WHITE PAPER: STORMWATER MANAGEMENT, FLOODPLAIN AND WETLAND RESOURCE AREAS QUINCY BUS MAINTENANCE FACILITY 599 THOMAS BURGIN PARKWAY

OCTOBER 21, 2020

INTRODUCTION AND BRIEF PROJECT DESCRIPTION

In support of the Bus Facility Modernization Program, the Massachusetts Bay Transportation Authority (MBTA) is proposing the construction, renovation, and expansion of bus maintenance and storage facilities throughout the MBTA service area. MBTA has identified the replacement of its Quincy Bus Maintenance Facility (BMF) as an operational priority, due to its age, condition, and inability to effectively support the maintenance and operations of the newer vehicles in the MBTA bus fleet. The purpose of the proposed project (Project) is to construct a facility that has expanded capacity for newer MBTA buses, including the ability to support battery electric buses, provide a modern workspace and support the MBTA goals for resiliency and sustainability. The MBTA's proposed site for the new BMF is 599 Burgin Parkway in Quincy, Massachusetts. It would replace the existing Quincy BMF on Hancock Street in Quincy, 1.4 miles from the proposed site.

The MBTA submitted an Environmental Notification Form (ENF) in accordance with the Massachusetts Environmental Policy Act (MEPA) on August 28, 2020, participated in the MEPA consultation session on September 21, 2020, and has received copies of several comment letters. In response to the questions raised associated with stormwater management, wetland resource areas and floodplain, the MBTA has prepared this White Paper to act as a stand-alone document presenting and clarifying the Project activities as they relate to these topics. Much of the language in this White Paper is taken from the ENF but is supplemented with clarifying detail, a description of the design process, and progress to date.

The proposed Project is being designed in accordance with sustainability and resiliency requirements. MBTA defines sustainability in its 2017 Sustainability Report¹ as "...the ability to be maintained at a certain rate or level; avoidance of the depletion of natural resources in order to maintain an ecological balance." It defines² resiliency as "a system's ability to recover from an acute extreme weather event (i.e., storm surge or flooding event) or to anticipate and respond to future climate condition scenarios (i.e., increasing temperatures, sea-level rise, or changing precipitation patterns)." The proposed Quincy facility and associated site would incorporate sustainability and resiliency design measures that address the environmental, social, and economic needs while protecting its efficiency and functionality long-term in the face of changing climatic conditions. MBTA facilities must address regional resiliency threats such as sea-level rise, flooding, increasing intensity and frequency of storms, extreme temperatures, and increased snow and blizzard events to remain operationally efficient and effective. As the project progresses through design phases, resiliency will be a design priority, and specific elements incorporated to address the applicable resiliency threats at this location. Currently the MBTA has evaluated six snow storage areas on site; solar, green, and composite roof systems; stormwater management consisting of raingardens, structured detention, treatment, deep sumps; and preserving existing natural habitats. As the project design advances, these and possibly other resiliency elements will be further evaluated, and, as appropriate, incorporated into the design.

¹ Massachusetts Bay Transportation Authority. 2017. *MBTA Sustainability Report*. Summer 2017. <u>https://cdn.mbta.com/sites/default/files/Sustainability/sustainability-report-092617.pdf</u>.
² https://www.mbta.com/engineering/project-specific-standards-and-criteria

This facility would be designed to meet the standards and goals of both the Envision and LEED rating systems and is currently tracking toward a Gold level in both categories. The sustainability elements to be incorporated at Quincy can set the bar for sustainability and resiliency at each of MBTA's facilities involved in the Bus Facility Modernization Program; the Quincy location is well suited to guide other projects towards a more sustainable future. For example, the MBTA recognizes that a roof of this size can act as a palate for a number of sustainable design initiatives – alone or in combination. The MBTA assessed the roof to determine if it should be used as a green roof, for a photovoltaic array, or for water reclamation. The MBTA's intent is to use the roof space in an environmentally sustainable manner that is most applicable to the facility's need. Based on an evaluation of multiple options, the MBTA instructed the Design Team to structure the roof for the installation of a photovoltaic array capable of generating a significant percentage of the facility's energy need. As the design advances, the MBTA will continue to study the best balance of uses for the roof, potentially for advanced stormwater management or water reclamation. The MBTA continues to evaluate the best balance of sustainability options within facility operations as well and is currently planning a system to re-use up to 80% of the domestic water needed for the bus wash system. As this is a very high-volume operation, the savings in terms of water used and discharge would be considerable. Additional future considerations may include a photovoltaic canopy within the parking area. In addition, the BMF is being designed for eventual conversion to an all-electric vehicle fleet, making it a leader in the emerging field toward carbon neutral bus operations.

The Project property at 599 Burgin Parkway is approximately 12.81 acres and is bounded by Burgin Parkway to the east, Columbia Street to the west and north, and Penn Street to south. Figure 1 shows a site location map, and Figure 2 is an aerial of the Project Area. The Project site currently contains a now vacant Lowe's home improvement store (119,384-square foot [ft²], steel-framed, two-story building occupying the eastern portion of the site) and associated parking and infrastructure. The proposed work area for the new BMF would be 10.24 acres of the total Project property, placed entirely within the existing developed area. The remaining 2.57 acres are open woods and wetlands associated with Town Brook located along the southern extent of the property. An approximately 0.02 acre area of the adjacent Deco Apartments is proposed to be taken or an easement obtained in order to support changes to the existing Penn Street and associated retaining wall in association with a shared use path that will provide access for residents of the neighborhood to the west of the site to the MBTA's Quincy Adams Red Line station.

The new facility would be located entirely within the developed portion of the previous Lowe's. The proposed BMF would accommodate up to 135 buses, with much of the building footprint in the location of the former Lowe's building. The proposed BMF would provide interior bus storage, maintenance, and offices, as well as fueling, washing, maintenance, support, administrative, and management capabilities required to support the fleet. All transit-vehicle maintenance and storage functions would be performed indoors.

As a result of the Project, the amount of impervious area would decrease, creating an opportunity for additional landscaping and green infrastructure (e.g. rain garden). There are several small trees located within the existing parking lot. The existing trees in the parking lot would be removed, and new trees would be planted at islands and other locations created as part of the new parking lot.

STORMWATER MANAGEMENT

When the Lowe's store was constructed, a stormwater management system was constructed to meet the Wetlands Protection Act requirements. The eastern portion of the former Lowe's site enters a water

quality separator before entering an underground detention system where the flow rates are attenuated and peaks are moderated prior to entering a culvert discharging to Town Brook.

Long-term Stormwater Management

The design of the proposed stormwater management system is currently at a conceptual level only. The MBTA commits in the ENF to further upgrade the stormwater management system to meet the Wetlands Protection Act requirements. This includes compliance with the Stormwater Management Standards. The ENF indicated that improvements to the existing stormwater system would be made to improve the condition of stormwater quality and quantity management. Examples included removing the direct discharge of parking lot drainage to Town Brook and re-directing it through a new water quality structure and underground detention system and reducing the amount of impervious area.

A number of comments made by the Massachusetts Department of Environmental Protection (DEP), Department of Conservation and Recreation (DCR), and City of Quincy are appropriate for later design phases of the Project. Because the ENF described the Project status at the 15% design phase (conceptual) the MBTA commits to addressing design comments as the Project proceeds. The MBTA will coordinate with the City Engineer and Conservation Agent. This coordination will include:

- 1. The MBTA will complete the design and permitting efforts to meet the Stormwater Management Standards. The standards include language regarding development or redevelopment projects, which this project is, requiring proponents to consider environmentally sensitive site design that incorporates low impact development techniques in addition to stormwater best management practices. Preliminary design includes some reduction in pavement, inclusion of raingardens, the potential for a green roof, increased landscaping plantings, increased detention and retention of stormwater (recharge and infiltration are dependent on subsurface conditions and AUL limitations). All these factors would represent an improvement in stormwater management over the current site design.
- 2. The project would meet requirements in stormwater discharge for oil and grease, TSS, and other water quality parameters, and is incorporating a substantial underground storage component to address peak runoff attenuation requirements. Since the existing site already consists of a large building, parking lot, and roadway, the fundamental characteristics of stormwater are not anticipated to change significantly, but the MBTA's commitment is to improve current design performance, reflecting the MBTA's commitment to sustainability and protecting the environment.
- 3. The MBTA will meet the Stormwater Management Standards. These standards are discussed below:

The Stormwater Management Standards state: "A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions."

Standard 1 is: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. The ENF contained a commitment to improve existing discharges to Town Brook. As design progresses, more specific detail will be identified, including calculations and design specifications. These will be submitted as part of the Notice of Intent filed for the Project.

Standard 2 is: Stormwater management systems shall be designed so that the postdevelopment peak discharge rates do not exceed pre-development peak discharge rates. The commitment to manage discharge rates as required was included in the ENF. Further design will dictate the level to which peak volumes may also be reduced.

Standard 3 is: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook. The ENF noted commitments to environmentally sensitive site design, and provided some examples (e.g. rain gardens, green roof), however at this preliminary design stage, details are not available. As mentioned earlier, the ability to conduct infiltration will depend on the soil types identified in the subsurface investigations, as well as AUL limitations.

Standards 4, 5 and 6 address water quality parameters, Land Uses with Higher Potential Pollutant Loading (LUHPPL) and stormwater management in Zone II or Interim Wellhead Protection Areas, respectively. It is the MBTA's intent to meet TSS standards to the maximum extent practicable, using the best management practices described above. In addition, the MBTA is familiar with the definition of "to the maximum extent practicable" and will document off- and on-site alternatives, soil conditions and design details in the Notice of Intent.

All bus washing and maintenance will be conducted interior to the facility and therefore will not result in higher pollutant loading. There are no Zone II or Wellhead Protection Areas in the area of the facility.

- 4. Long-term Operations and Management Plan. As part of the Notice of Intent, the following will be submitted, in addition to calculations, specifications, details, and documentation:
 - Full description of bus operations and maintenance, clarifying internal operations versus outside operations. At present, all bus washing and maintenance activities are proposed to be interior and recycling of wash water is proposed.
 - Full description of changes and improvements to the existing stormwater management system, including increased detention/retention, volume and rate calculations, and whether infiltration is feasible on the site or not.
 - Full stormwater report, including the Mass. DEP Checklist
 - Comprehensive Operations and Maintenance Plan both for construction (see below) and long-term
 - Snow storage and removal plan

As the City has indicated it should, the MBTA has reached out to the City Engineering Office and will continue to coordinate with the City as design progresses to discuss goals and approach.

Construction-Period Stormwater Management

A number of comments dealt with construction-period impacts. All redevelopment projects must fully comply with the provisions of the Stormwater Management Standards requiring the development and implementation of a construction period erosion and sedimentation control plan, a pollution prevention plan, an operation and maintenance plan, and the prohibition of illicit discharges. Construction

activities would be coordinated by MBTA and the contractor with the City of Quincy, utility companies, and other public and private entities as appropriate. As design is advanced, construction-period assessments would include evaluation of potential construction access locations and laydown areas for construction equipment and building materials.

Coverage under the US EPA Construction General Permit will be obtained, and a Stormwater Pollution Prevention Plan will be prepared and implemented, with plans showing detailed construction period phases, stormwater management, and documenting reporting requirements.

In general, as noted in the ENF, the construction-period measures associated with stormwater and wetland resource areas are designed to minimize impacts by:

- Developing and implementing a Stormwater Pollution Protection Plan in accordance with the National Pollution Discharge Elimination System (NPDES) and MassDEP standards, as well as installing and maintaining erosion and sediment control measures during construction.
- Minimizing the quantity and duration of soil exposure during construction.

In response to the City of Quincy's comment letter, the need for groundwater dewatering will be evaluated both for compliance with AUL limitations and to address the City's concerns regarding pollutant discharge to the Town Brook and Centre Street Diversion Culvert.

FEMA FLOODPLAIN AND MWPA BORDERING LAND SUBJECT TO FLOODING

Quincy Overlay Floodplain District

A portion of the site falls within the 100-Year (or 1% annual chance flood probability) flood designation, and per Section 8.1 of the Zoning Ordinance, it falls within the City's Flood Plain Overlay District (FPOD). The FPOD states: "...no new building or structure shall be erected, constructed, altered, enlarged or moved and no dumping, filling or earth transfer or relocation shall be permitted." Certain uses and activities are permitted, but none applies to the BMF. The MBTA is taking floodplain considerations into account in the design process as discussed below, to ensure safe and reliable operation of the facility.

The DCR noted that Executive Order 11988 should be addressed. That EO states that all federal agencies are to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. To the extent federal funds are used for this project, and in compliance with state and local law, the MBTA is approaching activities in the floodplain with a goal of reducing flood loss and associated impact to human safety, health and welfare.

The MBTA will work with the DCR and the City of Quincy to address comments provided in their letter dated October 13, 2020 as well as from their attendance at the MEPA consultation session. The MBTA appreciates the City's comments and has found them to be helpful and directive. At this point in the design stage, the MBTA has reached out to meet with both the DCR and City of Quincy regarding the ongoing design approach, design intent, and to discuss on-going data collection and design goals.

Quincy's letter notes that in the time since Lowe's was constructed, the City has experienced several major precipitation events that have caused flooding in the city and has highlighted the challenges it faces. This information was also documented in the City's Hazard Mitigation Plan, as briefly described in the ENF.

At the consultation session, DCR noted that a new FIRM was in process and the City's letter confirms that statement. Based on the 2020 Preliminary FIRM map, no work is proposed within the floodplain. The MBTA looks forward to meeting with the City Engineering Office to review the City-wide Drainage Capital Plan and to coordinate with the modeling for the Town Brook watershed. The MBTA has initiated discussions with both DCR and the City and looks forward to continued coordination as data is developed.

FEMA Floodplain and Wetland Resource Areas under the MA Wetlands Protection Act

The ENF documented that wetlands and waterways were field delineated on the proposed Project site. The proposed Project would result in temporary and permanent impacts to Massachusetts jurisdictional wetland resource areas, specifically Bordering Land Subject to Flooding (the 100-year floodplain) and Riverfront Area (the area within 200 feet of a perennial stream).

The Project would not result in direct dredge or fill activities in Waters of the United States. Therefore, a Section 404 permit is not expected to be required, nor would a Section 401 Water Quality Certification be required.

Vegetated wetlands (identified as Bordering Vegetated Wetlands under the Mass. Wetlands Protection Act) are located on the southern portion of the proposed Project site, associated with Town Brook (Figure 3). As noted in the ENF, Town Brook is identified as an impaired waterway (MA-74-09) and is impaired for aquatic invertebrates and fecal coliform. The bordering vegetated wetlands are not proposed to be impacted by the proposed Project. The brook enters a culvert at approximately the south-central portion of the parcel and flows northerly within the culvert and under the remainder of the site, to a point where it discharges at and flows into the Town River, an estuarine river flowing toward the Weymouth Fore River. Table 1 summarizes resource area impacts. This table was presented in the ENF (as Table 2) and has been updated based on further design relative to floodplain impact.

Resource Area	Project location	Impact
Bordering Vegetated Wetlands	South Central along Town Brook	No impact proposed
Land Under Water/Waterways	South Central, associated with Town Brook	No impact proposed
Bank	South Central, associated with Town Brook	No impact proposed
Bordering Land Subject to Flooding	Southern portion of site	205 ft ² or 150 ft ³ based on TetraTech data. No impact if using Preliminary FIRM Map data ³ *
Riverfront Area	South Central	 450 ft² undeveloped area permanent impact 410 ft² undeveloped area temporary impact 22,840 ft²developed area (same area as Lowe's mitigation)

Table 1. Summary of Massachusetts Resource Area Impacts

³ Preliminary data are for review and guidance purposes only. By viewing preliminary data and maps, the user acknowledges that the information provided is preliminary and subject to change. Preliminary data, including new or revised FIRMs, FIS reports, and FIRM Databases, are not final and are presented on the MSC as the best information available at this time. Additionally, preliminary data cannot be used to rate flood insurance policies or enforce the Federal mandatory purchase requirement. FEMA will remove preliminary data once effective data are available.

The DEP comment letter raised questions about the location of wetland areas on the Project Site, which are presented on the attached Figure 3 for better clarity.

It is the MBTA's full intent to meet the performance standards for the Wetland Resource areas on the site. The two wetland resource areas that may be impacted are discussed below.

Riverfront Area

The riverfront area is associated with Town Brook. At the point where Town Brook enters the culvert as it flows northerly under the project site, the riverfront area ends at a perpendicular line at the upstream end of the culvert (310 CMR 10.58 (2) 3. c.). This is shown in Figure 3.

This area will be impacted in two ways:

- The undeveloped portion of the Riverfront Area will be altered to improve the Penn Street turning radius. An existing retaining wall will be pushed slightly further into the Riverfront Area and will alter approximately 450 square feet of undeveloped Riverfront Area and 410 square feet of additional temporary impact for wall construction. This area falls within the first 100 feet of the Riverfront Area and is associated with the need to provide safe internal site vehicular circulation. In order to accommodate the turn on Penn Street, coming in from Burgin Parkway, Penn Street would bow out into the Riverfront Area, and a retaining wall would be constructed to minimize grading and impact. The performance standards include protection of other resource areas, protection of rare species and evaluation of practicable and substantially equivalent economic alternatives. The MBTA has conducted both an off-site and on-site alternative analysis for the Project, which was included in the ENF, however, as part of the Notice of Intent filing, the MBTA will present the off-site alternatives analysis along with a more detailed, engineered on-site alternatives analysis. An assessment of compliance with the "No Significant Adverse Impact" language in 310 CMR 10.59 (d) will also be presented in the Notice of Intent.
- The rest of the Riverfront Area overlays the existing parking lot, building, and travel ways and is the same Riverfront Area that was altered as part of the Lowe's site development and represents the current conditions. The Lowe's provided mitigation for the impact, as described in the SEIR, which included removal of debris and restoring approximately 22,000 square feet of degraded area on both sides of Town Brook. The proposed activities are not significantly altering, and some alteration is temporary. These activities fall within the redevelopment provisions of the Riverfront Area performance standards.
- As described in the stormwater management discussion above, it is the MBTA's intent to improve existing conditions and comply with the Stormwater Management Standards. Restoration and/or mitigation will be provided for that work that is proposed closer to Town Brook than current conditions. At this point, the design and data collection has not identified specific mitigation options, but the MBTA is committed to meeting performance standards. Types of mitigation for impacts to Riverfront Area will be developed but could include attenuation of peak flows to Town Brook, invasive species management within the buffer zone, beneficial planting of native plant species, and/or improvement of aquatic and wildlife habitat features within the brook and adjacent areas.

Floodplain and Bordering Land Subject to Flooding

There were several comments regarding activities within the floodplain and Bordering Land Subject to Flooding. Floodplain issues raised by DCR, the City, and Zero Emission Vehicles Coalition included requests to take floodplain considerations into account during the design process.

The DEP also noted that cut and fill information was not provided, nor detail on elevations or volumes. The design has not progressed to this level at this time and is typically developed during the permitting process. It will be developed in conjunction with data and direction from the City as part of design and engineering development.

The City of Quincy's comment letter was particularly helpful in summarizing current conditions in the City and coordination with the City has begun. The MBTA is committed to continued coordination and collaboration regarding floodplain data, including site topographic data. The MBTA was pleased to receive the comments from the City of Quincy, encouraging coordination and collection of more current flood studies and modeling.

The ENF described the proposed Project site as located within a Zone AE, as shown on the Federal Emergency Management Agency (FEMA) Flood Hazard Map, number 25021C0207E, effective on July 17, 2012. The FEMA map also shows a floodway associated with the open channel portion of Town Brook, which extends northerly onto the developed portion of the site (Figure 3). The City of Quincy also shows the same floodplain and floodway layout on its website.⁴

The City of Quincy noted these maps were replaced by FEMA on June 9, 2014 and have been adjusted by two Letters of Map Revisions (LOMR). The City noted it is currently working with FEMA and the USGS in the final issuance of new FIRMs in 2021.

Through coordination with DCR, the MBTA obtained a copy of the preliminary Flood Insurance Rate Map (FIRM) for the area. The preliminary map identifies the 1% flood (Zone AE) as being limited to the area around Town Brook to the south of the site. The rest of the site falls within the 0.2% flood hazard (or 1% with less than 1-foot inundation). In addition, the preliminary FIRM map no longer shows the floodway extending onto the developed portion of the property. See Figure 4. This map is preliminary and is not effective yet. FEMA is receiving comments and suggestions. The MBTA plans to coordinate with the City to provide up-to-date topographic survey information and to coordinate on engineering calculations as part of the public comment for the preliminary map and to coordinate site design.

As had been discussed in the ENF and in the City of Quincy's comment letter, the site was redeveloped in 2008-2009 by Lowe's. The improvements, as described in the Lowe's MEPA documents and as presented in the Lowe's Notice of Intent filed with the Quincy Conservation Commission, resulted in a reduction in the incidence of flooding on the site and a lowering of the floodplain elevation by approximately 4.2 feet, as compared to the FEMA mapping. The Lowe's Single Environmental Impact Report stated, "It is conservatively estimated that the operative 100-year flood elevation on the site (at the 72-inch culvert entrance and approximate center of the site) is 35.4 feet (City Datum). The *Proposed Lowe's of Quincy, Flood Plain Assessment, Quincy, Massachusetts*⁵ is based on the Army Corp of Engineers extensive drainage and flood study (July 1985), which we believe constitutes the 'credible evidence' required by the MassDEP regulations to demonstrate that the floodplain elevation differs from that published by FEMA."⁶ The new Preliminary FIRM map shows the100-year flood elevation to be at 27.3 feet.

⁴ <u>https://www.quincyma.gov/govt/depts/pwd/drain/floodplainm/flood_hazard.htm</u>

⁵ Tetra Tech Rizzo. 2007. Proposed Lowe's of Quincy, Flood Plain Assessment, Quincy, Massachusetts. September 25.

⁶ Tetra Tech Rizzo conducted an assessment of the floodplain associated with Town Brook in the vicinity of the Lowe's site to determine the influence of flood control improvements that have been implemented since 1980, when the U.S. Army Corps of engineers conducted a study of Town Brook. The assessment at that time noted that the FEMA floodplain mapping for the site did not reflect the results of measures implemented as part of the Town Brook Flood Control Project. These measures included: improvements at the Braintree Dam, culvert and channel improvements in Braintree and Quincy, the Town Brook Relief Tunnel, and the Burgin Parkway Diversion Culvert. The latter diverts approximately 80% of peak flood flows in Town Brook around the Lowe's site downstream to the Relief Tunnel.

Based on the Lowe's calculations, a small portion of the proposed Project site improvements would result in approximately 150 cubic feet of fill below the estimated 100-year floodplain elevation. Based on the 2020 Preliminary FIRM map, no work is proposed within the floodplain.

Using the Lowe's calculations, the impact is associated with the need to provide safe internal site vehicular circulation. In order to accommodate the turn on Penn Street, coming in from Burgin Parkway, Penn Street would bow out into the floodplain, and a new portion of retaining wall would be constructed to minimize grading and impact. The loss of flood storage would be fully mitigated by the creation of an equal amount of compensatory flood storage in compliance with the Massachusetts Wetlands Protection Act.

Locations of filling (within BLSF) and compensatory storage are described in Section 4.3 of ENF Attachment A. The slight re-alignment of Penn Street would result in the need to adjust a short section of the adjacent retaining wall, resulting in fill within the BLSF. The MBTA commits in the ENF to mitigate the loss of flood storage "by the creation of an equal amount of compensatory flood storage in compliance with the Massachusetts Wetlands Protection Act."

As for the additional potential fill and need for compensatory storage, given the state of flux associated with the definition of the floodplain on the site, the MBTA will be working with the City of Quincy to gain a better understanding of this issue, and will be incorporating floodplain considerations into the ongoing design development. The MBTA is committed to developing the necessary compensatory storage relative to the ultimate determination of the extent of BLSF fill, in order to satisfy the requirements of the Wetland Protection Act, and obtain necessary wetland permits for the project. Additionally, as noted in the ENF and as reinforced in DCR's comment letter, the MBTA intends to prepare a request for a Letter of Map Revision and to submit data to support a No-Rise Certification for the floodway if necessary, based on the most current information as can be obtained from DCR and the City of Quincy.

In preparing the ENF, the MBTA reviewed the Town's Hazard Mitigation Plan (Mitigation Plan)⁷, which discusses Town Brook. The original brook system has been altered (channeled, moved, and culverted) over time, commencing in the late 1800s and continuing to the present day. To date, the majority of Town Brook in Quincy is underground and mostly culverted. According to the Mitigation Plan, culverted sections of the brook have been designed to convey the 100-year flood and 500-year flood by the U.S. Army Corps of Engineers. Currently, stormflow is regulated via weirs at the Centre Street junction box and the Town Brook Relief Tunnel inlet constructed by the U.S. Army Corps of Engineers off of Burgin Parkway.⁸

The Tetra Tech Rizzo assessment identified that the flood improvement measures resulted in a reduction in the incidence of flooding in the site area and a substantial lowering of the floodplain elevation of approximately 4.2 feet as compared to thencurrent FEMA mapping on the site. The Tetra Tech Rizzo assessment conservatively estimated that the operative 100-year flood elevation on the site (at the 72-inch culvert entrance and approximate center of the Site) is 35.4 feet (City Datum) instead of the FEMA elevation of 33 feet NAVD88 (42 feet City Datum).

⁷ City of Quincy Multi-Hazard Mitigation Plan, 5-Year Update, Adopted April 2019.

⁸ The Mitigation Plan included an analysis for current conditions based on Quincy 2017 Assessor's data and the FEMA approved flood insurance rate maps (FIRMs) with 2017 and 2018 map revisions. Future flooding with climate change was evaluated using National Oceanic and Atmospheric Administration sea level rise data for 1, 2 and 4 feet of sea level rise (relative to sea level in 2000), as an approximation of near-, mid -and long-term vulnerability likely to occur based on sea level rise alone and not considering any other storm surge impacts. This flooding scenario would be likely to occur daily at high tide. To compare the results of the exposure assessment for different areas of the city, Quincy was split up into seven different geographic planning areas. The planning areas were determined by evaluating subwatershed areas, the FEMA 100-year flood zone, additional areas of local flooding identified by the City, and locations of FEMA repetitive loss claims. The seven planning area boundaries were then defined using roadways or parcel lines to capture flood sources. The FEMA 100-year flood zone was split into coastal and inland flood areas. The demarcation between the inland and the coastal zone was determined by utilizing the area of coastal inundation from the Quincy Coastal Climate Change Model (Boston Harbor Flood Model). The

Based on the Mitigation Plan, and the City's comments, the MBTA is aware that there are flooding concerns in the area. The Mitigation Plan noted some inadequacies in the tunnel were discovered during a 2017 U.S. Army Corps of Engineers inspection and that ongoing drainage improvements are identified as a high priority for Upper Town Brook. As stated in the ENF, the MBTA will work with the City regarding potential flooding concerns as part of the project design and development efforts, to ensure the project does not exacerbate flooding in the community. The October 13, 2020 Joint Comments of Participants in the Zero-Emission Vehicles Coalition commented that the Project should maximize climate resiliency options and suggested that the Project should plan for 2070 sea level rise projections. It should be noted that the MBTA has a Design Directive relative to Flood Resiliency. Its goal is to minimize risk to MBTA assets from flooding events; maximize resiliency of the systems, minimize downtime and prevent disruptions to the traveling public and protect the safety of system users, workers, and the surrounding environment from risks associated with flood hazards. It requires that, based on the intended lifespan of an MBTA asset, design should review the most current regional projections and use future design storm precipitation depths to perform a local hydraulic model; Alternatively, use of an estimated design flood frequency based on FIRM data can be used. The design team evaluated the elevation necessary to raise the site to meet extreme future flood elevations and determined that a combination of flooding avoidance and flood proofing was the optimal approach to take to balance potentially competing regulatory requirements, Design Directives, technical feasibility and costs. The Design Directive requires, at a minimum, that for all assets that cannot be elevated, design should consider flood proofing and be designed for operational recovery. The proposed project is taking these data into account as the design progresses.

Based on the Preliminary FIRM map due for publication in 2021, the Project will fall outside of the 1% chance flood and the Finished Floor Elevation (FFE) will be above the 0.2% chance storm. The MBTA commits that it will work with the City and DCR relative to floodplain considerations and monitor the progress towards finalization of the new FIRM map, and as new or confirmed information becomes available, continue to incorporate this into advancing the site design, and ultimately the permitting effort, such that the Project complies with the Design Directive.

most landward extent of the model was used as the boundary between coastal and inland flood areas for the purpose of this assessment.

The Proposed Project falls within the inland flood zone area and the 2030 project flooding map does not show changes to Town Brook in the Project location.

The influence of the many tide gates, sea walls, seawall drain check valves, and other flood-control structures such as the Blacks Creek tide gate and Town Brook deep rock tunnel currently in place were not evaluated in this planning-level vulnerability assessment. If these structures were to fail, significant portions of the City would be impacted by flooding.









JACOBS

FIGURE 4

OCT 2020

Massachusetts Bay Transportation Authority **Quincy Bus Maintenance Facility** QUINCY, NORFOLK COUNTY, MASSACHUSETTS

Preliminary FEMA National Flood Hazard Map

Prepared for: