o Jim Young
January 12, 2023
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If we can be of any further assistance regarding this matter, please contact us at our office.

Very truly yours,
BETA Group, Inc.



Jonathan Niro
Environmental Scientist



Gary D. James, P.E.
Senior Project Manager



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Transportation Project Manager

Tables:

Table 1
Signalized Intersection Level-of-Service Analysis Summary

Location/Peak Hour/Movement	2022 Existing				2029 No-Build				2029 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Main Street at Shea Memorial Drive												
<i>Weekday AM Peak Hour</i>												
WB Left	0.07	23.5	C	6/23	0.08	24.4	C	6/24	0.13	24.9	C	12/35
WB Right	0.40	20.3	C	41/94	0.43	21.3	C	50/103	0.46	21.9	C	58/109
NB All	0.82	13.4	B	252/430	0.83	13.4	B	278/471	0.83	13.5	B	301/507
SB Left	0.37	25.9	C	25/74	0.39	27.0	C	29/80	0.50	28.0	C	39/95
SB Thru	0.34	3.5	A	54/98	0.35	3.5	A	60/108	0.35	3.5	A	64/113
Overall		10.8	B			10.9	B			11.2	B	
<i>Weekday PM Peak Hour</i>												
WB Left	0.08	17.9	B	5/22	0.08	18.4	B	6/24	0.14	18.7	B	11/36
WB Right	0.27	14.0	B	13/41	0.28	14.5	B	15/46	0.32	14.8	B	19/54
NB All	0.75	13.2	B	150/241	0.76	13.2	B	159/261	0.76	13.4	B	167/281
SB Left	0.47	19.9	B	33/84	0.50	20.6	C	35/91	0.57	21.5	C	40/105
SB Thru	0.59	5.0	A	99/142	0.61	5.1	A	106/156	0.61	5.3	A	105/165
Overall		9.4	A			9.5	A			9.9	B	

^a Volume-to-capacity ratio
^b Average control delay in seconds per vehicle
^c Level of service
^d Average/95th percentile queue in feet, assuming 25 feet per vehicle

Table 2
Unsignalized Intersection Level-of-Service Analysis Summary

Peak Hour/ Movement	2022 Existing				2029 No-Build				2029 Build			
	V/C ^a	Delay ^b	LOS ^c	Q ^d	V/C	Delay	LOS	Q	V/C	Delay	LOS	Q
Shea Memorial Drive at Site Driveway												
<i>Weekday AM Peak Hour</i>												
NB All	-	-	-	-	-	-	-	-	0.02	9.5	A	25
WB Left	-	-	-	-	-	-	-	-	0.0	0.0	A	0
<i>Weekday PM Peak Hour</i>												
NB All	-	-	-	-	-	-	-	-	0.03	9.8	A	25
WB Left	-	-	-	-	-	-	-	-	0.0	0.0	A	0

^a Volume-to-capacity ratio;
^b Average control delay in seconds per vehicle;
^c Level of service;
^d 95th percentile queue in feet, assuming 25 feet per vehicle.

Table 3
Crash Summary

Location	Number of Crashes			Severity ^a		Crash Type ^b					% During Wet/Icy Conditions
	Total	Avg./Year	Crash Rate ^c	PD	PI	CM	RE	SW	HO	SV	
Main Street at Shea Memorial Drive	18	3.6	0.35	11	7	4	7	3	2	2	22%

Source: MassDOT Traffic Operations Safety Management System – 2015 through 2019 data.

^a PD = property damage only; PI = personal injury.

^b CM = cross movement/angle; RE = rear end; SW = sideswipe; HO = head-on; SV = single vehicle.

^c Measured in crashes per million entering vehicles.