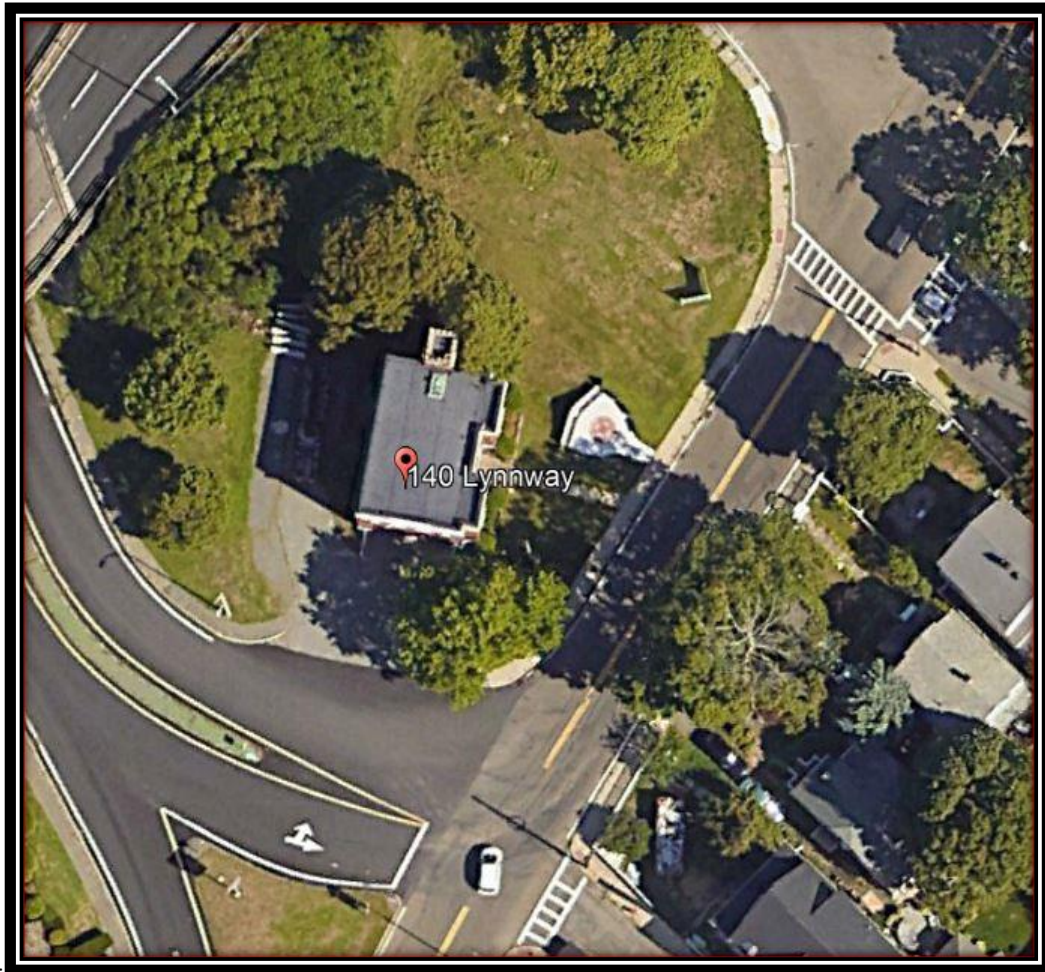


SINGLE ENVIRONMENTAL IMPACT REPORT

**ALDEN FIRE STATION
140 LYNNWAY, REVERE MA**



Prepared for:
**Winter Street Architects
27 Congress Street, Suite 201
Salem, MA 01970**

Prepared by:
**Brennan Consulting
24 Ray Avenue
Burlington, MA 01803
June 15, 2022**

Brennan Consulting

ENGINEERING • TRANSPORTATION • SURVEYING

June 15, 2022

Executive office of Environmental Affairs
MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: **Alden Fire Station**
140 Lynnway
Revere, Massachusetts

Dear MEPA Coordinator:

On behalf of the City of Revere, Brennan Consulting is submitting the following Single Environmental Impact Report (SEIR) in accordance with 301 CMR 11.00, Massachusetts Environmental Policy Act (MEPA) Regulations for the proposed construction of a fire station (referred to as The Project) with associated parking and utilities.

Brennan Consulting filed an Expanded Notification Form (EENF) that was noticed in the March 9, 2022 edition of the Environmental Monitor. The Secretary issued a Certificate on April 29, 2022 requesting a Single Environmental Impact Report (SEIR) be submitted. This SEIR therefore provides a complete and detailed description and analysis of the project and its alternatives, an assessment of its potential environmental impacts, proposed Section 61 mitigation measures sufficient for the appropriate State agencies to fulfill their obligations in accordance with MGL c. 30, Section 61, and responses to all comments received on the EENF. Agencies and persons receiving copies of this SEIR are listed in Attachment 9.

Once again, we appreciate the guidance that your staff has provided to Brennan Consulting as this SEIR was being prepared. If there are any questions regarding this filing, please do not hesitate to contact me at (781) 273-3434 ext. 100 or cemilius@brennanconsults.com. Thank you for your time and consideration in this matter.

Thank you,



Chris Emilius, P.E.
Principal

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SECRETARY'S CERTIFICATE AND COMMENT LETTERS



The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Charles D. Baker
GOVERNOR

Karyn E. Polito
LIEUTENANT GOVERNOR

Kathleen A. Theoharides
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1181
<http://www.mass.gov/eea>

April 29, 2022

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
EXPANDED ENVIRONMENTAL NOTIFICATION FORM AND
PROPOSED ENVIRONMENTAL IMPACT REPORT

PROJECT NAME : Alden Fire Station
PROJECT MUNICIPALITY : Revere
PROJECT WATERSHED : North Coastal
EEA NUMBER : 16536
PROJECT PROPONENT : City of Revere
DATE NOTICED IN MONITOR : March 9, 2022

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30, ss. 61-62L) and Section 11.06 of the MEPA Regulations (301 CMR 11.00), I have reviewed the Expanded Environmental Notification Form (EENF) and Proposed Environmental Impact Report (EIR) submitted by the Proponent in accordance with 301 CMR 11.05(9) with a request that I allow a rollover in accordance with 301 11.06(13). As noted below, comments submitted by Agencies identified the need for additional information and analyses that were not provided in the proposed EIR. The Proponent requested that, if a rollover EIR were not granted, a Single EIR be allowed to be submitted in accordance with 301 CMR 11.06(8) in lieu of the usual two-stage Draft and Final EIR process. I hereby grant the request to file a Single EIR, which the Proponent should submit in accordance with the Scope included in this Certificate.

Project Description

As described in the EENF/Proposed EIR, the project consists of the construction of a two-story fire station with a footprint of approximately 8,190 square feet (sf), a parking lot with

10 spaces and two driveways. The fire station will include two service bays for fire trucks, a smaller bay for fireboats, a community room and living space for firefighters. The project also includes construction of a new stormwater management system, landscaping and new sidewalks and four on-street parking spaces.

Project Site

The 0.6-acre (25,671-sf) project site is located in the Point of Pines section of Revere. The site is bordered by Lynnway to the east, ramps connecting Lynnway to Route 1A (North Shore Road) to the south, North Shore Road to the west and to the north by open space owned by the Department of Conservation and Recreation (DCR) and a bus loop with a landscaped island. A bus stop associated with bus service provided by the Massachusetts Bay Transportation Authority (MBTA) is located on the landscaped island.

The City of Revere (City) owns an approximately 0.35-acre portion of the project site, which was the site of a fire station that was used until 2000 and demolished in 2021. Portions of the site owned by DCR include a 0.11-acre (4,592 sf) parcel and 0.14 acres (6,000 sf) of land adjacent to Lynnway. The areas owned by DCR are parkland protected under Article 97 of the Amendments to the Constitution of the Commonwealth (Article 97). The project includes landscaping and construction of a new sidewalk and on-street parking in the area along Lynnway, which will continue to be owned by DCR. The proposed parking lot will be located on the 0.11-acre parcel, which will be conveyed from DCR to the City.

As shown on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) (number 25025C0029J, effective date March 16, 2016), a portion of the site is located within the 100-year floodplain (Zone AE) with a Base Flood Elevation (BFE) of 10 ft North American Vertical Datum of 1988 (NAVD 88) designated as Land Subject to Coastal Storm Flowage (LSCSF). The site is located on a Barrier Beach identified as Rv-1 in the Massachusetts Barrier Beach Inventory prepared by the Massachusetts Office of Coastal Zone Management (CZM).

The site is located within an Environmental Justice (EJ) population designated as Income, within one mile of EJ populations designated as Minority and Minority and Income and within 5 miles of EJ populations designated as Minority; Income; Minority and Income; Minority and English Isolation; Income and English Isolation; and Minority, Income and English Isolation. As described below, the EENF/Proposed EIR included a review of baseline health conditions, potential impacts of the project to EJ populations and described a public outreach plan.

Environmental Impacts and Mitigation

Potential environmental impacts of the project include the addition of 0.25 acres of impervious area; generation of 20 average daily trips (adt); construction of 10 parking spaces; and permanent conversion of 0.11 acres of public parkland to a parking lot for use by the fire station employees.

The project will minimize and mitigate environmental impacts by providing DCR with approximately 13 acres of land, constructing a new stormwater management system with Best Management Practices (BMPs) to improve water quality, reduce flow rates and infiltrate stormwater, constructing a new sidewalk along Lynnway and providing community meeting space in the fire station. The project design will incorporate climate resiliency measures.

Jurisdiction and Permitting

The project is undergoing MEPA review and requires preparation of an ENF and EIR, because it requires Agency Actions, meets the review threshold at 301 CMR 11.03(1)(b)(3) (conversion of land held for natural resources purposes in accordance with the Amendments to the Constitution of the Commonwealth Article 97 to any purpose not in accordance with Article 97) and is located within one mile of an EJ Population. While not acknowledged in the EENF/Proposed EIR, the project appears to also meet the threshold at 301 CMR 11.03(3)(3)(b)(1)(a), alteration of a barrier beach. The project requires a Construction Access Permit from DCR. The project was granted a Vehicular Access Permit by the Massachusetts Department of Transportation (MassDOT) on March 28, 2022,¹ and an 8(m) Permit from the Massachusetts Water Resources Authority (MWRA) on October 19, 2021. The project is subject to the EEA Article 97 Land Disposition Policy (Article 97 Policy).

The project received a negative Determination of Applicability (DOA) from the Revere Conservation Commission (RCC) on November 6, 2019; however, according to MassDEP, the project may require a new DOA and/or an Order of Conditions (OOC) from the RCC (and if the OOC is appealed, a Superseding Order of Conditions from MassDEP). The project may require a National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) from the United States Environmental Protection Agency (EPA).

The project involves a Land Transfer from DCR. Therefore, MEPA jurisdiction is broad and extends to those aspects of the project that are likely, directly or indirectly, to cause Damage to the Environment as defined in the MEPA regulations.

Request for Rollover EIR or Single EIR

The EENF/Proposed EIR included a request that I allow a Rollover EIR in accordance with 301 CMR 11.06(13) or alternatively, a Single EIR in accordance with 301 CMR 11.06(8).

The MEPA regulations provide that for projects required to submit an EIR under 301 CMR 11.06(7)(b), the Proponent may submit an EENF with a request that I allow a Rollover EIR in accordance with 301 CMR 11.06(13). To support this request, the EENF must be accompanied by a Proposed EIR, which, if the request for Rollover EIR is granted, would be published as a Final EIR in a subsequent Environmental Monitor in lieu of the typical two-stage Draft and Final EIR process.

¹ According to the City, the applications for the MassDOT and MWRA permits were submitted in 2021 before it was known that the project required MEPA review. The City should consult with MassDOT and MWRA to determine if amendments to the permit are necessary to reflect the project as described in the EENF/Proposed EIR.

In order to allow a Rollover EIR, I must find that the dual EENF and Proposed EIR:

1. presents a complete and definitive description and analysis of the project and its alternatives, and an assessment of its potential environmental and public health impacts and mitigation measures sufficient to allow a Participating Agency to fulfill its obligations in accordance with M.G.L. c. 30, §§ 61 and 62K and 301 CMR 11.12(5);
2. demonstrates that the project will not materially exacerbate any existing unfair or inequitable Environmental Burden and related public health consequences impacting an EJ population, and will not result in a disproportionate adverse effect or increased climate change effects on an EJ population;
3. describes measures taken to provide meaningful opportunities for public involvement by EJ populations prior to filing the dual ENF and Proposed EIR, including any changes made to the project to address concerns raised by or on behalf of EJ populations;
4. shows that comments received on the dual ENF and Proposed EIR do not raise substantial issues not previously considered by the Proponent; and
5. shows that no substantive issues remain to be resolved.

The MEPA regulations at 301 CMR 11.06(8) indicate that a Single EIR may be allowed provided I find that the EENF:

- a. describes and analyzes all aspects of the project and all feasible alternatives, regardless of any jurisdictional or other limitation that may apply to the Scope;
- b. provides a detailed baseline in relation to which potential environmental impacts and mitigation measures can be assessed; and,
- c. demonstrates that the planning and design of the project use all feasible means to avoid potential environmental impacts.

Consistent with these requests, the EENF/Proposed EIR was subject to an extended comment period under 301 CMR 11.05(9). In addition, the EENF/Proposed EIR was subject to an extended comment period of 45 days to provide additional time for outreach in accordance with the MEPA Public Involvement Protocol for Environmental Justice Populations (the “MEPA EJ Public Involvement Protocol”).

Review of the EENF/Proposed EIR

The EENF/Proposed EIR described existing site conditions, provided a basic project description and conceptual plans and identified alternatives to the project. It identified the project’s impacts on parkland, transportation, water and wastewater infrastructure and stormwater and described potential mitigation measures. Consistent with the MEPA Interim Protocol on Climate Change Adaptation and Resiliency, the ENF contained an output report from the MA Climate Resilience Design Standards Tool prepared by the Resilient Massachusetts Action Team (RMAT) (the “MA Resilience Design Tool”),² together with information on climate resilience strategies to be undertaken by the project. The Single EIR should provide a

² https://resilientma.org/rmat_home/designstandards/

more detailed description of the project's impacts and mitigation measures, as set forth in the Scope below.

Alternatives Analysis

The EENF/Proposed EIR reviewed No Build and Existing Site Alternatives to the proposed project. Under the No Build Alternative, the Point of Pines neighborhood would continue to be served by existing fire stations in other areas of Revere. According to the EENF/Proposed EIR, response times from other fire stations to Point of Pines are greater than 10 minutes, which exceeds the standard established by the National Fire Protection Association (NFPA) of 5 minutes and 20 seconds. The Existing Site Alternative would construct a new fire station on the City-owned lot where the station was formerly located. According to the EENF/Proposed EIR, the size of the parcel is too small for the City to construct a building large enough to accommodate the number of proposed truck and boat bays, which would reduce the effectiveness of the fire station, and a parking lot for firefighters on each shift.

The Preferred Alternative will reuse the site of the former fire station to minimize construction of project components on previously undeveloped land. It includes construction of a modern fire station facility that will provide adequate space for fire engines, a rescue boat, living space for firefighters and a community room. The proposed facility is located in a neighborhood that is currently served by fire stations in other parts the City that may not be able to quickly respond to emergencies.

Environmental Justice

As noted above, the project site is located within an EJ population designated as Minority and within one mile of EJ populations designated as Minority and Minority and Income. Within the census tracts containing the above EJ populations, the following languages are identified as those spoken by 5% of more of residents who also identify as not speaking English very well: Spanish, Khmer and Portuguese.

Effective January 1, 2022, all new projects in “Designated Geographic Areas” (“DGA,” as defined in 301 CMR 11.02, as amended) around EJ populations are subject to new requirements imposed by Chapter 8 of the Acts of 2021: *An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy* (the “Climate Roadmap Act”) and amended MEPA regulations at 301 CMR 11.00.³ Two related MEPA protocols—the MEPA EJ Public Involvement Protocol and MEPA Interim Protocol for Analysis of Project Impacts on Environmental Justice Populations (the “MEPA Interim Protocol for Analysis of EJ Impacts”)—are also in effect for new projects filed on or after January 1, 2022.⁴ Under the new regulations and protocols, all projects located in a DGA around one or more EJ populations must take steps to enhance public involvement opportunities for EJ populations, and must submit analysis of impacts to such EJ populations in the form of an EIR. The EENF/Proposed EIR indicated that

³ MEPA regulations have been amended to implement Sections 55-60 of the Climate Roadmap Act, and took effect on December 24, 2021. More information is available at <https://www.mass.gov/service-details/information-about-upcoming-regulatory-updates>.

⁴ Available at <https://www.mass.gov/service-details/eea-policies-and-guidance>.

the DGA for the project is 1 mile. The City circulated a supplemental Article 97 analysis on April 7, 2022 and provided other clarifying information during the review period.⁵

The notice of the MEPA site visit and a project summary were translated into Spanish, Portuguese, Khmer and Arabic and distributed to a list of community-based organizations and tribes/indigenous organizations provided to the City by the MEPA Office. The EENF/Proposed EIR indicated that additional outreach is not anticipated to be necessary because the project will have a positive impact on the community by providing public safety services. Nevertheless, the MEPA EJ Public Involvement Protocol is intended to promote opportunities for public participation, even for projects that are anticipated to have a net benefit. As discussed below, the project also has impacts and effects, including climate resiliency challenges, that should be disclosed. The Single EIR should describe ongoing public outreach efforts that will be implemented by the City to inform the public about the project and opportunities to provide input into the project, such as public meetings before the Conservation Commission.

The EENF/Proposed EIR contained a baseline assessment of any existing unfair or inequitable Environmental Burden and related public health consequences impacting EJ Populations in accordance with 301 CMR 11.07(6)(n)1. and the MEPA Interim Protocol for Analysis of EJ Impacts. The EENF/Proposed EIR reviewed data provided by the DPH EJ Tool applicable to the DGA regarding “vulnerable health EJ criteria”; this term is defined in the DPH EJ Tool to include any one of four environmentally related health indicators that are measured to be 110% above statewide rates based on a five-year rolling average.³ According to the EENF/Proposed EIR, EJ populations within the DGA are contained within census tracts or municipalities that exhibit the following vulnerable health criteria: heart attack hospitalizations, childhood asthma and childhood lead exposure.

The DPH EJ Tool also identifies potential sources of pollution in and around the identified EJ populations (census blocks). The MEPA Interim Protocol for Analysis of EJ Impacts requires a review of other pollution sources within the DGA, a narrative description of the estimated number and type of these facilities and a survey of enforcement histories of any facilities permitted by MassDEP. Potential pollution sources mapped by the DPH EJ Tool include:

- MassDEP major air and waste facilities
- M.G.L. c. 21E site
- “Tier II” toxics use reporting facilities
- MassDEP sites with Activity and Use Limitations (AULs)
- MassDEP groundwater discharge permits
- Wastewater treatment plants
- MassDEP public water suppliers
- Underground storage tanks (USTs)
- EPA facilities
- Road infrastructure
- MBTA bus and rapid transit

⁵ Emails dated April 25, 2022, April 26, 2022 and April 27, 2022 from Cam Gosine to Alex Strycky.

- Other transportation infrastructure
- Regional transit agencies
- Energy generation and supplies

The EENF/Proposed EIR included maps showing the locations of most of the potential pollution sources identified by the DPH EJ Tool, but did not include data regarding transportation and energy infrastructure. In addition, the maps provided in the EENF/Proposed EIR showed facilities near the project site but not in the entire DGA. The EENF/Proposed EIR did not include any discussion of other pollution sources in the DGA. The DPH EJ Tool indicates that there are significant numbers of potential pollution sources in the DGA, including two sites with air operating permits, 10 large quantity waste generators, two large quantity toxics users, two M.G.L. c. 21 E sites, six Tier II Toxics use reporting facilities, seven sites with AULs, two wastewater treatment facilities, three sites with USTs, one EPA toxic release inventory facility, three power plants and significant roadways, transit and cargo rail lines and public transportation facilities. The Single EIR should provide a revised discussion of potential pollution sources within the DGA.

The MEPA Interim Protocol for Analysis of EJ Impacts requires an analysis of potential climate risks affecting EJ populations. The output report from the MA Resilience Design Tool indicates that the site and surrounding areas are at high risk for urban flooding and extreme heat. I note that the City's "Municipal Vulnerability Preparedness Summary of Findings Report" dated June 2019 included maps showing that the Point of Pines area would be inundated under future scenarios with two- and four-foot increases in sea level rise and is affected by Category 1 hurricanes. Further analysis of climate risks is summarized in the Climate Change section below.

In addition to the baseline assessment of existing burdens impacting EJ populations, the EENF/Proposed EIR included an analysis of the project's impacts on the identified EJ populations. Based on the above, the filing indicates that there is some indication of an existing "unfair or inequitable" burden, including heart attack hospitalizations, childhood asthma, childhood lead exposure, potential sources of pollution and climate risks. However, the EENF/Proposed EIR asserts that the project will not result in disproportionate adverse effects, or increase the risks of climate change, on the EJ populations by materially exacerbating such existing burdens. In particular, the filing indicated the project is not expected to have a negative impact on EJ populations because the building and project site are small, the building will replace a fire station that was previously located at the site, the fire station will only generate 20 vehicle trips per day and the project will be designed with a new stormwater management system to minimize runoff and flooding. The project will provide a needed public safety service to the neighborhood, and thereby help alleviate public health burdens of the neighborhood. As discussed below, the Single EIR should provide supplemental analysis of the climate risks of the project given its location in the flood plain; the analysis should specifically address whether off-site flood risks may be exacerbated for surrounding EJ populations.

Article 97

The project is subject to the EEA Article 97 Policy and must obtain Article 97 legislation for the approximately 0.11-acre parcel to be transferred from DCR to the City. During the review period, the City provided a supplemental analysis which reviewed the six criteria for determining when “exceptional circumstances” exist such that a disposition of Article 97 land may be appropriate. In addition to the 0.11-acre parcel, the City is also seeking to acquire a 3.7-acre parcel from DCR to be used for a separate public safety facility constructed on Revere Beach Parkway. The City and DCR are in the process of negotiating a single transaction that would convey both parcels to the City in exchange for City-owned land that would be provided to DCR and, if necessary, a monetary payment to DCR if the City-owned parcels are not appraised at the same fair market value as the DCR parcels.

A summary of the City’s Article 97 analysis is as follows:

- *The Proponent of the disposition must conduct an analysis of alternatives, commensurate with the type and size of the proposed disposition, that achieve the purpose of the disposition without the use of Article 97 land, such as the use of other land available within the appropriate market area.*

The City reviewed other locations for a fire station, but the proposed site is the only one that would allow the fire department to respond to emergencies in the Point of Pines neighborhood with sufficient speed. The existing City-owned parcel at the site is not of sufficient size to accommodate a modern facility with sufficient living space for firefighters, parking for on-duty personnel, two truck service bays.

- *The disposition of the subject parcel and its proposed use may not destroy or threaten a unique or significant resource (e.g., significant habitat, rare or unusual terrain, or areas of significant public recreation).*

The proposed fire station will be located on City-owned land; the DCR parcel will be used only for parking and vehicular access to the fire station. The DCR land to be transferred to the City is a triangular parcel located between the City-owned land, the embankment of Route 1A and the bus loop and is not functionally connected to other land in recreational use.

- *Real estate of equal or greater value, and of significantly greater resource value is granted to the disposing agency.*

According to the EENF/Proposed EIR, the City has offered to provide over 13 acres of land in exchange for multiple parcels owned by DCR, including the 0.11-acre parcel. The EENF/Proposed EIR did not describe or identify the size of the other parcels to be transferred to the City, or the land offered to DCR. The legislation that will authorize the transfer is anticipated to require the City to provide greater land area to DCR than it receives and to provide additional compensation to DCR if the

fair market value of the land offered to DCR is not of equal or greater value than the land to be transferred to the City.

- *The minimum necessary area of Article 97 land should be included in the disposition and the existing resources continue to be protected to the maximum extent possible.*

According to the EENF/Proposed EIR, the City is seeking the minimum land area from DCR that will provide vehicular access to the fire station and sufficient area for a small 10-space parking lot for fire fighters. On-street public parking will be provided along Lynnway.

- *The disposition serves an Article 97 purpose or another public purpose without detracting from the mission, plans, policies and mandates of EEA and its appropriate department or division.*

The project will provide critical public safety services to the Point of Pines neighborhood. The proposed location will allow firefighters to quickly respond to emergencies in the neighborhood. The building will also provide community meeting space.

- *The disposition is not contrary to the express wishes of the person(s) who donated or sold the parcel or interests to the Commonwealth.*

According to the EENF/Proposed EIR, neither the City nor DCR believe that the land was acquired from a donor for specific purposes.

Wetlands and Stormwater

The EENF/Proposed EIR indicated that a portion of the project site is located within Bordering land Subject to Flooding (BLSF). The RCC issued a Negative Determination of Applicability (DOA) for the project on November 6, 2019, which found that the filing of a Notice of Intent was not required because the project would not alter an area subject to protection under the Wetlands Protection Act. According to MassDEP, the project site is located on a mapped Barrier Beach.⁶ In addition, MassDEP believes that the area referred to as BLSF is in fact Land Subject to Coastal Storm Flowage (LSCSF). According to MassDEP, there appear to be errors and inaccuracies in the Request for Determination of Applicability (RDA) filed by the City and the DOA issued by the RCC that make it inapplicable to the site and the proposed project. As noted by CZM, unconsolidated sediments on the coastal dune will move in response to moving floodwaters in a way that may destabilize solid foundations. MassDEP and CZM have also identified the potential for proposed fill and structures to reduce the dune's natural ability to dissipate storm damage and cause floodwaters to be reflected and channelized, which could result in damage to buildings and infrastructure. As detailed below, the Single EIR should

⁶ The EENF/Proposed EIR provided an "Environmental Constraints" map showing wetlands boundaries available from MassGIS on which the site is shown to be on a barrier beach; however, the EENF/Proposed EIR did not acknowledge the presence of this wetland resource area.

provide a revised delineation of wetland resource areas and discuss the project's impacts on those resource areas.

The project will add approximately 0.11 acres of impervious area. According to the EENF/Proposed EIR, the project will include a stormwater management system designed to meet the requirements of the Massachusetts Stormwater Management Standards (SMS). Runoff collected from the site will be directed to an infiltration system constructed under the proposed parking lot. According to the EENF/Proposed EIR, the stormwater management system will be designed with the capacity to attenuate peak flows and remove Total Suspended Solids (TSS) from the (current) 100-year storm event based on NOAA Atlas 14 precipitation estimates.

Traffic and Transportation

Access to the former fire station was provided via a driveway from the Route 1A ramp south of the site. Under proposed conditions, fire trucks will enter the facility via a new curb cut from the bus loop north of the building and then leave the building using the existing curb cut on the Route 1A ramp. An Access Permit has been issued to the City by MassDOT to permit access between the site and the Route 1A ramp using the existing curb cut. In addition to the new curb cut on DCR land, the City will construct a new sidewalk and landscaping within the Lynnway right-of-way east of the proposed building. An Access Permit from DCR is required for the new curb cut and the proposed work within the Lynnway ROW. As required by MassDOT's permit, the City will implement a traffic management plan during the construction period to maintain vehicular and pedestrian traffic through the area.

Climate Change

Governor Baker's Executive Order 569: Establishing an Integrated Climate Change Strategy for the Commonwealth was issued on September 16, 2016. The Order recognizes the serious threat presented by climate change and direct Executive Branch agencies to develop and implement an integrated strategy that leverages state resources to combat climate change and prepare for its impacts. The urgent need to address climate change was again recognized by Governor Baker and the Massachusetts Legislature with the recent passage of St. 2021, c. 8, An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy, which sets a goal of Net Zero emissions by 2050. I note that the MEPA statute directs all Agencies to consider reasonably foreseeable climate change impacts, including additional greenhouse gas emissions, and effects, such as predicted sea level rise, when issuing permits, licenses and other administrative approvals and decisions. M.G.L. c. 30, § 61.

Adaptation and Resiliency

The EENF/Proposed EIR included an evaluation of the design of the project with respect to its climate change resiliency using MA Resilience Design Tool. Based on the output of the MA Resilience Design Tool provided in the EENF/Proposed EIR, the project is rated high risk for extreme heat and urban flooding associated with extreme precipitation and moderate risk for sea level rise/storm surge. Based on a 30-year useful life of the project, the MA Resilience Design Tool recommends designing the building with a target planning horizon of 2050 and a

return period associated with a 10-year (10 percent) storm with respect to extreme precipitation and a 50-year (two percent) storm with respect to sea level rise/storm surge. These recommendations appear to be based on a “Low” criticality assessment of the project (generated from user inputs), which is understated given the fire station’s important public safety role. The planning horizon should be longer than 30 years given this critical function and the fact that a new permanent structure is being proposed. For “High” criticality buildings with an 11- to 50-year planning horizon, the MA Resilience Design Tool recommends planning for a 50-year storm for extreme precipitation and a 200-year storm for sea level rise, measured as of a future planning horizon.

As described in the EENF/Proposed EIR, the first floor of the building will be constructed at elevation 11.5 ft NAVD 88, which is 1.5 ft above the current 100-year Flood elevation. According to CZM, the Massachusetts Coastal Flood Risk Model (MC-FRM) indicates that the site will be inundated by two to three feet of floodwaters in a one-percent chance (100-year) storm event by 2050. Comments from MassDEP, CZM and DCR encourage the City to design the building to be resilient to more significant storm and flood conditions anticipated under future climate conditions. In addition, as noted by DCR, the Massachusetts Building Code requires critical facilities such as this fire station to be constructed with ground floors at least two feet above the 100-year flood elevation. Refinements to stormwater systems may also be needed to withstand higher rainfall volumes in future years. During the review period, the City committed to redesigning the building to comply with the Building Code to the most possible extent and to elevate all critical building systems. The Single EIR should review changes that will be made to the design of the building to increase its resiliency and comply with legal requirements.

Greenhouse Gas (GHG) Emissions

In accordance with the MEPA Interim Protocol on Analysis of EJ Impacts, the EENF/Proposed EIR included an estimate of the project’s GHG emissions using the EEA Emissions Footprint Estimation Tool (Emissions Tool). For purposes of estimating GHG emissions with the Emissions Tool, the City selected “lab/office use” as the closest building type to the proposed fire station. According to the Emissions Tool, an 8,910-sf building of this type would emit 134 tons of carbon dioxide (CO₂) per year.⁷ Because this falls under 2,000 tpy, the City was not required to prepare a GHG emissions analysis. I encourage the City to incorporate energy efficient measures into the building design, including a high-efficiency building envelope and electric heating and cooling systems; these systems may be eligible for financial incentives. I also encourage the City to consider taking advantage of the Commonwealth’s solar photovoltaic (PV) SMART plan, which allows building owners to receive financial incentives by providing solar production directly to the utility, without requiring the participation of residents as offtakers. For more information, please consult DOER’s website at <https://www.mass.gov/service-details/development-of-the-solar-massachusetts-renewable-target-smart-program>.

⁷ I note that the proposed fire station is a two-story building with a footprint of 8,910 sf; therefore, its gross floor area is 17,820 sf. According to the Emissions Tool, a lab/office building of that type would generate 291 tons of CO₂ per year.

Construction Period

All construction and demolition (C&D) activities should be managed in accordance with applicable MassDEP's regulations regarding Air Pollution Control (310 CMR 7.01, 7.09-7.10), and Solid Waste Facilities (310 CMR 16.00 and 310 CMR 19.00, including the waste ban provision at 310 CMR 19.017). I encourage the Proponent to reuse or recycle C&D debris to the maximum extent. The project should include measures to reduce construction period impacts (e.g., noise, dust, odor, solid waste management) and emissions of air pollutants from equipment, including anti-idling measures in accordance with the Air Quality regulations (310 CMR 7.11). I encourage the Proponent to require that its contractors use construction equipment with engines manufactured to Tier 4 federal emission standards, or select project contractors that have installed retrofit emissions control devices or vehicles that use alternative fuels to reduce emissions of volatile organic compounds (VOCs), carbon monoxide (CO) and particulate matter (PM) from diesel-powered equipment. Off-road vehicles are required to use ultra-low sulfur diesel fuel (ULSD). If oil and/or hazardous materials are found during construction, the Proponent should notify MassDEP in accordance with the MCP (310 CMR 40.00). All construction activities should be undertaken in compliance with the conditions of all State and local permits.

Conclusion

As noted above, the project requires additional analysis, particularly with respect to EJ impacts and the design of the project to increase the resiliency of the building. For these reasons, I am requiring that a Single EIR be prepared in accordance with the Scope.

SCOPE

General

The Single EIR should follow Section 11.07 of the MEPA regulations for outline and content and the additional information and analyses identified in this Scope.

Project Description

The Single EIR should include updated site plans for existing and post-development conditions at a legible scale and a detailed description of all project components. It should provide plans clearly showing the location of all proposed work and provide updated estimates of land alteration and impervious area. It should identify any changes since the filing of the EENF/Proposed EIR, including a detailed description, with plans and renderings, showing changes to the design of the building to increase its resiliency. Conceptual plans should be provided at a legible scale and clearly identify buildings, public areas, open space, impervious areas, roadways, and stormwater and utility infrastructure. The Single EIR should identify and describe State, federal and local permitting and review requirements associated with the project, provide an update on the status of each of these pending actions, analyze applicable statutory and regulatory standards and requirements, and provide a discussion of the project's consistency with those standards.

Environmental Justice

The Single EIR should include an EJ outreach plan for the design, permitting and construction phases of the project. It should provide a revised baseline assessment consistent with the MEPA Interim Protocol for Analysis of EJ Impacts, including a description of all pollutant sources within 1-mile DGA and, where possible, a review of the compliance history of facilities permitted by MassDEP. The Single EIR should provide an updated assessment of the project's impacts on EJ populations based on the revised baseline health assessment and the analysis of potential flooding in the area under future climate conditions as described below.

Article 97

The Single EIR should provide a more comprehensive Article 97 analysis that fully describes all DCR parcels to be acquired by the City and the land offered to DCR in exchange. It should describe the environmental and recreational values of the 13 acres of land the City proposes to convey to DCR in exchange for the 0.11-acre parcel and other DCR-owned property; this information is necessary in order to assess whether the City is proposing to grant real estate of equal or greater value to DCR. In addition, a comprehensive analysis would make the filing of another ENF to describe the other Article 97 transaction unnecessary.

Wetlands/Coastal Resiliency

The Single EIR should include revised site plans showing existing and proposed grades, all wetland resource areas on the site, including coastal dune and LSCSF, and the location of the stormwater management system components. The Single EIR should provide the analyses and information requested by MassDEP and CZM, including an analysis of the depth, extent, direction and velocity of flood flows across the site under existing and future conditions, and during storm events with a combination of rain and coastal flooding. The Single EIR should provide an analysis of the performance standards for coastal dunes applicable to the project.

The Single EIR should provide cross-sections through the site and proposed buildings with existing and proposed grades, exterior structures such as utilities and site access facilities, the FEMA 100-year flood elevation, and future projected flood elevations, and should explain in detail how the building has been designed to be resilient to climate conditions over a 30 to 50 year design life. The Single EIR should discuss whether it would be feasible to elevate the building to be resilient to 100-year and 200-year storm flood conditions as of 2050 and 2070. If not feasible, the Single EIR should discuss whether the City plans to follow an adaptive management strategy and whether future retrofits may be possible to improve resiliency. The Single EIR should discuss what contingency plans exist for surrounding communities, should future storm conditions make the fire station inoperable.

Mitigation and Draft Section 61 Findings

The Single EIR should include a separate chapter summarizing all proposed mitigation measures including construction-period measures. This chapter should also include a

comprehensive list of all commitments made by the City to avoid, minimize, and mitigate the environmental and related public health impacts of the project, including air/GHG, water quality and noise impacts during the construction period. The filing should contain clear commitments to implement these mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation. The list of commitments should be provided in a tabular format organized by subject matter (land, water/wastewater, GHG, environmental justice, etc.) and identify the Agency Action or Permit associated with each category of impact. Draft Section 61 Findings should be separately included for each Agency Action to be taken on the project. The filing should clearly indicate which mitigation measures will be constructed or implemented based upon project phasing to ensure that adequate measures are in place to mitigate impacts associated with each development phase

Responses to Comments

The Single EIR should contain a copy of this Certificate and a copy of each comment letter received. In order to ensure that the issues raised by commenters are addressed, the Single EIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the scope of the Single EIR beyond what has been expressly identified in this certificate.

Circulation

In accordance with 301 CMR 11.16, the City should circulate the Single EIR to those parties who commented on the EENF/Proposed EIR and to any State Agencies from which the City will seek permits or approvals. A copy of the Single EIR should be made available for review in the Revere Public Library.

April 29, 2022

Date



Kathleen A. Theoharides

Comments received:

04/21/2022	Massachusetts Office of Coastal Zone Management (CZM)
04/22/2022	Massachusetts Department of Environmental Protection (MassDEP)/Northeast Regional Office (NERO)
04/22/2022	City of Revere
04/22/2022	Massachusetts Water Resources Authority (MWRA)
04/22/2022	Massachusetts Department of Transportation (MassDOT)
04/29/2022	Department of Conservation and Recreation (DCR)

KAT/AJS/ajs



THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

MEMORANDUM

TO: Kathleen A. Theoharides, Secretary, EEA
ATTN: Alex Strycky, MEPA Office
FROM: Lisa Berry Engler, Director, CZM
DATE: April 21, 2022
RE: EEA-16536, Alden Fire Station; Revere

The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the above-referenced Expanded Environmental Notification Form (EENF), noticed in the *Environmental Monitor* dated March 9, 2022, and recommends that the following comments are addressed in the scope of the Environmental Impact Report (EIR) for the project.

Project Description

The EENF proposes construction of a new 2-story 8,190 square-foot fire station to serve the Point of Pines neighborhood on a 0.35-acre vacant site that was the location of a previously demolished fire house. According to the EENF, the project requires 4,592 square feet (SF) of land owned by DCR on an adjacent parcel to be transferred to the city for access to the existing bus loop, construction of four of the proposed parking spaces, the subsurface infiltration system, and a dumpster. This proposed Article 97 land transfer is a portion of a larger land swap between the city and DCR. Though not identified in the EENF, the project is located on a barrier beach, and will alter 0.31 acres of coastal dune. The project is also located within and adjacent to land subject to coastal storm flowage (LSCSF), FEMA zone AE elevation 10 NAVD88.

Project Comments

The EENF includes an Environmental Constraints map (Attachment 3) that indicates the project site is on a barrier beach, but this resource area is not otherwise referenced in the document. Because barrier beach is defined as “coastal beaches and coastal dunes extending roughly parallel to the trend of the coast,” the site is either a coastal dune or a coastal beach. In this instance, the entire site is within a coastal dune resource area. In addition to having implications for both wetland permitting and Massachusetts building code requirements, a coastal dune will respond to moving floodwaters in a particular way. Specifically, the unconsolidated sediments on the coastal dune will move in response to flood related energy in a way that is likely to destabilize solid foundations. In addition, solid foundations and impervious areas reduce the dune’s ability to dissipate storm damage and provide flood control and may reflect energy onto adjacent sites and structures. Because the site is located within and adjacent to LSCSF that is likely to be exacerbated by climate change impacts, the proponent should provide additional information in the EIR to demonstrate that these issues are addressed appropriately in the design of the building and the site. In addition, the analysis of impacts to resource areas should address how the project will affect floodplain function presently and for the design life of the project, including examining how floodwaters will flow across the site in a 100-year storm event and how will that change with the proposed fill and development. The analysis should include any changes in velocity, direction, depth, and extent of coastal floodwater. The EIR should include an analysis specific to how any proposed fill, grade changes, and solid project components may change these patterns within and adjacent to the site. This should be assessed for conditions



during rain events and coastal storm events where there is a combination of rain and coastal flooding. A statement at the bottom of page 23 in the EENF states the project will not affect floodplain function or flow paths in any way. This is unlikely to be the case. The proponent should provide an analysis to fully consider potential impacts to the floodplain functions in this location.

The ENF states that the building finish floor will be 1.5 feet above the 100-year flood elevation, at elevation 11.5 NAVD88. Plans showing cross-sections through the site with the existing grades, proposed grades, proposed buildings and structures, FEMA base flood elevations, and future projected flood zone elevations, as well as grading plans to show how the site will be elevated should be provided in the EIR to demonstrate that the site is designed appropriately for the existing and expected conditions for the site during the design life of the project. The EENF indicates a project design life of 30 years. The Massachusetts Coastal Flood Risk Model (MC-FRM) data indicates there will be 2-3 feet of flooding in a 1% storm on this site location by 2050. Because the fire station is a critical facility, it should be designed for protection from a 500-year event for the life of the building. The EIR should demonstrate that these considerations have been applied in the design of the building elevations and site approaches. For example, a transformer on the site plans appears to be at grade; all utilities should be elevated to provide the maximum protection from flooding for the design life of the building. Addressing these issues in the design of this critical facility will improve the function of the facility to provide emergency assistance over time in this vulnerable location.

Federal Consistency Review

The proposed project may be subject to CZM federal consistency review and if so must be found to be consistent with CZM's enforceable program policies. For further information on this process, please contact Robert Boeri, Project Review Coordinator, at 617-626-1050, or visit the CZM web site at www.mass.gov/czm.

LE/kg/rh

cc: Kathryn Glenn, Rebecca Haney, CZM
Rachel Freed, Jill Provencal, DEP NERO
Joy Duperault, Eric Carlson, DCR
John Shue, Revere Conservation Commission



The City of REVERE, MASSACHUSETTS

Director of Economic Development

281 Broadway, Revere, MA 02151

(781) 286-8201

www.revere.org

BRIAN M. ARRIGO

Mayor

April 22, 2022

Alexander Strysky, Environmental Analyst
MEPA Office of the Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Boston, MA 02114

RE: Support for MEPA Approval of the 02.28.22 EENF/EIR
For the New RFD Alden A. Mills Fire Station @ 140 Lynnway

Dear Mr. Strysky,

In my capacity as Director of Economic Development for the City of Revere, and on behalf of Mayor Brian M. Arrigo, we hereby recommend and respectfully request MEPA approval of the Extended Environmental Notification Form (EENF) / Environmental Impact Report (EIR) as filed on 02.28.22 by Brennan Consulting for the otherwise fully permitted proposal to construct a new Revere fire station at 140 Lynnway.

This new Alden A. Mill Fire Station will replace a long vacant and recently demolished Revere Fire Department facility in the same location; and the new fire station has resulted from a lengthy, extensive, and participatory community planning, design, and funding process. MEPA approval of this EENF/EIR, pursuant to the rollover provision that would obviate the need for further environmental filings, will allow the City of Revere to finally proceed with construction of this critical public safety project. The new fire station will address the fire safety needs of not only the currently underserved Point of Pines and Riverside neighborhoods that surround this site, but also those of the numerous new residential developments along the adjacent Revere Beach oceanfront that have been accomplished in recent years. In both respects, this new project is an increasingly urgent matter of public safety as well as environmental justice concern. It will also include a community room that will afford convenient space for neighborhood meetings, an election polling place, and other beneficial and important civic activities similar to those long provided in the previous facility.

As you know, the necessity for an EENF/EIR in this case was due to the Article 97 implications of a planned land-swap between the City of Revere and the Department of Conservation and Recreation (DCR). That will somewhat expand the current fire station property to provide a required lay-down area during construction and additional staff parking and improved fire apparatus access to the new station once operational. This in turn required the submission of an EIR to address the new environmental justice aspects of any such project environmental review and evaluation.

These Article 97 and environmental justice matters were addressed in the EENF/EIR document itself as well as orally in the 04.13.22 virtual site visit that followed. That session also addressed other issues and opportunities, primarily related to the climate resiliency of the new fire station. More specifically, your thoughtful questions and informed comments, as well as those of involved representatives of the Department of Environmental Protection (DEP), Coastal Zone Management (CZM) and DCR, suggested several areas in which the design of the planned facility could/should be enhanced. While the grade elevation of the new fire station site is above the 10.0-foot FEMA floodplain, the current design calls for the floor of the new building to be constructed at an elevation of 11.5 feet, with major utility systems located either on the roof of the building or otherwise raised above this base elevation. A principal focus of the site-visit discussion was on whether those elevations could be increased above 11.5 feet in order to provide for an increased level of climate resiliency for a longer period of time given the projected vulnerability of this site to the adverse effects of flooding due climate change, sea-level rise and increasingly severe storm events in future decades.

As a direct result of those MEPA, CZM, DEP and DCR comments and questions, both in the 04.13.22 site visit and in follow-up conversations, the Alden Fire Station project team was instructed to evaluate areas in which the climate resiliency of the current design and engineering could be improved and to refine/revise the current plans accordingly. That review process is now underway; and its results will be submitted in response to the DEP, CZM, DCR and other written comments that are expected to be filed no later 04.22.22. The updated plans can then be referenced in the MEPA Certificate that will hopefully be issued no later than 04.29.22.

In sum, although it does not appear feasible to elevate the floor of the apparatus bay - i.e., the fire truck garage - above the current 11.5-foot elevation given the equipment access/egress grade issues that would be created on such a small site, it does appear that we will be able to:

- Raise other building elements - e.g., the community room and communication center - an additional 21 inches above the current 11.5-foot elevation.
- Relocate the electrical room now in the apparatus bay into the higher areas of the building -- and as high as possible off the floor within that space. (NB: The elevator mechanical room and the generator are already on the roof in the current design.)
- Reduce the size of the exterior Fire Fighters Memorial to accommodate these changes and maintain accessibility.
- Flood-proof the building in additional ways - e.g., flood-resistant overhead bay doors.

The City of Revere is confident that these additional measures will significantly improve the climate resiliency of the new fire station; and we very much appreciate the MEPA, DEP, CZM and DCR input and feedback that has guided us in this direction. We are hopeful, however, that these changes will not unduly delay the MEPA approvals that will permit us to implement those plans as soon as possible.

It is to that end that we reiterate our recommendation and again respectfully request that MEPA approve the EENF/EIR as filed, and to be supplemented with updated design plans that are expected to be available for your review and comment within two weeks' time.

Many thanks for your support throughout this process; and we await your timely decision. In the meantime, please let us know if you have any questions or need additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Robert B. O'Brien', with a large, stylized loop at the end.

Robert B. O'Brien
Revere Director of Economic Development

cc: Kim Tori and Page Czepiga of the MEPA Office
Eric Carlson and Andy Backman of the Department of Conservation & Recreation
Phillip DiPietro of the Department of Environmental Protection
Kathryn Glenn of Coastal Zone Management
Mayor Brian M. Arrigo and Chief of Staff Kim Hanton
City Council President Gerry Visconti
Ward 5 Councillor Albert Fiore and Former Ward 5 Councillor John Powers
RFD Fire Chief Christopher Bright and Deputy Chief Paul Cheever
City Solicitor Paul Capizzi and Revere CFO Richard Viscay
Infrastructure Chief Don Ciarramella and City Engineer Nick Rystrom
Site Plan Review Committee Chair Frank String and Building Commissioner Louis Cavignaro
Director of Planning and Community Development Techrosette Leng
The Alden A. Fire Station Project Design/Development/Management Team



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

April 22, 2022

Kathleen A. Theoharides, Secretary
Executive Office of
Energy & Environmental Affairs
100 Cambridge Street
Boston MA, 02114

RE: Revere
Alden Fire Station
EEA # 16536

Attn: MEPA Unit

Dear Secretary Theoharides:

The Massachusetts Department of Environmental Protection Northeast Regional Office (MassDEP-NERO) has reviewed the Expanded Environmental Notification Form (EENF) for the proposed Alden Fire Station project in Revere. MassDEP provides the following comments.

Wetlands

The EENF describes the project as the construction of an 8,190 sf fire station with associated parking, utilities, and landscaping at 140 Lynnway in Revere, in the Point of Pines neighborhood. The fire station is intended to replace a fire station that was previously demolished. Construction requires obtaining 4,592 sf of DCR land on the abutting property, as well as obtaining a construction access permit which will allow access to the fire station from a bus loop that is on the DCR property. This land swap is part of a larger 14-acre land transfer between the DCR and City of Revere.

The land on which the project is proposed is mapped as a Barrier Beach as defined in and regulated by 310 CMR 10.29 of the Wetland Regulations. The Wetland Regulations define barrier

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.

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beach as “coastal beaches and coastal dunes extending roughly parallel to the trend of the coast.” In this case there is no coastal beach on the site, so the barrier beach is classified as coastal dune. The dune/barrier beach is significant to the functions of storm damage prevention and flood control, so the project must comply with the performance standards for work on dunes specified at 310 CMR 10.28(3) through (5). The project must also comply with the standards in the state building code for work in dunes, which includes elevating structures on open pilings.

In addition, a portion of the project is located within Land Subject to Coastal Storm Flowage (LSCSF), which is at elevation 10.0 NGVD 88. A Negative Determination of Applicability was issued by the Revere Conservation Commission on November 6, 2019. The Determination found that “The work described in the Request is within an area subject to protection under the Act, but will not remove, fill, dredge or alter that area.” The Negative Determination does not state what wetland area(s) subject to protection under the Act will be affected, nor does it list any wetland resource areas present on the site or confirm their respective boundaries. The EENF further complicates matters, stating (page 23) that the Revere Conservation Commission made a determination that the work will take place in Bordering Land Subject to Flooding (BLSF) but will not remove, fill, dredge or alter the BLSF.

In reviewing the RDA and Determination, MassDEP has identified several errors and inaccuracies that draw into question the validity of the commission’s findings. The RDA describes the work as “improv[ing] existing driveway connection to State Highway ramp in conjunction with new building.” The plan attached to the RDA is a schematic of the proposed fire station project with few details. Existing grades and site conditions are not depicted. The plan shows a FEMA Zone AE at El. 10 but the contour lines are discontinuous or run into the building. There is no information about the proposed improvement to the existing driveway connection; nor are any wetland resource areas identified. The Determination issued by the conservation commission describes the project as “Construction of a new fire station located at the old Point of Pines Fire Station.” Other than the address of the project, it would be difficult to recognize that the RDA and Determination are associated with the same project. Contrary to the statement in the EENF, MassDEP finds that the project site does not contain BLSF. Rather, the project involves the placement of fill below elevation 10 NGVD 88, within LSCSF, and on a coastal dune. Neither of these wetland resource areas have been identified by the commission or the applicant.

It is MassDEP’s opinion that the RDA filed by the applicant is inaccurate and that the Negative Determination contains errors that make it inapplicable to the site and the proposed project. Based on this conclusion, MassDEP advises the applicant to file a Notice of Intent for the project, with the appropriate details, including but not limited to wetland resource area delineations, plans showing existing and proposed grades, stormwater management plans, and information that demonstrates that the project will comply with all applicable performance standards. It should also be noted that the Determination of Applicability will expire 3 years from its issuance date, in November 2022, and cannot be extended.

The project has designed the first floor elevation to be at elevation 11.5, 1.5 feet above the current 100-year flood elevation. The ENF states that “proposed changes to the site’s topography will not affect the function of the floodplain or present-day floodwater flow paths in any way.”

More information should be developed in the EIR to support that statement as well as showing that the project design will comply with the State Building Code.

MassDEP concurs with the Massachusetts Office of Coastal Zone Management (CZM) that in developed areas of LSCSF, channelization of flow is of primary concern as a potential cause of damage to buildings and infrastructure. Therefore, the potential impacts of the proposed project on future coastal floodwater flow and drainage patterns should be assessed, including changes in velocity, direction, depth, and extent of coastal floodwater. The EIR should include an analysis specific to how any proposed fill, grade changes, and solid project components may change these patterns within and adjacent to the site. This should be assessed for conditions during rain events and coastal storm events where there is a combination of rain and coastal flooding. The EIR should include cross-sections through the site that show the existing grades, proposed grades, proposed buildings and structures, FEMA base flood elevations, and future projected flood zone elevations.

The MassDEP appreciates the opportunity to comment on this proposed project. Please contact Rachel.Freed@mass.gov at (978) 694-3258 for further information on wetlands issues. If you have any general questions regarding these comments, please contact me at John.D.Viola@mass.gov or at (978) 694-3304.

Sincerely,

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

John D. Viola
Deputy Regional Director

cc: Brona Simon, Massachusetts Historical Commission
Eric Worrall, Rachel Freed, MassDEP-NERO



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Jamey Tesler, Secretary & CEO



April 22, 2022

Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2150

RE: Alden Fire Station
(EEA #16536)

ATTN: MEPA Unit
Alex Strysky

Dear Secretary Theoharides:

On behalf of the Massachusetts Department of Transportation, I am submitting comments regarding the Environmental Notification Form filed for the proposed Alden Fire Station project at 140 Lynnway in Revere as prepared by the Office of Transportation Planning. If you have any questions regarding these comments, please contact J. Lionel Lucien, P.E., Manager of the Public/Private Development Unit, at (857) 368-8862.

Sincerely,

David J. Mohler
Executive Director
Office of Transportation Planning

DJM/jll

cc: Jonathan Gulliver, Administrator, Highway Division
Carrie Lavalley, P.E., Chief Engineer, Highway Division
Paul Stedman, District 4 Highway Director
Neil Boudreau, Assistant Administrator of Traffic and Highway Safety
Boston Region Metropolitan Planning Organization (MPO)
Planning Department, City of Revere



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Jamey Tesler, Secretary & CEO



MEMORANDUM

TO: David J. Mohler, Executive Director
Office of Transportation Planning

FROM: J. Lionel Lucien, P.E., Manager
Public/Private Development Unit

DATE: April 22, 2022

RE: Alden Fire Station
(EEA #16536)

The Public/Private Development Unit (PPDU) has reviewed the Expanded Environmental Notification Form (EENF) for the Alden Fire Station Redevelopment Project (the "Project") submitted by Brennan Consulting, Inc. on behalf of the City of Revere (collectively, the "Proponent"). The Project includes the construction of a new 8,190 square foot (sf) fire station at 140 Lynnway, a previously-developed site with extant impervious surface and driveway connecting to the Route 1A Southbound on-ramp. The Project proposes to maintain access via the exiting paved driveway to the Route 1A Southbound on-ramp and develop the new fire station with rear parking including 10 total parking spaces and an additional access driveway connecting to an existing MBTA bus stop roundabout on Lynnway.

The Project surpasses MEPA thresholds for review of an ENF per 301 CMR 11.03(1) as it involves the transfer of land from the Department of Conservation and Recreation (DCR) in order to support the proposed expansion. The Project requires a Draft Environmental Impact Report (DEIR) per 301 CMR 11.06(7)(b) as the Project site falls within an identified income EJ population in Tract 1705.02 Block Group 2. The Project will require an Access Permit from MassDOT as proposed site driveways connect to Lynnway and the Route 1A access ramp in an area of shared DCR/MassDOT jurisdiction.

Once completed, the Project is expected to result in minor change in observed traffic volumes on jurisdictional or local roadways. The Proponent estimates that the proposed fire station will generate a total of 20 additional vehicle trips above current roadway use. There are no MassDOT projects on nearby roadways which are likely to be impacted by this Project, and no HSIP-identified crash clusters in the area of the Project which will be exacerbated by increased vehicle trips.

As a result, MassDOT recommends that no further environmental review be required based on transportation-related issues. The Proponent should coordinate with the City of Revere, DCR, and MassDOT District 4 to minimize traffic disruption during project

construction. Additionally, the Proponent should coordinate with the MBTA to limit disruption of bus service at the station nearby the newly proposed access driveway during and after construction. If you have any questions regarding these comments, please contact me at *Curtis.B.Wiemann@dot.state.ma.us*.



MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard
100 First Avenue, Building 39
Boston, MA 02129

Frederick A. Laskey
Executive Director

Telephone: (617) 242-6000
Fax: (617) 788-4899
TTY: (617) 788-4971

April 22, 2022

Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge St, Suite 900
Attn: MEPA Office, Alex Strysky
Boston, MA 02114

Subject: EOEEA #16536 – Environmental Notification Form
Alden Fire Station, Revere, MA

Dear Secretary Theoharides,

The Massachusetts Water Resources Authority (MWRA) appreciates the opportunity to comment on the Environmental Notification Form (ENF) submitted by City of Revere (the “Proponent”) for Alden Fire Station (the “Project”) located at 140 Lynnway in Revere. The Project site formerly contained a fire station, which was demolished and the site was cleared in 2021. The Project involves construction of a new 2-story fire station which will service the Point of Pines neighborhood of Revere.

MWRA’s comments on this ENF address Toxic Reduction and Control (TRAC) discharge permitting and MWRA Enabling Statue Section 8(m) permitting.

TRAC Discharge Permitting

MWRA prohibits the discharge of groundwater and stormwater into the sanitary sewer system, pursuant to 360 C.M.R. 10.023(1) except in a combined sewer area when permitted by the Authority and the local community. The Project site has access to separate sewer and storm drain systems. Therefore, the discharge of groundwater or stormwater to the sanitary sewer system associated with this Project is prohibited.

Any gas/oil separators in parking garages associated with the Project must comply with 360 C.M.R. 10.016 and State Plumbing Code. Installation of gas/oil separator(s) may not be back filled until inspected and approved by the MWRA and the Local Plumbing Inspector. For assistance in obtaining an inspection, the Proponent should contact Alix Pierre-Louis, Regional Manager, in the TRAC Department at (617) 305-5660 or Alix.Pierre-Louis@mwra.com.

Section 8(m) Permitting

Section 8(m) of Chapter 372 of the Acts of 1984, MWRA's Enabling Legislation, allows the MWRA to issue permits to build, construct, excavate, or cross within or near an easement or other property interest held by the MWRA, with the goal of protecting Authority-owned infrastructure. Due to the proximity of MWRA infrastructure to the Project site, an 8(m) permit will be required. The Proponent should coordinate with Ralph Francesconi in the Operations Permitting Group at (617) 305-5827 or Ralph.Francesconi@mwra.com for assistance.

On behalf of the MWRA, thank you for the opportunity to provide comments on this Project. Please do not hesitate to contact Katie Ronan of my staff at (857) 289-1742 with any questions or concerns.

Sincerely,

A handwritten signature in black ink, appearing to read 'Rebecca Weidman', with a long horizontal flourish extending to the right.

Rebecca Weidman

Director

Environmental and Regulatory Affairs

cc: John Viola, MassDEP



April 29, 2022

Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs
Attn: Alex Strycky, MEPA Office
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Re: EOEEA #16536 Alden Fire Station EENF and Proposed EIR

Dear Secretary Theoharides:

The Department of Conservation and Recreation (“DCR” or “Department”) is pleased to submit the following comments in response to the Expanded Environmental Notification Form (“EENF”) and Proposed Environmental Impact Report (“EIR”) submitted by City of Revere (the “City” or the “Proponent”) for the Alden Fire Station project (the “Project”).

The Project is located within 1 mile of an Environmental Justice (“EJ”) Population requiring submittal of an EIR under 301 CMR 11.06(7)b. An EIR was submitted along with the EENF as a proposed rollover filing under the new EJ assessment guidelines. As described in the EENF and EIR, the Project will construct a new fire station at 140 Lynnway in Revere’s Point of Pines neighborhood. The City is requesting transfer of an adjacent 4,592 sf parcel from the DCR to allow for a larger building footprint and increased parking area on the site.

Article 97

Transfers of interests in DCR’s protected property must meet the requirements set forth in the Executive Office of Energy and Environmental Affairs (“EEA”) Article 97 Land Disposition Policy (the “Policy”). The Policy has the stated goal of ensuring no net loss of lands protected under Article 97 of the amendments to the State Constitution in the ownership and control of the Commonwealth and its political subdivisions, and states as a general premise that EEA and its agencies shall not sell, transfer or otherwise dispose of any right or interest in Article 97 lands. Transfer of ownership or interests therein only may occur under exceptional circumstances, as defined in the Policy, including the determination that no feasible alternative is available, and a minimum amount of land or an interest therein is being disposed for the proposed use. Such a transfer also requires legislative authorization by the General Court through a two-thirds supermajority roll-call vote.

In January 2022, DCR provided to the Proponent a re-draft of H.4221, originally filed at the request of the Proponent, that would meet EEA’s no-net-loss policy. That re-draft has not yet been filed, though a representative of the City has indicated that it will be filed. The bill includes three DCR parcels that the City has requested be transferred from DCR to the City, including the DCR parcel located at the proposed fire station Project site. The bill calls for an appraisal to be performed by DCAMM to determine the fair

COMMONWEALTH OF MASSACHUSETTS · EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS

Department of Conservation and Recreation
251 Causeway Street, Suite 600
Boston, MA 02114-2199
617-626-1250 617-626-1351 Fax
www.mass.gov/dcr



Charles D. Baker
Governor
Karyn E. Polito
Lt. Governor

Kathleen A. Theoharides, Secretary
Executive Office of Energy & Environmental Affairs
Stephanie C. Cooper, Acting Commissioner
Department of Conservation & Recreation

market value of the DCR parcels, as well as parcels owned by the City which the City has offered to DCR as replacement parcels. If the appraisal identifies a difference in the values of the DCR land and the City land, such that the DCR land has a higher appraised value, the City will be required to pay the difference to DCR, and DCR would use those funds for purposes of meeting the requirements of the EEA Article 97 Land Disposition Policy. Following completion of MEPA review and passage of the Article 97 legislation, DCR may issue a 5-year License Agreement for the City to occupy the site to bridge the time while the DCAMM Article 97 appraisal process is progressing.

Construction and Access Permit

The Project will require a DCR Construction and Access Permit ("CAP") for work activities within the boundaries of the adjacent DCR managed roadways. DCR has developed 'Design Standards and Guidelines for Revere Beach Boulevard and Ocean Avenue'. Conditions in the DCR CAP will be informed by the Design Standards and Guidelines.

Flood Hazard Management

As proposed, this Project involves activities within a 100-year floodplain as delineated on the current effective Flood Insurance Rate Map ("FIRM") for Suffolk County, dated March 16, 2016. Specifically, the site includes a zone AE, with a base flood elevation of 10 feet above North American Vertical Datum ("NAVD"). In its role as the state coordinating agency for the National Flood Insurance Program ("NFIP"), DCR submits the following comments.

DCR's Flood Hazard Management Program ("FHMP"), under agreement with the Federal Emergency Management Agency ("FEMA"), is the state coordinating agency for the NFIP. As such, the FHMP provides technical assistance to communities that participate in the NFIP related directly to the program and also related to floodplain management in general. Communities that participate in the NFIP are required by FEMA, as a condition of their participation, to regulate development within the 100-year floodplain in a manner that meets or exceeds the minimum standards established by FEMA, located at 44 CFR 60.3. Participating communities such as Revere are required to adopt the NFIP requirements through locally enforceable measures. In Massachusetts, many of the requirements contained in 44 CFR 60.3 are enforced through existing state regulations such as the State Building Code (780 CMR) and Wetlands Protection Act regulations (310 CMR 10.00). Communities typically adopt the remainder of the requirements as part of a zoning ordinance or other locally enforceable measure. Revere has a zoning ordinance that includes a Floodplain District section which has been accepted by FEMA as meeting their requirements under the NFIP.

In our role as NFIP coordinator, the FHMP offers comments on the proposed Project's relationship to many of the above regulations and requirements. The FHMP does not administer any of these requirements and therefore does not provide official determinations as to compliance with them; rather, our comments are provided as an overview of the requirements and the documentation that the FHMP believes may be necessary to demonstrate compliance with these requirements.

The State Building Code requires that buildings constructed in A zones be elevated such that the lowest floor, as defined, is elevated to a specified level in accordance with ASCE 24-14, Chapter 2. For design class 4 buildings, the required elevation is the base flood elevation plus two feet, or the 500-year flood

elevation, whichever is higher. A site plan in the EENF shows the building site to be above elevation 11 (no datum specified). According to the Proponent, the datum used is NAVD 1988, which would render the building site above the base flood elevation for that location. Elevation of the building site, with datum source specified, will need to be verified as it appears to be inconsistent with what is depicted on the FIRM.

Thank you for the opportunity to comment on the EENF. Questions related to the Article 97 process can be directed to Jennifer Howard, Director of Land Acquisition and Protection at jennifer.howard@mass.gov. Questions related to Flood Hazard Management can be directed to Eric Carlson at eric.carlson@mass.gov. Please contact Sean Casey at sean.casey@mass.gov, DCR's Director Construction and Access Permits, to request a CAP.

Sincerely,

Stephanie C. Cooper

Stephanie Cooper
Acting Commissioner

cc: Patrice Kish, Priscilla Geigis, Tom LaRosa, Jennifer Howard, Sean Casey, Eric Carlson

NARRATIVE

2. SUMMARY

The Alden Mills Fire Station (FS), located at 140 Lynnway in Revere, was recently demolished, and the site cleared in 2021. This project proposes to construct a modern Fire Station in the same plot of land. However, because the parcel is small, 15,078 sf, additional land is required to be obtained from the Department of Conservation and Recreation (DCR). The plot of land requiring the Land Transfer from DCR is shown in **Attachment 4**, and is 4,592 sf. The need for the DCR land, which is considered Park Land, necessitated the submission of an Environmental Notification Form (ENF), under the Land Standard. The ENF was being developed when the project preparer and proponent were informed that the submission of an ENF for a project in a specific geographic area now required compliance with a new MEPA regulation.

A new MEPA regulation entitled Climate Roadmap Act, effective December 24, 2021, requires consideration and mitigation of public health impacts in EIRs. The Act expanded public participation in the MEPA review process for Environmental Justice (EJ) populations. The EJ population is defined by criteria based on income, English proficiency, and minority composition. The Alden Mills FS is within an EJ population, which requires the submission of an ENF / DEIR / FEIR. However, the regulation also created a new compliance pathway, known as a “rollover EIR”, that allows a Proponent to submit an “Expanded ENF / Proposed EIR” as a way to comply with the new requirements to perform full EIRs in EJ communities for projects that previously only required an ENF. The Alden Mills FS fits this situation which is why we submitted an EENF/Proposed EIR.

Brennan Consulting submitted the EENF/Proposed EIR on February 28, 2022 for the Environmental Monitor publication date of March 3, 2022. Comments were received by MEPA, transmitted to Brennan, and MEPA published the Certificate on April 29, 2022. The Certificate required the project to submit a Single EIR, which is this submission.

The primary purpose of the Single EIR is the need for further investigation and mitigation relative to wetlands/coastal resiliency raised by DEP/CZM issues regarding coastal beach and dune resource areas. Other comments addressed in this Single EIR are further outreach plans for EJ, and Article 97 analysis

3. PROJECT DESCRIPTION

3.1 Description of the Project

The City of Revere is proposing the construction of a new fire station at 140 Lynnway. The previous Alden Mills Fire Station, located on the same lot, was antiquated and has been inactive since approximately 2000. The project is located within the Point of Pines district, which is the community that the fire station will be servicing. The City is proposing this fire station due to the existing fire station's inability to properly service fire trucks, and high response times from neighboring fire stations for the Point of Pines district. The new 8,190 sf fire station will include 2 service bays for fire trucks as well and a service bay for fireboats. The larger footprint and increased parking area will require a land transfer from DCR as shown in Attachment 4 – ANR Plan.

The proposed fire station will be serviced by electricity through a new manhole connection on site to an existing electric line. Water, gas, sewer, and drain connections will be made off of existing utilities within the Lynnway. The project will be completed in 2 phases of construction: 1) The demolition of the existing fire station which took place in 2021 and 2) the construction of the proposed fire station and associated parking, utilities, and landscaping. The proposed work area will include the entire existing lot and the entire portion of land obtained from the land swap with DCR. Proposed land alterations and change in impervious area on site and within the Lynnway right-of-way can be found in **Table 3-1** below.

Table 3-1. Land Alteration Summary

<i>Item</i>	<i>Existing (acres)</i>	<i>Proposed (acres)</i>	<i>Net Change (acres)</i>
On Site			
Total Site Acreage	0.47	0.47	N/A
New Acres of Land Altered	N/A	0.47	0.47
Acres of Impervious Area	0.14	0.39	0.25
Lynnway Right-of-Way			
Total Site Acreage	0.14	0.14	N/A
New Acres of Land Altered	N/A	0.14	0.14
Acres of Impervious Area	0.06	0.09	0.03

3.2 Timetable and Approximate Project Cost

The City of Revere hopes to complete permitting activities during the spring of 2022, such that construction can begin during the summer of 2022. The proposed fire station will be completed in one phase of construction, which will include the construction of an 8,190 sf fire station with associated utilities, parking, and landscaping. The estimated project cost is \$10,400,000. A summary can be found below in **Table 3-2**.

Table 3-2. Cost Estimate

Item	Total
Concrete, Masonry, Metals, Woods Plastics, Composites	\$1,508,261
Thermal and Moisture protection	\$486,848
Openings, Finishing, Specialties, Equipment, Furnishings	\$2,074,001
Fire Suppression, Plumbing, HVAC, Electrical, Comm, Security	\$2,821,853
Earthwork	\$479,921
Exterior Improvements	\$593,325
Sewer and Drain Utilities	\$177,430
NET COST	\$8,332,117
Margins & Adjustments	2,075,801
TOTAL COST	\$10,407,918

4. ALTERNATIVES TO THE PROJECT

4.1 No Build

A no-build scenario would mean that the Point of Pines district would continue to be serviced by neighboring fire stations. Under existing conditions, the fire response times from neighboring stations has been reported to be over 10 minutes long, significantly higher than the 5 minute 20 second benchmark established in NFPA Standard 1710. In addition, during exceptional flooding conditions, the Point of Pines district can periodically become inaccessible, requiring already on-site public safety staff and equipment. The public safety issues associated with these longer response times and accessibility issues are what necessitated the construction of a new fire station.

4.2 Article 97 Land

Construction of the fire station without the acquisition of 4,592 sf would mean an overall reduction in the proposed building size and parking lot. This would significantly impact the department's ability to properly service the Point of Pines district. Reducing the building footprint would include removal of the fire truck service bays, this would increase the response times for fires and other emergency services. Reducing the parking area means there wouldn't be adequate parking for the fire shifts. The absence of a laydown area would also complicate the construction process and schedule.

5. EXISTING ENVIRONMENT

5.1 Topography, Geology & Soils

The site is bounded by a series of state roadways: the Lynnway and MBTA access roadway to the south and east, the Massachusetts Route 1A southbound on ramp to the west, and the Route 1A to the north. The site is generally flat and level with grades ranging from EL.10.0± feet to EL. 12.0± feet. It is worthy of note that the elevation of project parcel is among the highest in the Point of Pines district; and the existing fire station has been a place of refuge for community residents during storm event and in flooding conditions. A highway berm rises approximately 18 feet from the northern edge of the property to the Route 1A roadway surface. The site is situated on a peninsula surrounded by the Atlantic Ocean.

The regional geology was mapped on the USGS Geological Map and MassMapper. The lithology of the area predominantly consists of floodplain alluvium.

A geotechnical investigation was performed in January 2021 by John Turner Consulting (JTC) as reported in the Geotechnical Investigation Report dated February 10, 2021. A total of 8 borings were performed in the vicinity of the project site. Bedrock was not encountered at any boring location and is not expected to impact construction. Topsoil material was encountered at ground surface and consists of brown sandy silt with organics, rootlets and trace gravel. Marine deposits consisting of gravel and sand, peat, and structural fill used during the construction of the previous fire station were also encountered on site. Glacial till was also observed below the urban fill. As a result of this technical analysis, it was determined that the use of geo-piers for foundation purposes would be the most efficient and effective construction methodology, as it has been for other recent projects in the vicinity, and that geo-piers would be preferable to piles given documented subterranean conditions in this case.

5.2 Surface and Groundwater Hydrology

Under existing conditions stormwater from the site generally flows overland to either the existing closed drainage network in the Lynnway or the closed drainage network located on the Route 1A on ramp. Under proposed conditions stormwater runoff from the parking lot and monument area would be collected and piped into a proposed subsurface infiltration basin located in the parking lot with overflow discharging to the existing closed drainage network in the Lynnway which has an existing discharge controlled by pumps that are being upgraded. This will ensure that groundwater recharge, water quality, and removal of total suspended solids (TSS) will match or exceed the existing conditions of the site while also maintaining drainage patterns from pre-existing conditions.

Groundwater was encountered at a depth of 7ft to 9ft below existing ground elevation. JTC estimates that this investigation occurred during a period of seasonally normal to low ground water. Site groundwater levels should be expected to fluctuate seasonally and in response to precipitation events, construction activity, site use, and adjacent site use.

5.3 Traffic, Transit, and Pedestrian and Bicycle Transportation

The proposed fire station is located on the Lynnway. The Lynnway is a two-way minor arterial road, with a width of 32 ft and an 85 ft wide Right-of-Way. There are sidewalks on both sides of the road for pedestrian movement. The posted speed limit is 30 mph. The annual average daily traffic (AADT) for the Lynnway was 10,442 vehicle trips per day in 2019 (pre-covid). The fire station is expected to increase traffic by 20 trips per day (10 employee shifts entering and exited the site) which is considered negligible.

5.4 Scenic Qualities, Open Space, and Recreational Resources

The proposed fire station is located within the Point of Pines district. The site is situated on a peninsula surrounded by the Atlantic Ocean and the Pines River; and the surrounding area has been and continues to be developed as primarily residential.

5.5 Zoning

The proposed site is located in the RA – Single Family District with an allowed fire station use. See Attachment 5 – City of Revere Zoning Map.

6. ASSESSMENT OF IMPACTS

As described in the project summary, the proposed fire station will have a positive benefit on the community through improved response times for fires and emergency situations within the Point of Pines district. There will also be a community center within the fire station.

6.1 Article 97 Land

Development of this project will require transferring 4,592 sf of DCR owned land, which is considered Park Land. The need for this DCR land, which is the subject of pending special legislation, has required the submission of an Expanded Environmental Notification Form (EENF), under 301 CMR 11.03(1)(b)(3) for the conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97. Further analysis on the Article 97 land transfer can be found in **Section 11**.

6.2 Environmental Justice Population

Because the Project is located within 1 mile of an Environmental Justice (EJ) Population an EIR is required under Section 58 of the Climate Roadmap Act, effective December 24, 2021. Information on impact assessment for the EJ populations can be found in **Section 8**.

6.3 Wetland Resources

There are no certified or potential vernal pools located within or adjacent to the project site. No portion of the project site is located within an Area of Critical Environmental Concern (ACEC). According to DEP, the project site is not located in an area designated as an Outstanding Resource Water¹. The project site is not located within a Zone II Interim Wellhead Protection area or within the water resource protection overlay district (**Attachment 11**).

State-regulated wetland resource areas identified on and/or near the proposed Project include:

- **Barrier Beach**
- **Coastal Dunes**
- **Land Subject to Coastal Storm Flowage**

These resource areas can be seen in **Attachment 11** and are further defined below:

6.3.1 Barrier Beach (310 CMR 10.29)

Definition

Barrier Beach means a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends (310 CMR 10.29(2)).

WPA Performance Standards

1. When a Barrier Beach Is Determined to Be Significant to Storm Damage Prevention, Flood Control, Marine Fisheries or Protection of Wildlife Habitat. 310 CMR 10.27(3) through (6) (coastal

beaches) and 10.28(3) through (5) (coastal dunes) shall apply to the coastal beaches and to all coastal dunes which make up a barrier beach.

2. Notwithstanding the provisions of 310 CMR 10.29(3), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

Standard 1 – The Wetland Regulations define barrier beach as “coastal beaches and coastal dunes extending roughly parallel to the trend of the coast.” Therefore, the site cannot be classified as a coastal beach. Additionally, in previous conditions this lot was altered and disturbed with a fire station and it currently does not provide wildlife habitat for a variety of plant and animal life. **This is an altered barrier beach, which is on the landward end of the system, not really playing an important role in wave energy dissipation.**

Standard 2 – There are no state-listed rare species within the project limits.

6.3.2 Coastal Dunes (310 CMR 10.28)

Definition

Coastal Dune means any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention and flood control (310 CMR 10.28 (2)).

WPA Performance Standards

When a coastal dune is significant to storm damage prevention, flood control, marine fisheries, or the protection of wildlife habitat, the following performance standards apply:

1. Any alteration of, or structure on, a coastal dune or within 100 feet of a coastal dune shall not have an adverse effect on the coastal dune by:
 - a) affecting the ability of waves to remove sand from the dune;
 - b) disturbing the vegetative cover so as to destabilize the dune;
 - c) causing any modification of the dune form that would increase the potential for storm or flood damage;
 - d) interfering with the landward or lateral movement of the dune;
 - e) causing removal of sand from the dune artificially; or
 - f) disturbing mapped priority habitat.
2. When a building already exists upon a coastal dune, a project accessory to the existing building may be permitted, provided that such work, using the best commercially available measures, minimizes the adverse effect on the coastal dune caused by the impacts listed above.
3. The following projects may be permitted provided that they have no adverse effect on the coastal dune caused by the impacts listed above:
 - a) pedestrian walkways, designed to minimize the disturbance to the vegetative cover and traditional bird nesting habitat;

- b) fencing and other devices designed to increase dune development, and to direct vehicular and pedestrian traffic; and
 - c) plantings compatible with the natural vegetative cover.
4. No project may be permitted which will have any adverse effect on the habitat of state-listed rare species.

310 CMR 10.28 Define Coastal Dunes as “...any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control.” **Although other elements of the Point of Pines district are and function as coastal dunes, the project itself is not a coastal dune. This definition does not apply to the project site for several reasons:**

- **The site is fairly level and therefore not a natural hill, mound or ridge of sediment.**
- **The site is not landward of a coastal beach.**
- **Sediments on the site are not fine to medium well sorted sands typical of material deposited by wind action or storm overwash.**
- **And, since the site is fairly level it is not serving the purpose of storm damage prevention or flood control.**
- **The site is developed “significant to storm damage prevention, flood control, marine fisheries, or the protection of wildlife habitat”**

A visual inspection of the site indicates that there are no “dune like” structures on the site. The site was developed over 80 years ago and is completely surrounded by state roadways, erasing any natural dune function that may or may not have been present prior to development. The borings performed by JTC in January 2021 during their geotechnical investigation support this position (see **Attachment 10: Geotech Report**).

Additionally, the site is not mapped within bird nesting habitat and provides no significant wildlife habitat since the site has been developed. For these reasons the site is not “significant to storm damage prevention, flood control, marine fisheries, or the protection of wildlife habitat” as stated in the WPA performance standards. The presumption of significance for Coastal Dune do not apply to this site and it should not be regulated as Coastal Dune.

Standard 1 – Not applicable.

Standard 2 – Not applicable.

Standard 3 – Not applicable.

Standard 4 – There are no state-listed rare species within the project limits.

6.3.3 Land Subject to Coastal Storm Flowage

Definition

Land Subject to Coastal Storm Flowage means land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater (310 CMR 10.04).

WPA Performance Standards

There are no performance standards pertaining to this resource area.

6.4 Traffic

The proposed fire station will generate a total of 20 additional vehicle trips above current roadway use which will not lead to long-term traffic impacts.

6.5 Endangered Species

There are no known endangered species within the project area.

6.6 Invasive Species

There are no known invasive species within the project area.

6.7 ACECs and Outstanding Resource Waters

The project will not impact ACECs and outstanding resource waters.

6.8 Historical Resources

The project will not impact cultural and historical resources.

7. STATUTORY AND REGULATORY STANDARDS AND REQUIREMENTS

7.1 Applicable Statutory and Regulatory Standards

Implementation of the project will require various approvals from the following agencies:

- MassDOT State Highway Access Permit (Category III Vehicular and Non-Vehicular)
- Department of Conservation and Recreation (DCR) Construction and Access Permit
- Massachusetts Water Resource Authority (MWRA) 8m Permit
- Executive office of Environmental Affairs – MEPA: Expanded Environmental Notification Form and Environmental Impact Report
- Revere Conservation Commission Notice of Intent

A list of the specific permits needed for this project and their current status is provided in **Table 7-1**.

7.2 Request for Funding Assistance

Revere is not seeking funding assistance from state or federal agencies.

7.3 Other Coordination Related to Project

Implementation of the project will also require coordination with the Massachusetts Department of Environmental Protection (DEP) and the Coastal Zone Management (CZM) office. Revere has been coordinating with these agencies to ensure that all permits and special requirements are met and that the project is designed to enhance its resiliency. To that end, the mitigation measures outlined in Section 9.2.3 below have been incorporated into an improved project design in response to recommendations and requests made by DEP and CZM in the site meeting organized pursuant to our initial ENF filings. That includes filing a Notice of Intent (NOI) with the Revere Conservation Commission, which had initially ruled that an NOI was not required. This NOI project was submitted on May 23, 2022; a public hearing on the NOI was held by the Revere Conservation Commission on June 1, 2022; and the related Order of Conditions is expected shortly.

Table 7-1. Summary of Project Permit Requirements

<i>Permit</i>	<i>Status</i>
<i>State Permits</i>	
Massachusetts Department of Transportation	
State Highway Access Permit	Permit Issued March 28, 2022
Massachusetts Water Resource Authority	
8m Permit	Permit Authorized November 9, 2021
Executive office of Environmental Affairs	
Department of Conservation and Recreation	
Construction and Access Permit	Submitted March 17, 2022
Massachusetts Environmental Policy Act	
Expanded Environmental Notification Form	Noticed March 9, 2022. Secretary's Certificate issued April 29, 2022 requesting a Single EIR.
Single Environmental Impact Report	To be submitted in June.
<i>Local Permits</i>	
Revere Conservation Commission	
Notice of Intent	NOI Submitted May 23, 2022

8. ENVIRONMENTAL JUSTICE POPULATION

8.1 Vulnerable Health Environmental Justice Criteria

The proposed fire station is within 1 mile of an EJ population. Under Section 58 of the Act, and consistent with new 301 CMR 11.07(6)(n), this project must submit an EIR that contains “statements about the results of an assessment of any existing unfair or inequitable environmental burden and related public health consequences impacting the environmental justice population from any prior or current private, industrial, commercial, state, or municipal operation or project that has damaged the environment.”

The proponent consulted the Massachusetts Department of Public Health (DPH) EJ Tool to identify whether the identified EJ populations exhibited any of four “vulnerable health EJ criteria.” Such criteria are environmentally related health indicators that are measured to be 110% above statewide rates based on a five-year rolling average. The EJ population could then be viewed as exhibiting “vulnerable health EJ criteria,” and therefore potentially bearing an “unfair or inequitable” environmental burden and related public health consequences. Upon consulting the DPH EJ Tool it was discovered that EJ populations within 1 mile of the site had statistically higher rates of heart attack hospitalization, childhood asthma, and childhood lead exposure.

8.1.1 Heart Attack Hospitalization

Heart attack hospitalization is a criterion used to identify vulnerable health EJ Populations because exposure to air pollution can increase the risk for heart attack and other forms of heart disease, and it is indicative of a serious chronic illness that can lead to disability, decreased quality of life, and premature death. People living in EJ areas have higher than average heart attack hospitalization rates when compared to other communities.

8.1.2 Childhood Asthma

Childhood asthma is a criterion used to identify vulnerable health EJ Populations because people of color and low-income individuals are at greater risk for asthma exacerbations due to increased exposure to asthma triggers, and uncontrolled asthma can impact an individual’s overall health and wellbeing. Uncontrolled asthma can reduce activity levels, negatively impact cardiovascular fitness, and increase school absenteeism.

8.1.3 Childhood Lead Exposure

Childhood lead exposure is a criterion used to identify vulnerable health EJ Populations because lead exposure disproportionately impacts lower income communities and communities of color, and childhood exposure to relatively low levels can cause severe and irreversible health effects, including damage to a child’s mental and physical development. Lead paint is the primary cause of childhood lead exposure. Historical housing policies that have perpetuated segregation and limited opportunity for home ownership, such as redlining, have led to the increase in risk factors for lead poisoning in black communities, including older house stock, dilapidated housing, and fewer owner-occupied housing units. Children living in low-income communities are more than 3 times more likely to have elevated blood lead levels than children living in high income communities, children of color are 1.5 times more likely than white children to exhibit dangerous levels of lead in their blood, and black children are nearly 2.5 times more likely to have lead poisoning than white children.

8.2 Potential Pollutant Sources

The DPH EJ Tool was also used to identify potential sources of pollution in and around the identified EJ populations. Potential pollutant sources found within the 1-mile Designated Geographic Area (DGA) of the site included the following:

- MassDEP major air and waste facilities
- M.G.L. c. 21E site
- “Tier II” toxics use reporting facilities
- MassDEP sites with Activity and Use Limitations (AULs)
- Wastewater treatment plants
- Underground storage tanks (USTs)
- EPA facilities
- Road infrastructure
- MBTA bus and rapid transit
- Other transportation infrastructure
- Energy generation and supplies

These potential pollutant sources are described in further detail below.

8.2.1 MassDEP Major Air and Waste Facilities

There are two sites with air operating permits, 10 large quantity waste generators, and two large quantity toxic users within the DGA. An air operating permit is required for any facility that is a major source of air pollution, has the potential to emit specific pollutants above certain thresholds or falls into a specific category. Large quantity waste generators are sites that generate more than 2,200 pounds (about 270 gallons) and/or more than 1 kilogram (2.2 pounds) of acutely hazardous waste per month. Large quantity toxic users are facilities that use large amounts of toxic chemicals and are required to report on their chemical use, conduct toxics use reduction planning every two years, and pay a fee under the Toxins Use Reduction Act (TURA). These potential pollutant sources can be found in the table below.

MassDEP Major Air and Waste Facilities

Potential Pollutant Source		Address	Community	Region
Air Operating Permits				
1	General Electric Company	1000 Western Avenue	Lynn	3
2	Wheelabrator Saugus Inc.	100 Salem Turnpike	Saugus	3
Hazardous Waste Treatment, Storage and Disposal				
Large Quantity Waste Generators				
1	Sullivan Tire	637 Lynnway	Lynn	3
2	Pride Hyundai of Lynn	777 Lynnway	Lynn	3
3	Patty's Auto Parts	2A Salem Turnpike	Saugus	3
4	General Electric Company	1000 Western Avenue	Lynn	3
5	Pride Chevrolet Pontiac Inc.	715 Lynnway	Lynn	3
6	Autozone 5122	637 Lynnway	Lynn	3
7	Atlanta Toyota Group Inc.	671 Lynnway	Lynn	3
8	Wheelabrator Saugus Inc.	100 Salem Turnpike	Saugus	3
9	G J Companies	22 Whittin Avenue Ext	Revere	2
10	Auto Fitness II Inc. DBA Easy Lube	843 Lynnway	Lynn	3
Large Quantity Toxic User				
1	Garelick Farms LLC	626 Lynnway	Lynn	3
2	Wheelabrator Saugus Inc.	100 Salem Turnpike	Saugus	3

8.2.2 M.G.L. c. 21E Sites

There are two Massachusetts General Law chapter 21E Sites within the DGA. 21E sites are oil and/or hazardous material disposal sites that have been reported and are Tier Classified under M.G.L. Chapter 21E and the Massachusetts Contingency Plan (MCP). The sites, their status and date of compliance can be found in the table below.

M.G.L. c. 21E Site

Potential Pollutant Source		Address	Community	Status	Status Date
1	Patty's Auto Parts	2A Salem Turnpike	Saugus	Tier II	07/14/21
2	Lot 75, Block 752, Map 85	Hanson Fld	Lynn	Tier 1D	06/30/08

8.2.3 MassDEP Tier II Facilities

There are 7 MassDEP Tier II facilities located within the DGA. Tier II reports are required by the EPA for facilities that store hazardous chemicals above certain threshold quantities. The sites and their status can be found in the table below.

MassDEP Tier II Facilities

	<i>Potential Pollutant Source</i>	<i>Address</i>	<i>Community</i>	<i>ESH Above TPQ</i>
1	Garelick Farms LLC	626 Lynnway	Lynn	Yes
2	General Electric Company	1000 Western Ave	Lynn	Yes
3	Walmart #2139	780 Lynnway	Lynn	No
4	Wheelabrator Saugus Inc.	100 Salem Turnpike	Saugus	Yes
5	Pride Chevrolet Pontiac Inc.	715 Lynnway	Lynn	Yes
6	Pride Hyundai of Lynn	777 Lynnway	Lynn	Yes
7	Pride Kia	793 Lynnway	Lynn	Yes

8.2.4 MassDEP Sites With AULs

There are 7 sites with activity and use limitations (AUL) within the DGA. An AUL provides notice of the presence of oil and/or hazardous material contamination remaining at the location after a cleanup has been conducted pursuant to Chapter 21E and the MCP. The sites, their status and AUL dates can be found in the table below.

MassDEP Sites With AULs

	<i>Potential Pollutant Source</i>	<i>Address</i>	<i>Community</i>	<i>Status</i>	<i>AUL Date</i>
1	Atlanta Toyota Group Inc.	671 Lynnway	Lynn	RAO	2/5/1998
2	General Electric Company	1000 Western Ave	Lynn	REMOPS	10/13/2008
3	Pride Chevrolet Pontiac Inc.	715 Lynnway	Lynn	RAO	7/8/1999
4	No Location Aid	24 Whitin Ave	Revere	RAO	11/4/2001
5	613-623 Lynnway	613-623 Lynnway	Lynn	PCS	8/21/2016
6	No Location Aid	130 Ballard St	Saugus	RAO	2/1/2009
7	Wheelabrator Saugus Inc.	100 Salem Turnpike	Saugus	RAO	11/14/2010

8.2.5 Wastewater Treatment Plants

There are two wastewater treatment plants located within the DGA. Wastewater treatment plants range from small privately-owned facilities treating sanitary wastewater from a housing development to large regional facilities treating millions of gallons a day of sanitary and industrial wastewater. The treatment plants, permit type and receiving waters can be found in the table below.

Wastewater Treatment Plants

	<i>Potential Pollutant Source</i>	<i>Address</i>	<i>Community</i>	<i>Permit Type</i>	<i>Receiving Waters</i>
1	Wheelabrator Saugus Inc.	100 Salem Turnpike	Saugus	Major	Saugus River
2	General Electric Company	1000 Western Ave	Lynn	Major	Saugus River

8.2.6 Underground Storage Tanks

There are 3 sites containing underground storage tanks (USTs) within the DGA. USTs are tanks that contain petroleum products and other hazardous materials. The sites can be found in the table below.

Underground Storage Tanks

<i>Potential Pollutant Source</i>		<i>Address</i>	<i>Community</i>	<i>Region</i>
1	Garelick Farms LLC	626 Lynnway	Lynn	3
2	Point of Pines Yacht Club Inc.	28 Rice Ave	Revere	3
3	General Electric Company	1000 Western Avenue	Lynn	3

8.2.7 EPA Facilities

There is one site listed in the EPA Toxics Release Inventory (TRI) within the DGA. The TRI compiles data on the toxic chemicals that are released into the environment or otherwise managed as waste by certain industrial and federal facilities. The site listed on the TRI can be found in the table below along with the chemicals and when they were listed.

EPA Facilities

<i>Potential Pollutant Source</i>		<i>Address</i>	<i>Community</i>	<i>Chemical</i>	<i>Year</i>
Toxics Release Inventory Sites					
1	General Electric Company	1000 Western Avenue	Lynn	Chromium	2019
				Cobalt	2019
				Nickel	2019

8.2.8 Road Infrastructure

There were 2 roads listed in the Road Infrastructure inventory within the DGA. These roads are listed below.

Road Infrastructure

<i>Potential Pollutant Source</i>		<i>Route Direction</i>	<i>Community</i>
1	Route 1A	Northbound	Revere
2	Route 1A	Northbound	Revere

8.2.9 MBTA Bus and Rapid Transit

There were 15 MBTA bus stops, one rapid transit stop, one commuter rail station, and 10 MBTA bus routes found within the DGA. These potential pollutant sources are listed in the table below.

MBTA Bus and Rapid Transit

Potential Pollutant Source		Address	Community
MBTA Bus Stops			
1	MBTA Bus	621 Lynnway	Lynn
2	MBTA Bus	626 Lynnway	Lynn
3	MBTA Bus	Lynnway @ General Edwards Bridge	Lynn
4	MBTA Bus	Lynnway @ General Edwards Bridge	Lynn
5	MBTA Bus	777 Lynnway	Lynn
6	MBTA Bus	Lynnway @ Hanson St	Lynn
7	MBTA Bus	Salem Tnpk @ Ballard St	Saugus
8	MBTA Bus	Salem Tnpk @ Ballard St	Saugus
9	MBTA Bus	Lynnway @ Harding St.	Lynn
10	MBTA Bus	715 Lynnway	Lynn
11	MBTA Bus	Point of Pines	Revere
12	MBTA Bus	N Shore Rd @ Blanchard Ave	Revere
13	MBTA Bus	N Shore Rd opp Blanchard Ave	Revere
14	MBTA Bus	N Shore Rd @ John Ave	Revere
15	MBTA Bus	N Shore Rd @ John Ave Ext	Revere
MBTA Rapid Transit Stops			
1	River Works	1000 Western Ave	Lynn
MBTA Commuter Rail Stations			
1	Newburyport/Rockport Line	1000 Western Ave	Lynn
MBTA Bus Routes			
1	Route 424 Inbound	Wonderland	
2	Route 455 inbound	Wonderland	
3	Route 459 outbound	Salem Depot via Airport & Central Square (Express)	
4	Route 450 outbound	Salem Depot	
5	Route 448 inbound	Downtown Express via Airport and Paradise Rd	
6	Route 459 inbound	Downtown via Central Square & Airport (Express)	
7	Route 439 outbound	Nahant via Central Square	
8	Route 442 outbound	Central Square	
9	Route 450 inbound	Haymarket	
10	Route 442 inbound	Wonderland	

8.2.10 Other Transportation Infrastructure

One set of railroad tracks was found within the DGA. They can be found in the table below.

Other Transportation Infrastructure

	<i>Potential Pollutant Source</i>	<i>Ownership</i>	<i>Operator</i>
	Railroad Tracks		
1	Cargo Rail Line	MBTA	PANAM

8.2.11 Energy Generation and Supply

3 power plans were found on sites within the DGA. The sites along with the primary fuel used and power capacity for the power plants can be found in the table below.

Energy Generation and Supply

	<i>Potential Pollutant Source</i>	<i>Address</i>	<i>Community</i>	<i>Primary Fuel</i>	<i>Capacity (kW)</i>
	Power Plants				
1	General Electric Company	1000 Western Ave	Lynn	Natural Gas	47,100
2	Wheelabrator Saugus Inc.	100 Salem Turnpike	Saugus	Biomass	32,000
3	Lynn Water & Sewer Commission	2 Circle Ave	Lynn	Wind	600

8.3 Climate Risks

An RMAT Climate Resilience Design Standards analysis was performed for the proposed site area. The report indicated that the project was a high risk for Sea Level Rise/Storm Surge, Urban Flooding and Extreme Heat within the estimated 50-year lifespan of the project. These climate risks are further analyzed in **Section 9.2.3**.

8.4 Analysis of Project Impacts

The project is not expected to have a negative impact on EJ populations for several reasons:

Size: The building footprint is only 8,190 sf. The existing lot is only 15,078 sf (19,670 sf after proposed land transfer). There will be a 20-vehicle trip per day increase in traffic which is negligible.

Environmental: Greenhouse Gas Emissions will be minimal (<200 tons/year and <50 lbs CO₂/sf-yr) and there will not be any hazardous materials stored on site. Drainage infrastructure will be improved in proposed conditions through the use of a subsurface infiltration basin which will create improvements in water quality, groundwater recharge, and total suspended solid removal over existing conditions.

Climate: Based on the RMAT Climate Resilience Design Standards analysis flooding poses significant risk to the surrounding communities during the project lifetime, with the 200-year floodplain elevation potentially reaching 12.0ft in 2050 and 13.9ft in 2070. The project will not contribute to these risks, but as a critical structure it is imperative that the building is designed with improved resiliency measures to assure that it will remain operational throughout the projects lifetime in order to service the surrounding community during large storm events. Improved resiliency measures for the project are detailed in **Section 9.2.2**.

Community: The proposed fire station will greatly reduce response times to fires and emergency situations, and improve the safety of the neighborhood residents. The fire station will also include a community room which will be utilized for community outreach.

Due to the small size of the project, the lack of environmental impact expected, and the positive benefits a new fire station brings to the community it is believed that the project will not have any adverse impacts on the surrounding EJ populations – quite the contrary, it will have significant, immediate and continuing public safety as well as environmental justice benefits for impacted EJ communities.

8.5 Environmental Justice Outreach Plan

Public outreach efforts have been implemented by the City to inform the public about the project and provide opportunities to give input into the project. These efforts include:

- Advanced notification of the project to community-based organizations (CBOs)
- Translation of appropriate forms into languages listed within 1 mile of the project on the EJ Map Viewer.
- Wide dissemination of a written project summary (with translation into relevant languages) with basic project details
- Providing translation services at public meetings
- Holding community meetings upon request by anyone contacted through advance notification that was provided

These measures have been implemented and will continue to be implemented throughout the MEPA process and various phases of the project in order to allow the local environmental justice populations to remain informed on the status of the project and provide them with opportunities to provide input on the project.

9. MITIGATION MEASURES

9.1 Positive Long-Term Impacts of the Project

The main focus of this project is to ensure that the surrounding Point of Pines district receives quicker response times for fire and emergency situations. There will also be a community center within the fire department that will be used to promote community outreach.

9.2 Long-Term Mitigation Measures

9.2.1 Stormwater

9.2.1.1 Water Quality

The stormwater management system has been designed in accordance with the MassDEP Stormwater Handbook. The site utilizes a number of stormwater features to provide stormwater quality and attenuation, including:

- Deep Sump Hooded Catch Basins
- Contech Subsurface Infiltration Basin – will provide TSS and other common pollutant removal.
- Proprietary Separators – The site will utilize an STC 450i Stormceptor which will provide TSS and other common pollutant removal.

The measures described above have been sized to meet 80% TSS removal rate as required in Standard 4: Water Quality of the MassDEP checklist for stormwater reports. For more details see **Appendix B: Stormwater Report**.

9.2.1.2 Extreme Precipitation

The stormwater system was initially design to mitigate a current 100-yr storm event using NOAA Atlas 14 precipitation frequency estimates with 90% confidence intervals for rainfall depths. While the project is not expected to have any adverse impacts on EJ populations the project is a high risk for urban flooding in its 50-year lifespan. In order to mitigate this the stormwater system was designed to mitigate stormwater runoff up to the projected 2070 50-yr return period recommended by the RMAT analysis. Current NOAA Atlas 14 rainfall depth values and projected values can be seen in **Table 9-1** below. A HydroCAD analysis of the present and future storm conditions can be found in **Attachment 12**.

Table 9-1 NOAA Atlas 14 and Projected Rainfall Depths

Design Storm	NOAA Atlas 14 Rainfall Depths (in)	2030/2050 Rainfall Depths (in)	2070 Rainfall Depth (in)
50-yr	N/A	7.62	9.6
100-yr	7.06	N/A	N/A

9.2.2 Coastal Resiliency

Beyond the project site itself, coastal resiliency is both an issue and an opportunity for the Point of Pines district as a whole. On that basis, the City of Revere, in conjunction with the Commonwealth of Massachusetts, has been taking proactive measures in recent years to improve coastal resiliency in this

district and elsewhere under the aegis of the Municipal Vulnerability Program (MVP). Those efforts in this vicinity are summarized in the attached MVP Progress Report, as well as in the attached RiverFront Master Plan, which was funded through the State's Seaport Economic Council. Both of these reports outline a coordinated climate strategy that includes natural shoreline resiliency programs as well as infrastructure improvements that include additional stormwater pumping and storage capacity for the Point of Pines district as a whole. These overall district enhancements are expected to have long-term resiliency benefits for the project parcel in particular.

Beyond those district improvements, resiliency measures have been implemented for the building and site since the filing of the proposed EENF/EIR in order to address MassDEP and CZM comments on mitigating the potential impacts of coastal flooding and building in a barrier dune context. The 100-year flood plain elevation at the site is 10.0. The existing fire station had a finished floor elevation (FFE) of 11.86. The proposed fire station initially had an 11.50 FFE, but several changes have been made to the design in order to make the structure more resilient to coastal storm events to the maximum extent possible:

- The building has been raised 21" to a 13.25 FFE which is above the 500-year flood plain elevation and provides 2ft of freeboard above the 100-year flood plain elevation as required by Mass State Building Code for critical structures (Table 9-2).
- Electrical outlets have been raised to elevation 16.5 and floor outlets have been eliminated.
- All occupied portions of the Apparatus Bay such as bathrooms and gear rooms have been raised to FFE 14.0.
- Wet floodproofing for the fire station including the use of paperless gypsum board below elevation of 16.5' for the station and concrete masonry unit (CMU) walls for the apparatus bay in accordance with Chapter 5 of the American Society of Civil Engineers (ASCE) Flood Resistant Design and Construction Manual.
- Transformer pad has been raised to elevation 13.25.
- Building mechanical systems are roof mounted.
- Stairs, ramps, walls that support ramps, and granite block benches will be used as natural elements to dissipate wave energy in coastal flood events.
- Landscaping the site with native coastal vegetation to enhance site resiliency.

The floor of the Apparatus Bay cannot be raised beyond the 11.5 elevation shown in the initial design without creating serious access/egress issues for the fire apparatus itself, which would "bottom-out" with a more severe driveway grade given the existing elevation of the adjacent state roadways. It should be noted that the fire trucks and other equipment is elevated on tires well above floor level; and in any case, it is designed to routinely function in flooding and other emergency conditions, as are the RFD staff.

An RMAAT Climate Resilience Design Standards analysis was performed for the proposed site area. The report indicated that the project was a high risk for Sea Level Rise/Storm Surge, Urban Flooding and Extreme Heat within the estimated 50-year lifespan of the project. The projected water surface elevations and wave action water elevations can be found in **Tables 9-3 and 9-4**.

Table 9-2. Flood Plain Elevation

Return Period	Elevation (ft – NAVD88)	Proposed FFE (ft – NAVD88)
1% (100-year) + 2ft Freeboard	12.0	13.25
0.2% (500-year)	11.2	

Table 9-3 Projected Water Surface Elevation

Recommended Planning Horizon	Recommended Return Period	Area Weighted Average (ft – NAVD88)	Proposed FFE (ft – NAVD88)
2050	0.5% (200-year)	12.1	13.25
2070		13.9	

Table 9-4 Projected Wave Action Water Elevation

Recommended Planning Horizon	Recommended Return Period	Area Weighted Average (ft – NAVD88)	Proposed FFE (ft – NAVD88)
2050	0.5% (200-year)	13.1	13.25
2070		15.5	

Based on the RMA2 analysis the proposed FFE for the fire station will be above the projected water surface and wave action elevation for a 200-year storm in 2050. And while the proposed FFE is not above the projected water surface and wave action elevation for a 200-year storm in 2070 the building will be floodproofed up to elevation 16.50 which will allow the fire station to remain operational. This will ensure that the fire station will be able to service the community in large storm events throughout the 50 year project lifetime.

In the event that a future storm event does make the fire station inoperable the Point of Pines District would rely on neighboring firehouses to respond to emergencies. This would lead to longer response times and in high flooding scenarios could result in an inability for neighboring departments to respond at all due to the flooding of access roads, a situation that has already happened in 2016 and 2018. This is why every possible measure has been taken to make the Alden Mills Fire Station as resilient as possible. Additionally, the proposed fire station is among the highest elevation points in the Point of Pines District and would be used as a place of refuge for the community residents during large future storm events whether the station was operable or not.

9.2.3 Greenhouse Gas Emissions

The City has included numerous features and systems in the design of the fire station to avoid, reduce, or mitigate GHG emissions. Specifically, the City commits to the following measures:

- Energy recovery ventilation
- Solar reflective roof
- Efficient LED lighting
- Enhanced insulation measures
- Low-E glass for windows

- Fast acting vertical bifold doors for heat loss reduction
- Use of sustainable refrigerants
- Bike racks to encourage commuting by bike

9.3 Short-Term Construction Related Mitigation Measures

Measures for minimizing or mitigating impacts associated with the construction activities associated with the project are described below.

9.3.1 Traffic Management

Construction of the Alden Mills Fire Station will involve construction activities along the Lynnway and Route 1A on-ramp as well as the closure of pedestrian walkways along the Lynnway. A traffic management plan has been developed to ensure that vehicular and pedestrian traffic is maintained during construction. See **Attachment 13** for Traffic Management Plan.

9.3.2 Wetland Resources

The project will undertake extensive measures to avoid and minimize impacts to the wetland resource areas. During construction, the Applicant will implement an erosion and sediment control program to minimize off-site transportation of sediment during the construction phase of the Project. The program incorporates Best Management Practices (BMPs) specified in guidelines developed by the DEP and the U.S. Environmental Protection Agency (EPA). Proper implementation of the erosion and sediment control program will:

- Minimize exposed soil areas through sequencing and temporary stabilization;
- Place structures to manage stormwater runoff and erosion; and
- Establish a permanent vegetative cover or other forms of stabilization as soon as practicable.

For more details See **Appendix A: Notice of Intent**.

9.3.3 Endangered Species

There are no known endangered species within the project area.

9.3.4 Invasive Species

There are no known invasive species within the project area.

9.3.5 ACECs and Outstanding Resource Waters

The project will not impact ACECs and outstanding resource waters.

9.3.6 Historical Resources

The project will not impact cultural and historical resources.

9.3.7 Solid and Hazardous Waste

No hazardous waste is to be generated by the construction activities. Any solid waste found during construction activities must be disposed of at an appropriate facility. All other materials not recycled will be disposed of in accordance with the Massachusetts Solid Waste Regulations (310 CMR 19.00).

9.3.8 Noise

Excessive idling of construction equipment and trucks will be prohibited in accordance with MassDEP anti-idling regulations. Night time construction shall be prohibited and the contractor will be required to maintain mufflers on construction equipment.

9.3.9 Air Quality

Excessive idling of construction equipment and trucks will be prohibited in accordance with MassDEP anti-idling regulations. All diesel equipment used on-site will be fitted with after-engine emission controls, including diesel oxidation catalysts and/or particulate filters and ultra-low sulfur diesel fuel is required for all construction vehicles.

9.4 Environmental Justice

As discussed in **Section 8.4** no disproportionate impacts, including financial impacts, will occur and mitigation measures for impacts unique to environmental justice populations are not required. Mitigation measures for unavoidable impacts to environmental justice populations such as those described in **Sections 9.3.7-9.3.9** above will be incorporated during construction.

10. PROPOSED SECTION 61 FINDINGS

This section provides a consolidated overview of the proposed mitigation and other environmental and community benefits proposed in order to minimize potential impacts from the proposed fire station. A draft template for Section 61 findings is also provided and in accordance with MGL Chapter 30, Section 61 that states: “Any determination made by any agency of the Commonwealth shall include a finding describing the environmental impact, if any, of the project and a finding that all reasonable measures have been taken to avoid or minimize said impacts.” Draft 61 Findings are provided for those issues that are within the scope of this EIR, including the following state agencies, actions and/or statutory requirements:

- Massachusetts Department of Transportation
 - State Highway Access Permit (Category III Vehicular)
 - State Highway Access Permit (Non-Vehicular)
- Department of Conservation and Recreation – Construction and Access Permit
- Massachusetts Water Resource Authority – 8m Permit

Permanent impacts resulting from construction of the project will be mitigated, as described in **Section 9.2** and summarized in **Table 10-1 below**. The proposed mitigation measures will be refined during the final design.

Table 10-1 Summary of Proposed Mitigation Measures for Permanent Impacts

<i>Category</i>	<i>Mitigation Measures</i>	<i>Responsible Party</i>	<i>Schedule</i>	<i>Agency Action/ Permit</i>
Stormwater	Develop detailed Operation and Maintenance (O&M) Plan for site.	Proponent	During design	ConCom NOI
	Construct deep sump hooded catch basins, subsurface infiltration basin and proprietary separators.	Contractor	During construction	ConCom NOI
Coastal Resiliency	Implement improved resiliency measures into design and construction of fire station.	Proponent/ Contractor	During design and construction	MEPA ENF & EIR
Greenhouse Gas Emissions	Implement GHG mitigation measures into design and construction of fire station.	Proponent/ Contractor	During design and construction	MEPA ENF & EIR
Article 97	Identify and acquire replacement open space to compensate for transfer of DCR owned land.	City	Prior, During and After Construction	Department of Conservation and Recreation

Temporary, short-term impacts from construction activities would be mitigated to the extent practicable as described in **Section 9-3** summarized in **Table 10-2** below. Appropriate construction mitigation measures will be incorporated into the contract documents and specifications governing the activities of contractors and subcontractors constructing elements of the proposed project.

Table 10-2 Summary of Proposed Mitigation Measures for Construction-Period Impacts

Category	Mitigation Measures	Responsible Party	Schedule	Agency Action/ Permit
Traffic Management and Safety	Implement measures outlined in the Traffic Management Plan during construction activities within the Lynnway and Route 1A Right-of-Ways.	Contractor	During construction	MassDOT Access Permit
	Roadway Restoration shall be done in accordance with MassDOT Standard Specifications for Highway and Bridges	Contractor	During construction	MassDOT
	Contractor shall adhere to the MWRA Water Operations Special Terms and Conditions when construction activities involve crossing or working within 5 feet of the MWRA water line located in the Lynnway Right-of-Way.	Contractor	During construction	MWRA 8m Permit
Wetland Resources	Erosion and sedimentation control measures will be used to limit turbidity and water quality impacts during construction.	Contractor	During construction	ConCom NOI
Noise	Maintain mufflers on construction equipment.	Contractor	During construction	MassDEP
	Keep truck idling to a minimum in accordance with MassDEP anti-idling regulations.	Contractor	During construction	MassDEP
	Prohibit nighttime construction.	Contractor	During construction	MassDEP
Air Quality	Keep truck idling to a minimum in accordance with MassDEP anti-idling regulations.	Contractor	During construction	MassDEP
	Require that all diesel equipment used on-site will be fitted with after-engine emission controls.	Contractor	During construction	MassDEP
	Require use of ultra-low sulfur diesel fuel for all construction vehicles.	Contractor	During construction	MassDEP
	Provide dust protection at work sites.	Contractor	During construction	MassDEP
Solid and Hazardous Waste	Any solid waste found during construction activities must be disposed of at an appropriate facility. All other materials not recycled will be disposed of in accordance with the Massachusetts Solid Waste Regulations	Contractor	During construction	MassDEP

Massachusetts Department of Transportation

Draft Findings Pursuant to MGL Ch 30, Section 61

Project Name: Alden Mills Fire Station
Project Location: Revere, Massachusetts
Project Proponent: City of Revere
EEA Number: 16536

Permit: State Highway Access Permit

Project Description: This project proposed the construction of an 8,190 sf Fire Station with associated parking, utilities, and landscaping. The new fire station will service the Point of Pines district and will also contain a community center aimed to promote community outreach.

MEPA History: The MEPA review was initiated on February 28, 2022 with the filing of an Expanded Environmental Notification Form (EENF) that was noticed in the March 9, 2022 edition of the Environmental Monitor. The Secretary issued a Certificate on April 29, 2022 requesting a Single Environmental Impact Report (SEIR) be submitted.

Project Impact and Mitigation: Refer to Table A for a list of impacts and corresponding mitigation measures relative to the construction of the proposed fire station.

Table A. Summary of Transportation Related Mitigation Measures

<i>Category</i>	<i>Mitigation Measures</i>	<i>Responsible Party</i>	<i>Schedule</i>
Traffic Management and Safety	Implement measures outlined in the Traffic Management Plan during construction activities within the Lynnway and Route 1A Right-of-Ways.	Contractor	During construction
	Roadway Restoration shall be done in accordance with MassDOT Standard Specifications for Highway and Bridges	Contractor	During construction

Findings: Based on review of the permit application, MEPA criteria, and ongoing discussions with MassDOT, and with implementation by the Proponent of the mitigation measures described in the attached Table A, all practical means and measures will be taken to avoid or minimize the adverse impacts to the environment related to the Project. MassDOT will include appropriate conditions associated with this Section 61 Finding in the State Highway Access Permits to be issued by the Department.

Massachusetts Department of Transportation

BY

DATE

**Executive Office of Energy and Environmental Affairs
Department of Conservation and Recreation**

Draft Findings Pursuant to MGL Ch 30, Section 61

Project Name: Alden Mills Fire Station
Project Location: Revere, Massachusetts
Project Proponent: City of Revere
EEA Number: 16536

Permit: Construction and Access Permit
Article 97

Project Description: This project proposed the construction of an 8,190 sf Fire Station with associated parking, utilities, and landscaping. The new fire station will service the Point of Pines district and will also contain a community center aimed to promote community outreach.

MEPA History: The MEPA review was initiated on February 28, 2022 with the filing of an Expanded Environmental Notification Form (EENF) that was noticed in the March 9, 2022 edition of the Environmental Monitor. The Secretary issued a Certificate on April 29, 2022 requesting a Single Environmental Impact Report (SEIR) be submitted.

Project Impact and Mitigation: Refer to Table A for a list of impacts and corresponding mitigation measures relative to the construction of the proposed fire station.

Table A. Summary of DCR Related Mitigation Measures

<i>Category</i>	<i>Mitigation Measures</i>	<i>Responsible Party</i>	<i>Schedule</i>	<i>Agency Action/ Permit</i>
Traffic Management and Safety	Implement measures outlined in the Traffic Management Plan during construction activities within the Lynnway and Route 1A Right-of-Ways.	Contractor	During construction	MassDOT Access Permit
	Roadway Restoration shall be done in accordance with MassDOT Standard Specifications for Highway and Bridges	Contractor	During construction	MassDOT
Article 97	Identify and acquire replacement open space to compensate for transfer of DCR owned land.	City	Prior, During and After Construction	Department of Conservation and Recreation

Findings: Based on review of the permit application, MEPA criteria, and ongoing discussions with DCR, and with implementation by the Proponent of the mitigation measures described in the attached Table A, all practical means and measures will be taken to avoid or minimize the adverse impacts to the environment related to the Project. DCR will include appropriate conditions associated with this Section 61 Finding in the Construction and Access Permit to be issued by the Department.

Department of Conservation and Recreation

BY

DATE

Massachusetts Water Resource Authority

Draft Findings Pursuant to MGL Ch 30, Section 61

Project Name: Alden Mills Fire Station
Project Location: Revere, Massachusetts
Project Proponent: City of Revere
EEA Number: 16536

Permit: 8mPermit

Project Description: This project proposed the construction of an 8,190 sf Fire Station with associated parking, utilities, and landscaping. The new fire station will service the Point of Pines district and will also contain a community center aimed to promote community outreach.

MEPA History: The MEPA review was initiated on February 28, 2022 with the filing of an Expanded Environmental Notification Form (EENF) that was noticed in the March 9, 2022 edition of the Environmental Monitor. The Secretary issued a Certificate on April 29, 2022 requesting a Single Environmental Impact Report (SEIR) be submitted.

Project Impact and Mitigation: Refer to Table A for a list of impacts and corresponding mitigation measures relative construction activities within the MWRA water line.

Table A. Summary of Transportation Related Mitigation Measures

Category	Mitigation Measures	Responsible Party	Schedule	Agency Action/ Permit
Traffic Management and Safety	Implement measures outlined in the Traffic Management Plan during construction activities within the Lynnway and Route 1A Right-of-Ways.	Contractor	During construction	MassDOT Access Permit
	Roadway Restoration shall be done in accordance with MassDOT Standard Specifications for Highway and Bridges	Contractor	During construction	MassDOT
	Contractor shall adhere to the MWRA Water Operations Special Terms and Conditions when construction activities involve crossing or working within 5 feet of the MWRA water line located in the Lynnway Right-of-Way.	Contractor	During construction	MWRA 8m Permit

Findings: Based on review of the permit application, MEPA criteria, and ongoing discussions with MWRA, and with implementation by the Proponent of the mitigation measures described in the attached Table A, all practical means and measures will be taken to avoid or minimize the adverse impacts to the environment related to the Project. MWRA will include appropriate conditions associated with this Section 61 Finding in the 8m Permit to be issued by the Department.

Massachusetts Water Resource Authority

BY

DATE

11. ARTICLE 97 ANALYSIS

11.1 Feasible Alternative Analysis

11.1.1 No Build Scenario

A no-build scenario would mean that the Point of Pines district would continue to be serviced by neighboring fire stations. This larger district includes the Point of Pines neighborhood, east of the planned new fire station, which parallels the Atlantic Ocean; the Riverside neighborhood, west of the new fire station, which parallels the Pines River; the Revere Beach Boulevard neighborhood, south of the new fire station, which parallels Broad Sound; and the emerging RiverFront neighborhood, north of the new fire station, which parallels the Pines River Inlet. These latter two elements of the larger district have been the site of hundreds of new residential units constructed in recent years or now under construction with local and state review and approval. Under existing conditions, the fire response times from neighboring stations has been reported to be over 10 minutes long, significantly higher than the 5 minute 20 second benchmark established in NFPA Standard 1710; and this situation is likely to become even more problematic given recent and continuing redevelopment in the immediate area. The public safety issues associated with these longer response times are what necessitated the construction of a new fire station. There are no other feasible city owned lots that can be used for the fire station that are located close enough to the Point of Pines neighborhood to make an adequate reduction in emergency response time.

11.1.2 City Owned Land Scenario

Construction of the fire station without the acquisition of 4,592 sf of DCR land would mean an overall reduction in the proposed fire station. Four of the proposed parking spaces are located on the DCR land, as well as the subsurface infiltration system and dumpster. Limiting the project to the city owned lot would mean reducing the size of the building in order to fit adequate parking for the fire fighter shifts. This would mean a reduction in living space, facilities, and the potential loss of a fire truck service bay.

Not acquiring the DCR land would also mean the fire station would no longer be able to gain access from the Lynnway via the bus loop that is located on the abutting lot. This would mean that fire trucks would have to back into the station from the Route 1A on-ramp which could potentially lead to traffic accidents or longer response times. This would significantly impact the department's ability to properly service the Point of Pines district.

11.2 EEA Resource Analysis

The disposition of the subject parcel and its proposed use does not destroy or threaten a unique or significant resource as determined by EOEA and its agencies. See **Attachment 11** for a copy on the Environmental Constraints map which shows there are no protected resources located within the proposed parcel.

11.3 Land Swap

The City of Revere and DCR have negotiated, and are in the process of finalizing, a transfer of land involving multiple parcels, which is the subject of pending special legislation. The City has offered multiple parcels of land in and around Rumney and Belle Isle Marshes, representing 574,188 square feet and, in exchange, will receive multiple parcels from DCR. The parcel of land represented by this EENF and EIR is just one of the parcels being transferred from DCR and a separate application will be submitted by the City for the remainder of the transacted land.

An appraisal will be performed for the parcels involved in the transfer of land by DCAMM, at the City's expense, to determine the fair market value and value in use of both the land being transferred to the City (the DCR land) and the land being transferred to DCR (the City land). In the unexpected event that the appraisal identifies a difference in such values of the DCR land over the City land, the City would need to pay that difference to DCR, and DCR would use those funds for purposes of the EEA Article 97 Land Disposition Policy.

11.4 Site Acreage

The acreage proposed for the disposition is the absolute minimum required to build the proposed fire station, construct the required parking and drainage infrastructure while gaining access to the bus loop located on the Lynnway. See **Attachment 4** for a copy of the ANR Plan that shows the acreage proposed for the land swap (labelled "Lot A"). This additional land will also provide a necessary and otherwise unavailable laydown area during construction of the new fire station.

11.5 Proposed Use

The disposition will serve a public purpose as part of the development of a new fire station for the Point of Pines district. Under existing conditions, the fire response times from neighboring stations has been reported to be over 10 minutes long, significantly higher than the 5 minute 20 second benchmark established in NFPA Standard 1710. The public safety issues associated with these longer response times are what necessitated the construction of a new fire station.

11.6 Alignment With Donation Intent

The City of Revere has indicated that they are not aware of any express wishes of the original donor of the DCR land. And DCR has stated that the parcel was not acquired by gift or donation.

12. RESPONSE TO COMMENTS

The EENF / Proposed EIR for the proposed fire station was noticed in the March 9, 2022 edition of the Environmental Monitor and the Secretary issued a Certificate on April 29, 2022. The comments received on the EENF / Proposed EIR are summarized in the Certificate and the comment letters received from State agencies accompany the Certificate. The Certificate and comment letters are provided in **Section 1**. The comments received and the responses to these comments are provided below.

12.1 MEPA

12.1.1 Project Description

- Include updated site plans for existing and post-development conditions at a legible scale and a detailed description of all project components.

See Attachment 2 for updated site plans.

- Provide plans clearly showing the location of all proposed work and provide updated estimates of land alteration and impervious area.

See Attachment 2 for updated site plans and Table 3-1 in Section 3 for land alteration estimates.

- Identify any changes since the filing of the EENF/Proposed EIR, including a detailed description, with plans and renderings, showing changes to the design of the building to increase its resiliency.

See Section 9.2.2 for changes to site and building since the filing of the EENF/EIR. See Attachment 2 for updated site plans and isometric renderings.

- Conceptual plans should be provided at a legible scale and clearly identify buildings, public areas, open space, impervious areas, roadways, and stormwater and utility infrastructure.

See Attachment 2 for updated site plans.

- Identify and describe State, federal and local permitting and review requirements associated with the project, provide an update on the status of each of these pending actions, analyze applicable statutory and regulatory standards and requirements, and provide a discussion of the project's consistency with those standards.

Various Permits and their current status are provided in Section 7 and Table 2.

12.1.2 Environmental Justice

- Include an EJ outreach plan for the design, permitting and construction phases of the project.

See Section 8.5 for Environmental Justice Outreach Plan.

- Provide a revised baseline assessment consistent with the MEPA Interim Protocol for Analysis of EJ Impacts, including a description of all pollutant sources within 1-mile DGA and, where possible, a review of the compliance history of facilities permitted by MassDEP.

Potential pollutant sources with the DGA have been added to the Single EIR. See Section 8.2.

- Provide an updated assessment of the project's impacts on EJ populations based on the revised baseline health assessment and the analysis of potential flooding in the area under future climate conditions as described below.

See Section 8 for updated baseline health assessment and analysis of potential flooding.

12.1.3 Article 97

- Provide a more comprehensive Article 97 analysis that fully describes all DCR parcels to be acquired by the City and the land offered to DCR in exchange.

The City is currently coordinating with DCR on filing a separate Article 97 analysis for the remaining DCR and City parcels involved in the land swap.

- Describe the environmental and recreational values of the 13 acres of land the City proposes to convey to DCR in exchange for the 0.11-acre parcel and other DCR-owned property; this information is necessary in order to assess whether the City is proposing to grant real estate of equal or greater value to DCR.

See response above.

12.1.4 Wetlands/Coastal Resiliency

- Include revised site plans showing existing and proposed grades, all wetland resource areas on the site, including coastal dune and LSCSF, and the location of the stormwater management system components.

See Attachment 2 for Revised Site Plans and Attachment 11 for Environmental Constraints Maps.

- Provide the analyses and information requested by MassDEP and CZM, including an analysis of the depth, extent, direction and velocity of flood flows across the site under existing and future conditions, and during storm events with a combination of rain and coastal flooding.

See Section 9.2.2 for Coastal Resiliency Measures.

- Provide an analysis of the performance standards for coastal dunes applicable to the project.

See Section 6.3.2 for analysis of the performance standards for Coastal Dunes.

- Provide cross-sections through the site and proposed buildings with existing and proposed grades, exterior structures such as utilities and site access facilities, the FEMA 100-year flood elevation, and future projected flood elevations, and should explain in detail how the building has been designed to be resilient to climate conditions over a 30 to 50 year design life.

See Attachment 14 for Cross Sections of Site.

- Discuss whether it would be feasible to elevate the building to be resilient to 100-year and 200-year storm flood conditions as of 2050 and 2070. If not feasible, the Single EIR should discuss whether the City plans to follow an adaptive management strategy and whether future retrofits may be possible to improve resiliency.

See Section 9.2.2 and Tables 9-3 and 9-4 for building resilience and elevation in comparison to future storm conditions.

- Discuss what contingency plans exist for surrounding communities, should future storm conditions make the fire station inoperable.

See Section 9.2.2 for contingency plan.

12.1.5 Mitigation and Draft Section 61 Findings

- Include a separate chapter summarizing all proposed mitigation measures including construction-period measures.

Proposed mitigation measures for permanent and construction-period impacts can be found in Section 9 and Tables 10-1 and 10-2.

- Draft Section 61 Findings should be separately included for each Agency Action to be taken on the project.

Draft Section 61 findings can be found in Section 10.

12.1.6 Responses to Comments

- The Single EIR should contain a copy of this Certificate and a copy of each comment letter received. In order to ensure that the issues raised by commenters are addressed, the Single EIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the scope of the Single EIR beyond what has been expressly identified in this certificate.

Secretary's Certificate and comment letters are provided in Section 1.

12.1.7 Circulation

- In accordance with 301 CMR 11.16, the City should circulate the Single EIR to those parties who commented on the EENF/Proposed EIR and to any State Agencies from which the City will seek permits or approvals. A copy of the Single EIR should be made available for review in the Revere Public Library.

The Single EIR will be circulated with the appropriate parties.

12.2 Coastal Zone Management

- Provide an analysis of impacts to resource areas that addresses how the project will affect floodplain function presently and for the design life of the project, including examining how floodwaters will flow across the site in a 100-year storm event and how will that change with the proposed fill and development.

See Section 9.2.2 for Coastal Resiliency Measures.

- Plans showing cross-sections through the site with the existing grades, proposed grades, proposed buildings and structures, FEMA base flood elevations, and future projected flood zone elevations, as well as grading plans to show how the site will be elevated should be provided in the EIR to

demonstrate that the site is designed appropriately for the existing and expected conditions for the site during the design life of the project.

See Attachment 14 for Cross Sections of Site.

- The Massachusetts Coastal Flood Risk Model (MC-FRM) data indicates there will be 2-3 feet of flooding in a 1% storm on this site location by 2050. Because the fire station is a critical facility, it should be designed for protection from a 500-year event for the life of the building. The EIR should demonstrate that these considerations have been applied in the design of the building elevations and site approaches.

See Section 9.2.2 for Coastal Resiliency Measures.

12.3 MassDEP

12.3.1 Wetlands

- The project must comply with the performance standards for work on dunes specified at 310 CMR 10.28(3) through (5). The project must also comply with the standards in the state building code for work in dunes, which includes elevating structures on open pilings.

See Section 6.3.1 for wetland resource compliance pertaining to Coastal Dune standards.

- MassDEP advises the applicant to file a Notice of Intent for the project, with the appropriate details, including but not limited to wetland resource area delineations, plans showing existing and proposed grades, stormwater management plans, and information that demonstrates that the project will comply with all applicable performance standards.

A Notice of Intent was filed for the Project on May 23, 2022. See Table 2 under Section 7.

- More information should be developed in the EIR to support that statement as well as showing that the project design will comply with the State Building Code.

Building has been raised to be above the 500-year flood plain and more than 2ft above the 100-year flood plain per Mass Building Code. See Section 9.2.1.

- The potential impacts of the proposed project on future coastal floodwater flow and drainage patterns should be assessed, including changes in velocity, direction, depth, and extent of coastal floodwater. The EIR should include an analysis specific to how any proposed fill, grade changes, and solid project components may change these patterns within and adjacent to the site. This should be assessed for conditions during rain events and coastal storm events where there is a combination of rain and coastal flooding.

See Section 9.2.2 for Coastal Resiliency Measures.

- The EIR should include cross-sections through the site that show the existing grades, proposed grades, proposed buildings and structures, FEMA base flood elevations, and future projected flood zone elevations.

See Attachment 14 for Cross Sections of Site.

12.4 Department of Conservation and Recreation

12.4.1 Flood Hazard Management

- The required elevation is the base flood elevation plus two feet, or the 500-year flood elevation, whichever is higher.

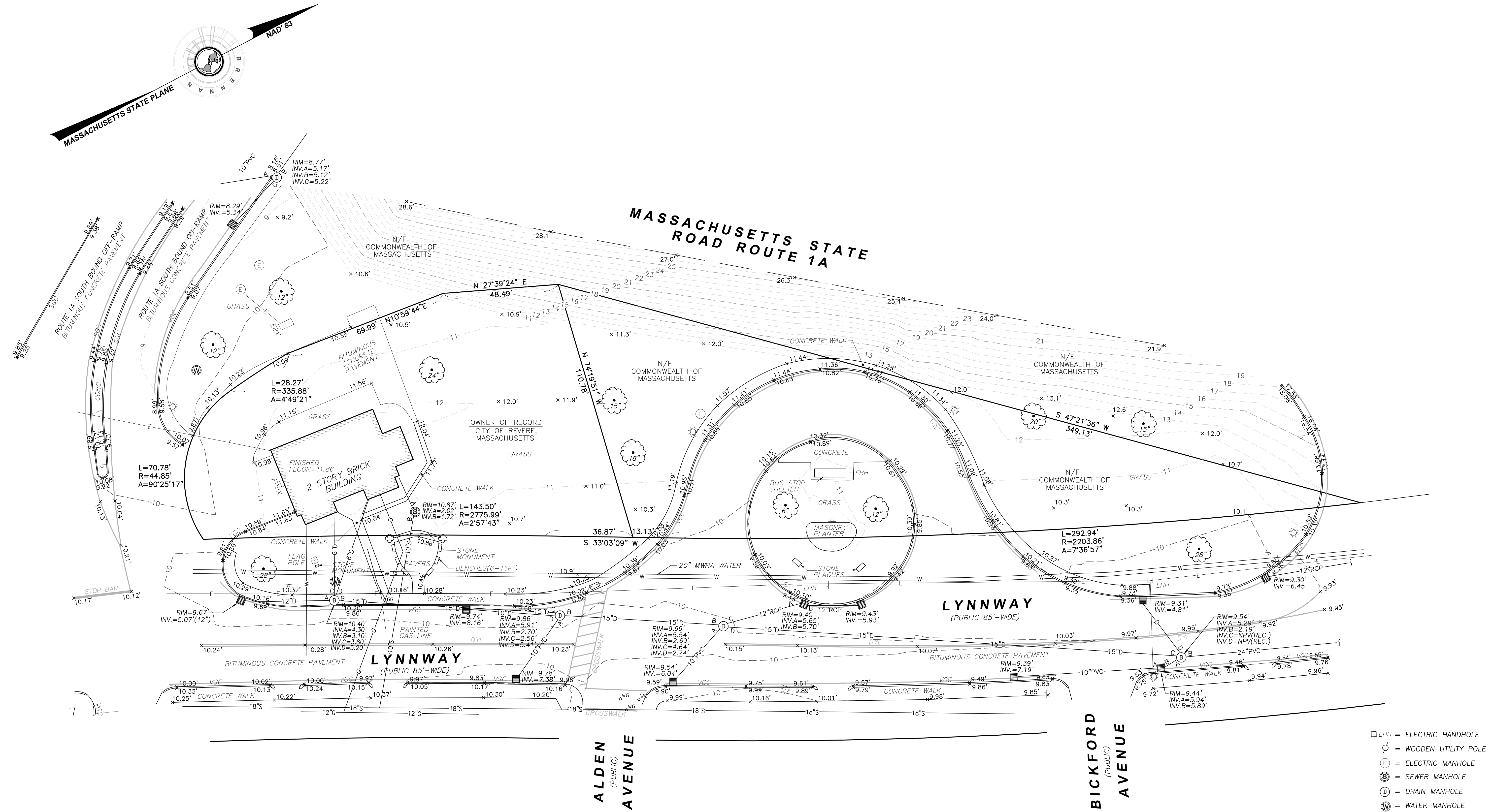
Building is above the 500-year flood plain and more than 2ft above the 100-year flood plain. See Section 9.2.1.

- Elevation of the building site, with datum source specified, will need to be verified as it appears to be inconsistent with what is depicted on the FIRM.

Elevations depicted on the site plans are based on NAVD88 and were field verified. Horizontal datum is NAD 83. See Attachment 1.

ATTACHMENTS

ATTACHMENT 1
EXISTING CONDITIONS PLAN

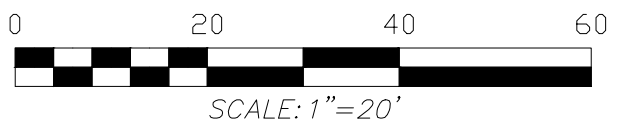


NOTES

- ELEVATIONS SHOWN HEREON ARE BASED ON NAVD 88'.
- THIS SURVEY WAS PERFORMED ON THE GROUND BY BRENNAN CONSULTING INC. IN AUGUST OF 2019.
- THE HORIZONTAL DATUM REFERS TO NAD 83'.
- THIS PURPOSE OF THIS SURVEY IS TOPOGRAPHIC AND PROPERTY INFORMATION FOR THE SUBJECT AREA.
- FEMA FLOOD INFORMATION TAKEN FROM MAP 25025C0029J DATED 3-16-16.
- THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF BRENNAN CONSULTING ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO BRENNAN CONSULTING' SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY BRENNAN CONSULTING.

DRAFT 9-8-21

- EHH = ELECTRIC HANDHOLE
- ⊙ = WOODEN UTILITY POLE
- ⊙ = ELECTRIC MANHOLE
- ⊙ = SEWER MANHOLE
- ⊙ = DRAIN MANHOLE
- ⊙ = WATER MANHOLE
- = CATCH BASIN
- ☀ = LIGHT POLE
- DYL = DOUBLE YELLOW LINE
- ⊙ GG = GAS GATE
- ⊙ WG = WATER GATE
- ⊙ = SIGN
- ⊙ = DECIDUOUS TREE
- VGC = VERTICAL GRANITE CURB
- NPV = NO PIPES VISIBLE
- REC. = RECORD
- D — = DRAIN LINE
- S — = SEWER LINE
- W — = WATER LINE
- G — = GAS LINE
- E — = ELECTRIC LINE
- X — = CHAINLINK FENCE



TOPOGRAPHIC PLAN OF LAND
ALDEN A. MILLS FIRE STATION
LOCATED IN
REVERE, MASSACHUSETTS
(SUFFOLK COUNTY)

PREPARED FOR

WINTER STREET ARCHITECTS

SCALE: 1" = 20'

DATE: 9-4-19

Brennan Consulting

ENGINEERING · TRANSPORTATION · SURVEYING

24 RAY AVENUE, BURLINGTON, MA

PHONE: (781) 273-3434 FAX: (781) 273-3430

REVISIONS

CHECKED BY: WT

DRAWN BY: DA

PROJECT 19954B

SHEET

1

ATTACHMENT 2 PROPOSED SITE PLAN

PERMIT SET

ALDEN A. MILLS FIRE STATION

140 LYNNWAY

REVERE, MASSACHUSETTS

Prepared for:

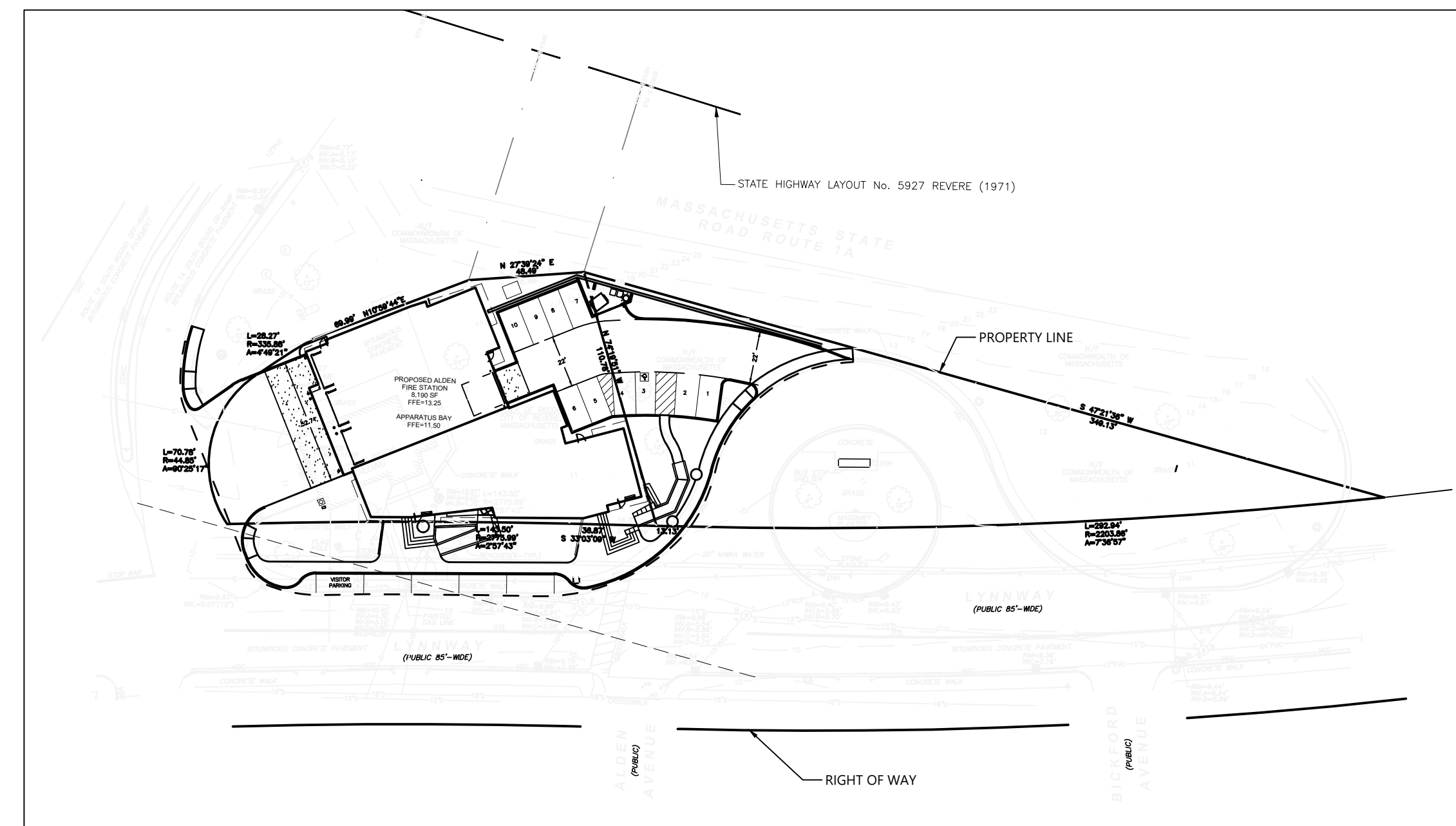
WINTER STREET ARCHITECTS

27 CONGRESS STREET SUITE 201

SALEM, MA 01970

PLAN INDEX

- C-01 TITLE SHEET
- EX-01 EXISTING CONDITIONS PLAN
- C-02 SITE PREPARATION PLAN
- C-03 SITE LAYOUT PLAN
- C-04 GRADING & DRAINAGE PLAN
- C-05 UTILITY PLAN
- C-06 DETAILS I
- C-07 DETAILS II
- C-08 DETAILS III



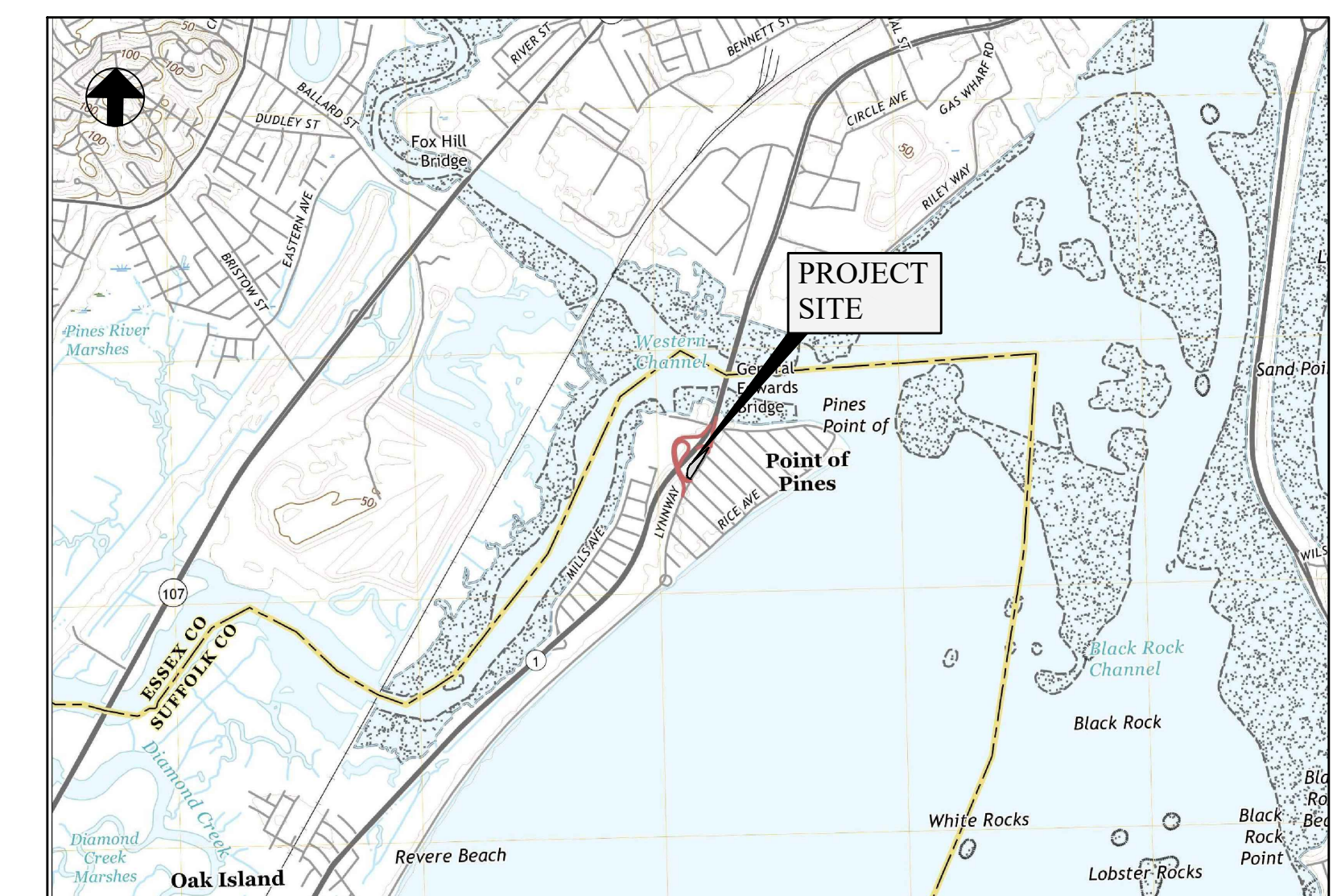
PROJECT SITE

SCALE: 1"=50'

Issue Date:
MAY 23, 2022

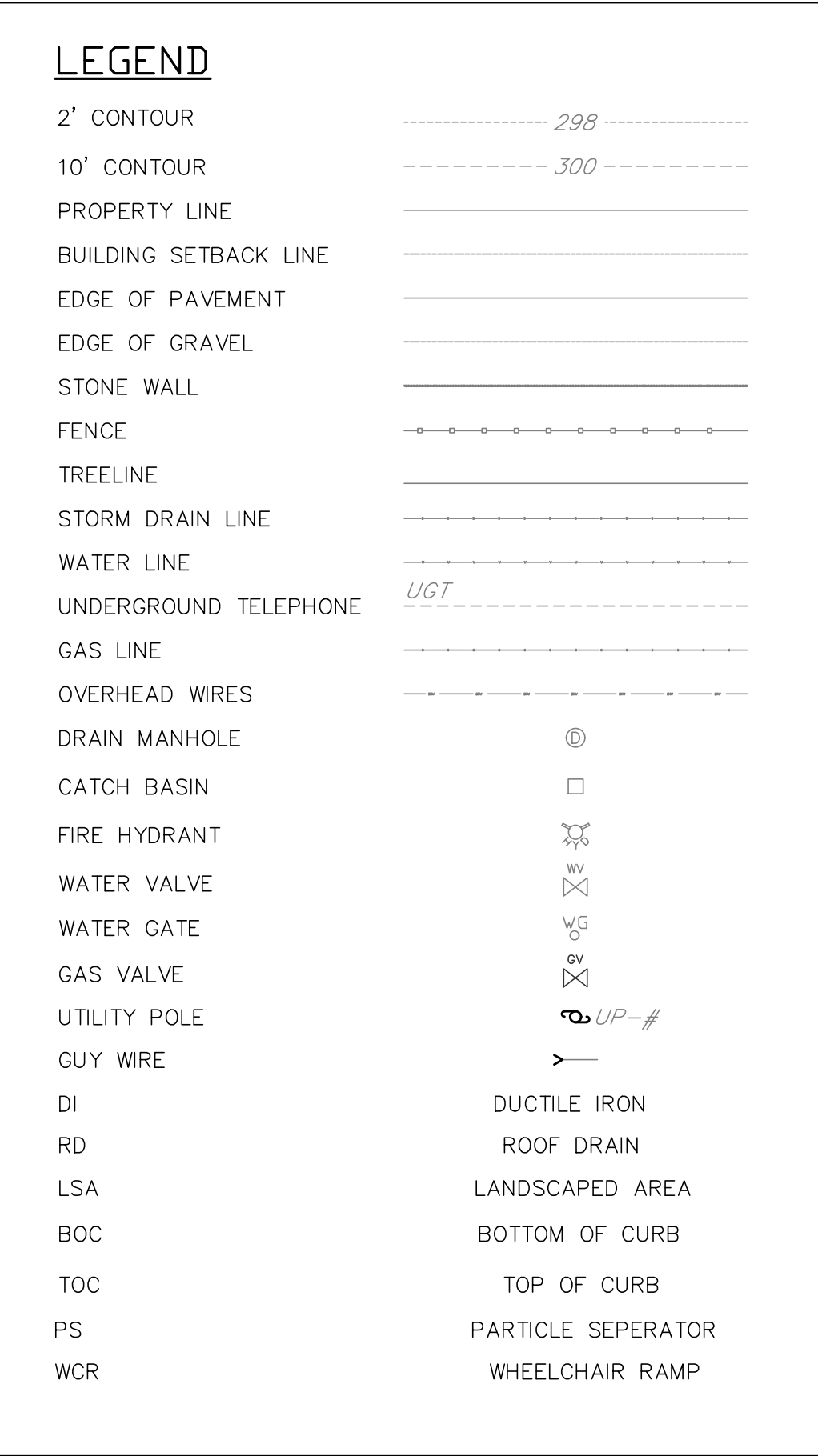
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PHONE: (781) 273-3434 FAX: (781) 273-3430



SITE LOCUS MAP

SCALE: 1" = 2000'



SITE PREPARATION

1. CONTRACTOR SHALL CONTACT DIG SAFE AT 1-888-DIG-SAFE AT LEAST SEVEN DAYS PRIOR TO ANY CONSTRUCTION ACTIVITIES.
2. INSTALL EROSION AND SILTATION DEVICES AS INDICATED ON THE DRAWINGS.
3. LEGALLY DISPOSE OF ALL DEMOLISHED MATERIALS OFF SITE. STOCKPILED TOPSOIL SHALL BE SCREENED FOR RE-USE AND EXCESS MATERIAL REMOVED FROM SITE.
4. TOPSOIL REMOVAL AND SUBGRADE EXPOSURE SHALL BE PERFORMED IN STAGES TO CONTROL EROSION AND SEDIMENT TRANSFER FROM SITE.
5. CONTRACTOR SHALL INSPECT EROSION CONTROL MEASURES DAILY AND PRIOR TO ANY PREDICTED STORM EVENT AND REPAIR AS NECESSARY.
6. ALL WORK SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS OF THE CITY OF REVERE AND SHALL BE BUILT IN A WORKMANLIKE MANNER IN ACCORDANCE WITH THE PLANS AND THE CITY OF REVERE STANDARD DETAILS AND SPECIFICATIONS.
7. GRANITE CURB REMOVED AND STACKED SHALL BE OFFERED TO THE DEPARTMENT OF CONSERVATION AND RECREATION FOR SALVAGE.

CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING CUT AND CAP OF EXISTING GAS LINE PER GAS COMPANY LOCATION AND REQUIREMENTS.

SITE PREPARATION PLAN
LOCATED IN
140 LYNNWAY
REVERE, MA

PREPARED FOR
WINTER STREET ARCHITECTS

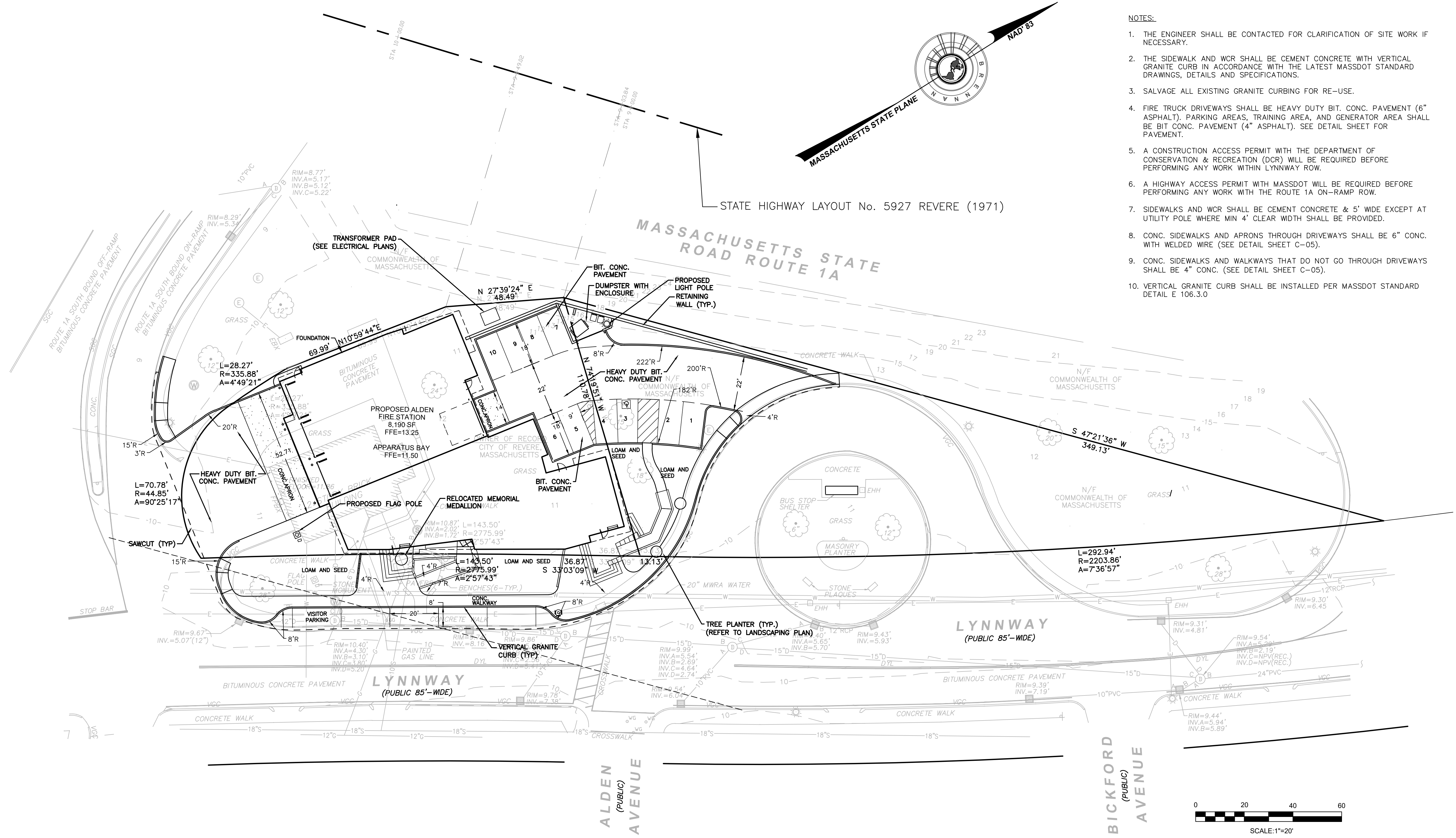
SCALE: 1" = 20'

DATE: 5-23-2022

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C-02



- NOTES:
1. THE ENGINEER SHALL BE CONTACTED FOR CLARIFICATION OF SITE WORK IF NECESSARY.
 2. THE SIDEWALK AND WCR SHALL BE CEMENT CONCRETE WITH VERTICAL GRANITE CURB IN ACCORDANCE WITH THE LATEST MASSDOT STANDARD DRAWINGS, DETAILS AND SPECIFICATIONS.
 3. SALVAGE ALL EXISTING GRANITE CURBING FOR RE-USE.
 4. FIRE TRUCK DRIVEWAYS SHALL BE HEAVY DUTY BIT. CONC. PAVEMENT (6" ASPHALT). PARKING AREAS, TRAINING AREA, AND GENERATOR AREA SHALL BE BIT CONC. PAVEMENT (4" ASPHALT). SEE DETAIL SHEET FOR PAVEMENT.
 5. A CONSTRUCTION ACCESS PERMIT WITH THE DEPARTMENT OF CONSERVATION & RECREATION (DCR) WILL BE REQUIRED BEFORE PERFORMING ANY WORK WITHIN LYNNWAY ROW.
 6. A HIGHWAY ACCESS PERMIT WITH MASSDOT WILL BE REQUIRED BEFORE PERFORMING ANY WORK WITH THE ROUTE 1A ON-RAMP ROW.
 7. SIDEWALKS AND WCR SHALL BE CEMENT CONCRETE & 5' WIDE EXCEPT AT UTILITY POLE WHERE MIN 4' CLEAR WIDTH SHALL BE PROVIDED.
 8. CONC. SIDEWALKS AND APRONS THROUGH DRIVEWAYS SHALL BE 6" CONC. WITH WELDED WIRE (SEE DETAIL SHEET C-05).
 9. CONC. SIDEWALKS AND WALKWAYS THAT DO NOT GO THROUGH DRIVEWAYS SHALL BE 4" CONC. (SEE DETAIL SHEET C-05).
 10. VERTICAL GRANITE CURB SHALL BE INSTALLED PER MASSDOT STANDARD DETAIL E 106.3.0

SITE LAYOUT PLAN
LOCATED IN
140 LYNNWAY
REVERE, MA

PREPARED FOR
WINTER STREET ARCHITECTS

DATE: 5-23-2022

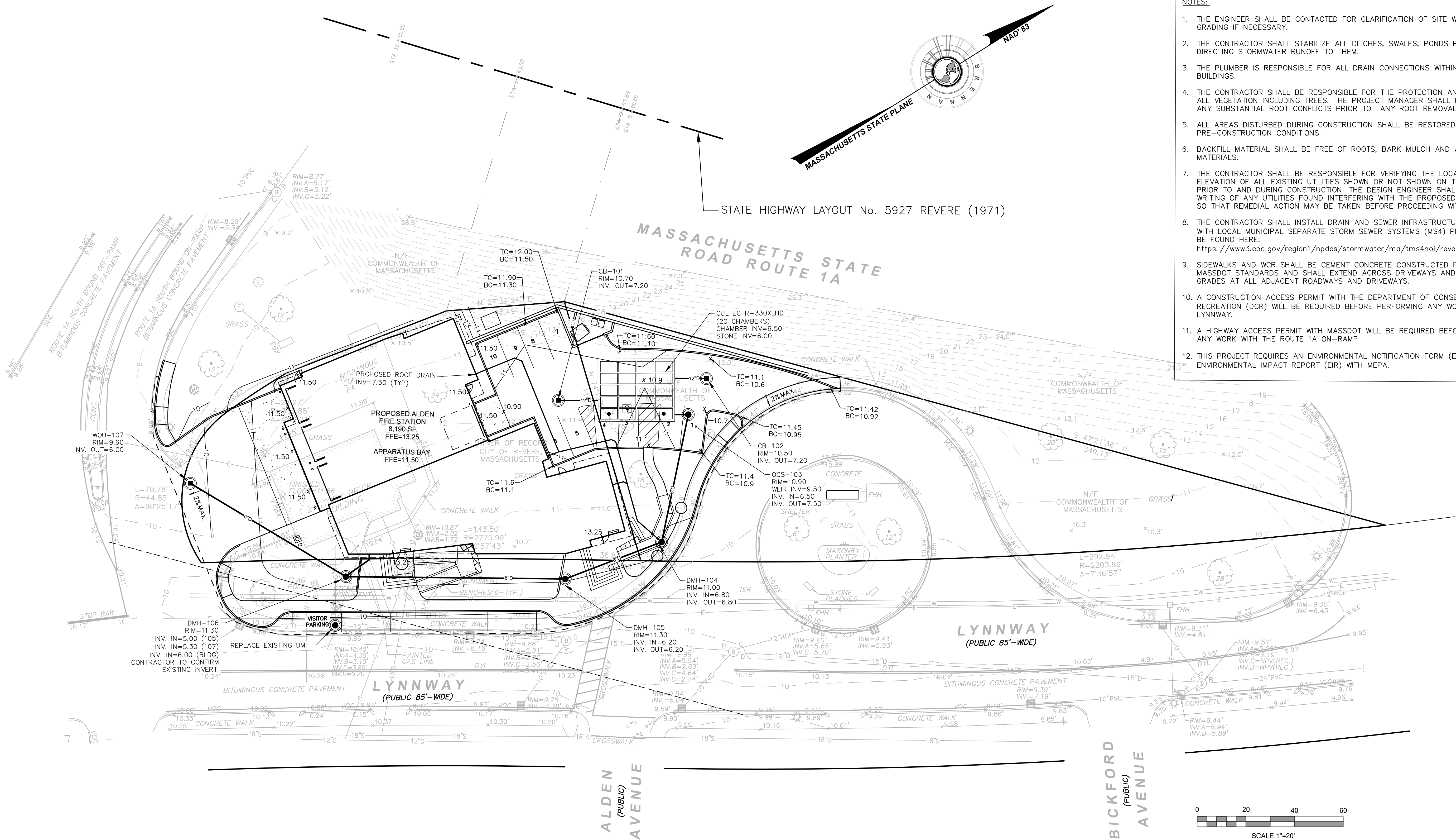
SCALE: 1" = 20'

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REVISIONS		NO.	DATE	DESCRIPTION	BY

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DRAWN BY: CG
PROJECT 19954B

C-03



- NOTES:
1. THE ENGINEER SHALL BE CONTACTED FOR CLARIFICATION OF SITE WORK AND/OR GRADING IF NECESSARY.
 2. THE CONTRACTOR SHALL STABILIZE ALL DITCHES, SWALES, PONDS PRIOR TO DIRECTING STORMWATER RUNOFF TO THEM.
 3. THE PLUMBER IS RESPONSIBLE FOR ALL DRAIN CONNECTIONS WITHIN 10'-FT OF ALL BUILDINGS.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND STABILITY OF ALL VEGETATION INCLUDING TREES. THE PROJECT MANAGER SHALL BE NOTIFIED OF ANY SUBSTANTIAL ROOT CONFLICTS PRIOR TO ANY ROOT REMOVAL.
 5. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS.
 6. BACKFILL MATERIAL SHALL BE FREE OF ROOTS, BARK MULCH AND ANY ORGANIC MATERIALS.
 7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THESE PLANS PRIOR TO AND DURING CONSTRUCTION. THE DESIGN ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION SO THAT REMEDIAL ACTION MAY BE TAKEN BEFORE PROCEEDING WITH THE WORK.
 8. THE CONTRACTOR SHALL INSTALL DRAIN AND SEWER INFRASTRUCTURE IN COMPLIANCE WITH LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4) PERMIT WHICH CAN BE FOUND HERE:
<https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/revere.pdf>.
 9. SIDEWALKS AND WOR SHALL BE CEMENT CONCRETE CONSTRUCTED PER MASSDOT STANDARDS AND SHALL EXTEND ACROSS DRIVEWAYS AND MEET EXISTING GRADES AT ALL ADJACENT ROADWAYS AND DRIVEWAYS.
 10. A CONSTRUCTION ACCESS PERMIT WITH THE DEPARTMENT OF CONSERVATION & RECREATION (DCR) WILL BE REQUIRED BEFORE PERFORMING ANY WORK WITHIN LYNNWAY.
 11. A HIGHWAY ACCESS PERMIT WITH MASSDOT WILL BE REQUIRED BEFORE PERFORMING ANY WORK WITH THE ROUTE 1A ON-RAMP.
 12. THIS PROJECT REQUIRES AN ENVIRONMENTAL NOTIFICATION FORM (ENF) AND ENVIRONMENTAL IMPACT REPORT (EIR) WITH MEPA.

GRADING AND DRAINAGE PLAN
LOCATED IN
140 LYNNWAY
REVERE, MA

PREPARED FOR
WINTER STREET ARCHITECTS

DATE: 5-23-2022

SCALE: 1" = 20'

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PROJECT 19954B

C-04



PREPARED FOR
WINTER STREET ARCHITECTS

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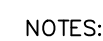
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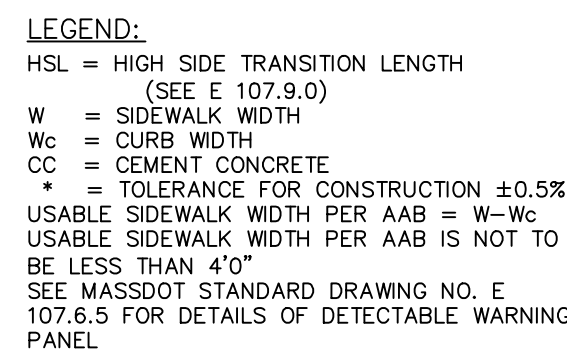
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PROJECT 19954B

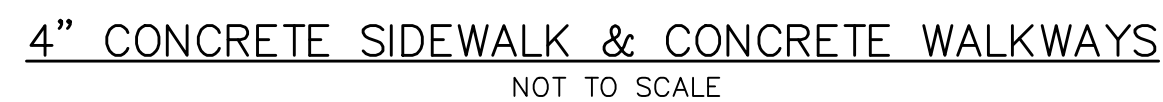
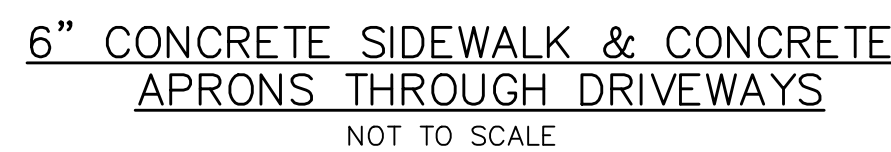
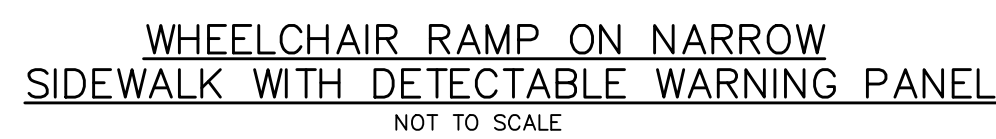
C-05



1. ALL TREE PROTECTION SHALL BE IN PLACE AND APPROVED BEFORE SITE WORK BEGINS.
2. THE CONTRACTOR SHALL AVOID ROOT DAMAGE TO TREES. PRUNE ROOTS AS NEEDED AND AVOID LARGER ROOT SYSTEMS.
3. EXPOSED ROOTS SHALL BE COVERED WITHIN 24 HOURS.
4. EXPOSED TREE ROOTS SHALL BE COVERED WITH NATURAL MULCH PRODUCTS AND KEPT MOIST UNTIL SOIL IS REPLACED.



NOTES:
ROADWAY, GUTTER, AND FIRST 6'
OF SIDEWALK TO BE ADJUSTED
FOR FIELD CONDITIONS



1. THIS PROCEDURE IS APPLICABLE ONLY IF CURB IS TO BE SET AFTER BASE COURSE IS IN PLACE PRIOR TO BINDER AND TOP PLACEMENT.
2. CUT NEAT LINE 6" FROM CURB LINE AND REMOVE BASE AND GRAVEL. REPLACE WITH CONCRETE CEMENT.
3. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED. ALL TEST REQUIREMENTS ARE WAIVED. **HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.**



1. TO BE INSTALLED IN ALL CATCH BASINS THAT COULD RECEIVE RUNOFF FROM DISTURBED AREAS UNTIL COMPLETION OF CONSTRUCTION.



CHECKED BY: CE
DRAWN BY: CG
<i>PROJECT 19954B</i>

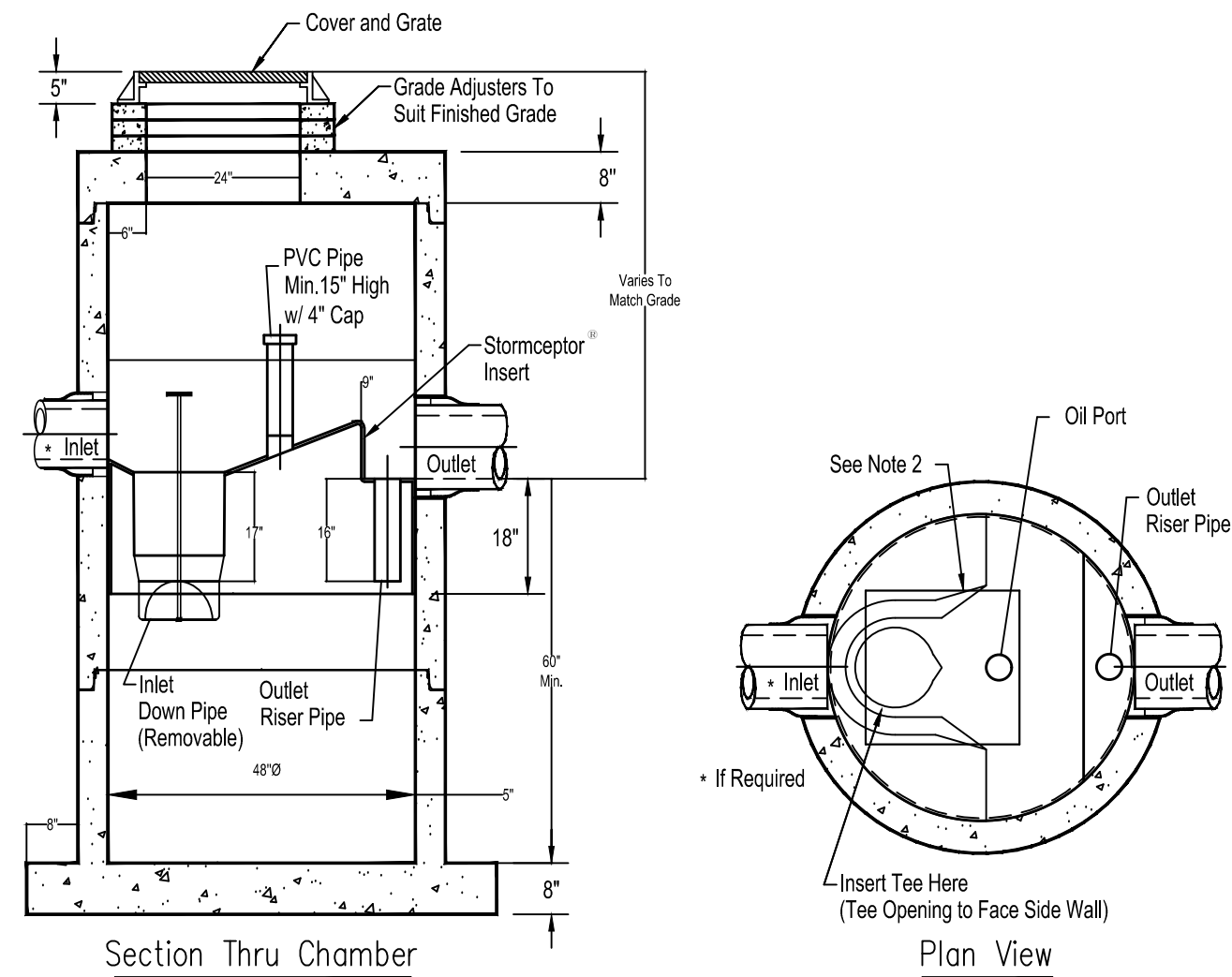
C-06

CONSTRUCTION DETAILS
LOCATED IN
140 LYNNWAY
REVERE, MA

PREPARED FOR
WINTER STREET ARCHITECTS

SCALE: 1" = 20'

DATE: 5-23-2022

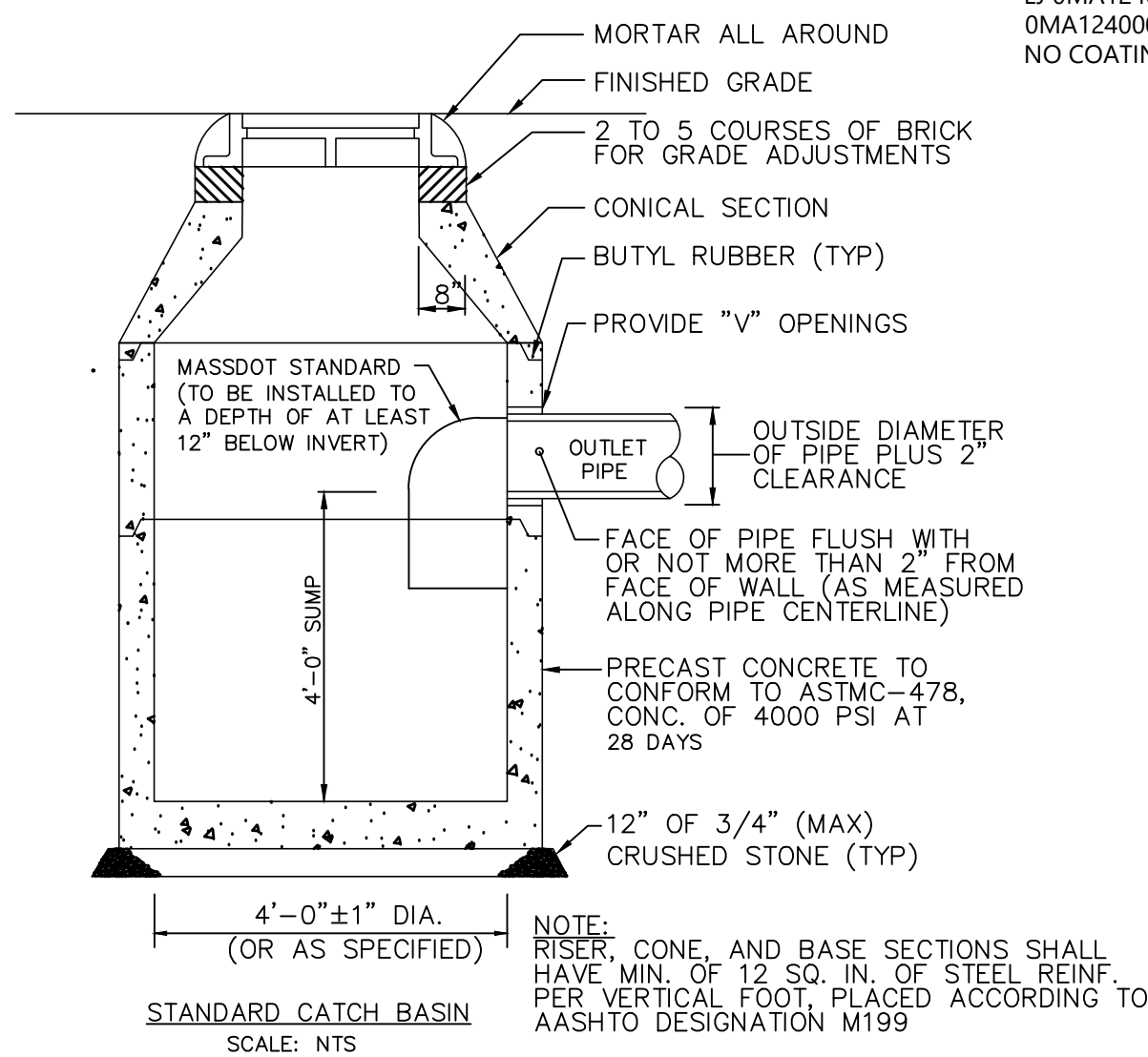


- Notes:
1. The Use Of Flexible Connection is Recommended at The Inlet and Outlet Where Applicable.
 2. The Cover Should be Positioned Over The Inlet Drop Pipe and The Oil Port.
 3. The Stormceptor System is protected by one or more of the following U.S. Patents: #5753115, #5849181, #6068765, #6371690, #7582216, #7666303.
 4. Contact a Concrete Pipe Division representative for further details not listed on this drawing.

PARTICLE SEPARATOR
STC 450i PRECAST CONCRETE STORMCEPTER OR EQUAL
(450 U.S. GALLON CAPACITY)
NOT TO SCALE

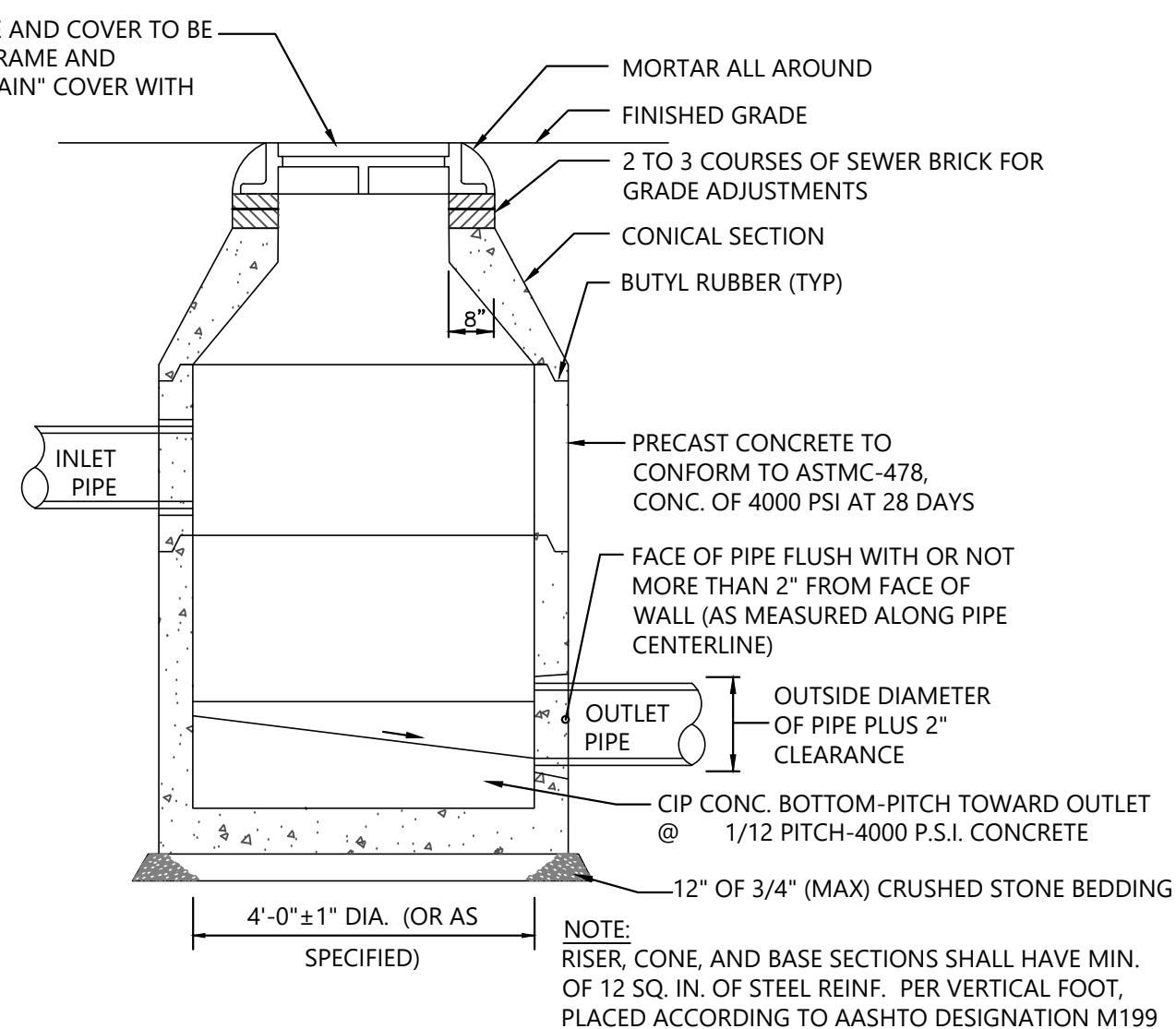
1. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
2. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."
3. BUTYL RESIN SECTION JOINT CONFORMS TO LATEST ASTM C443 SPEC.
4. STEEL REINFORCED COPOLYMER POLYPROPYLENE PLASTIC STEP CONFORMS TO LATEST ASTM C478 SPEC.

DIAMETER	WALL THICKNESS	FLOOR THICKNESS
4 FT.	5 IN.	6 IN.
5 FT.	6 IN.	7 IN.
6 FT.	7 IN.	8 IN.

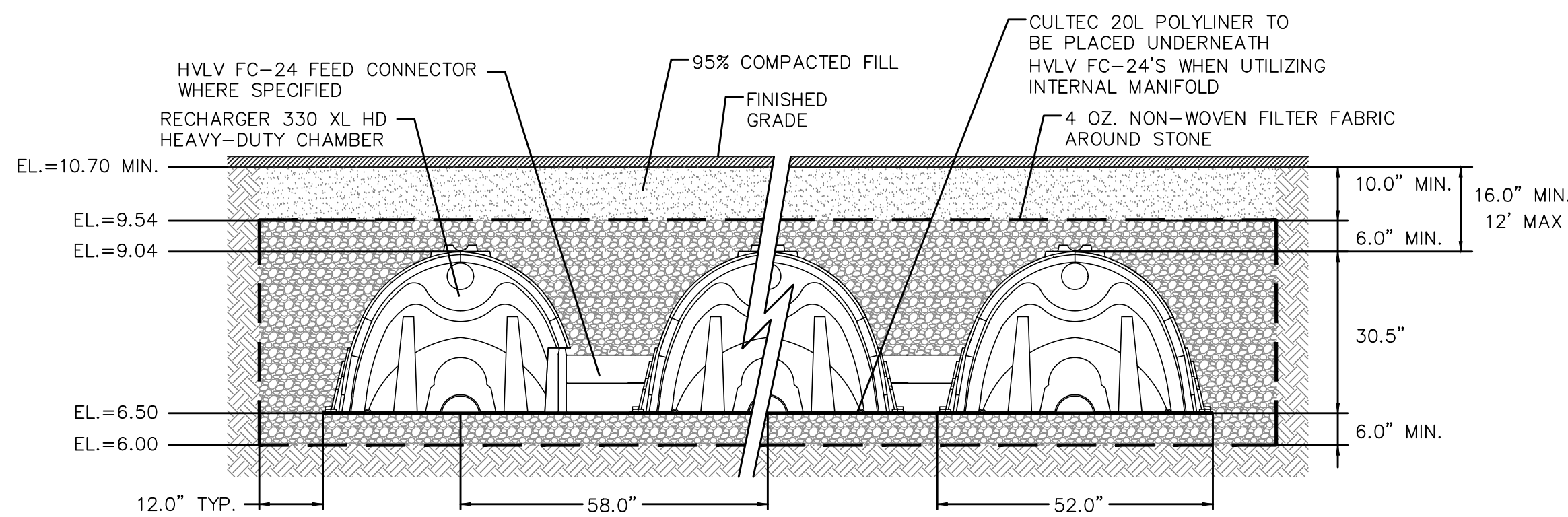


STANDARD CATCH BASIN DETAIL
NOT TO SCALE

DIAMETER	WALL THICKNESS	FLOOR THICKNESS
4 FT.	5 IN.	6 IN.
5 FT.	6 IN.	7 IN.
6 FT.	7 IN.	8 IN.



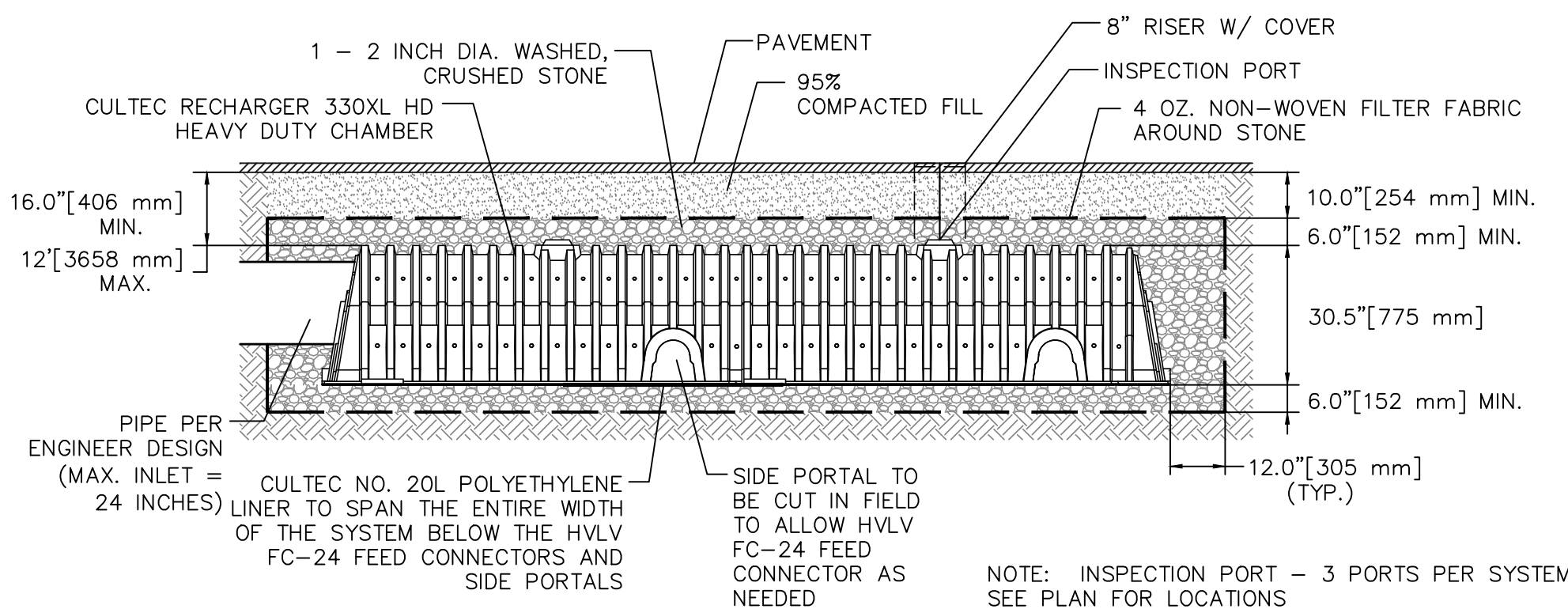
DRAIN MANHOLE DETAIL
NOT TO SCALE



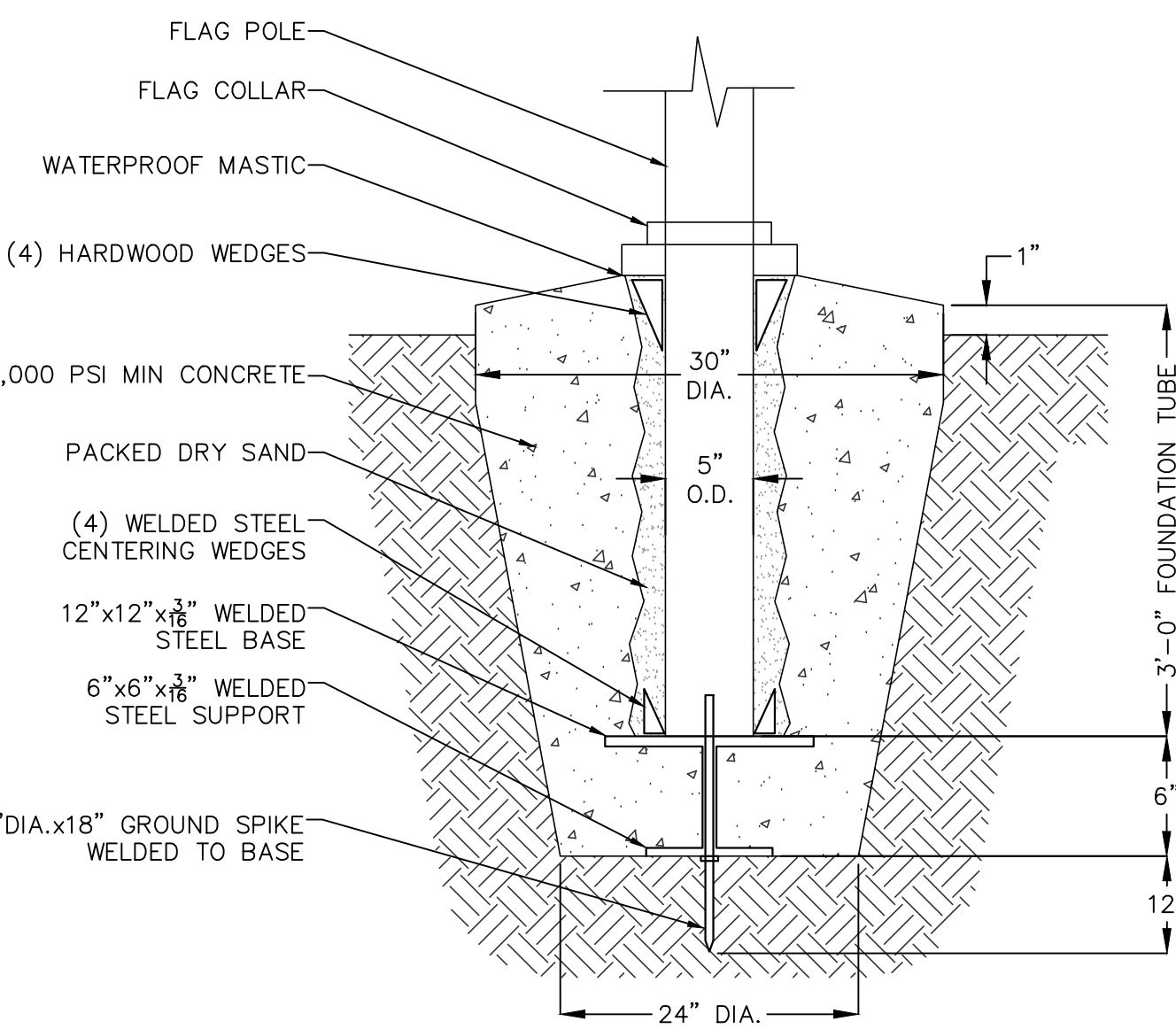
GENERAL NOTES
RECHARGER 330XL HD BY CULTEC, INC. OF BROOKFIELD, CT.
STORAGE PROVIDED = 11.32 CF/FT PER DESIGN UNIT.
REFER TO CULTEC, INC.'S CURRENT RECOMMENDED INSTALLATION GUIDELINES.
USE RECHARGER 330XL HD HEAVY DUTY FOR TRAFFIC AND/OR HS-25 APPLICATIONS.

ALL RECHARGER 330XL HD HEAVY DUTY UNITS ARE MARKED WITH A COLOR STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER. ALL RECHARGER 330XL HD CHAMBERS MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

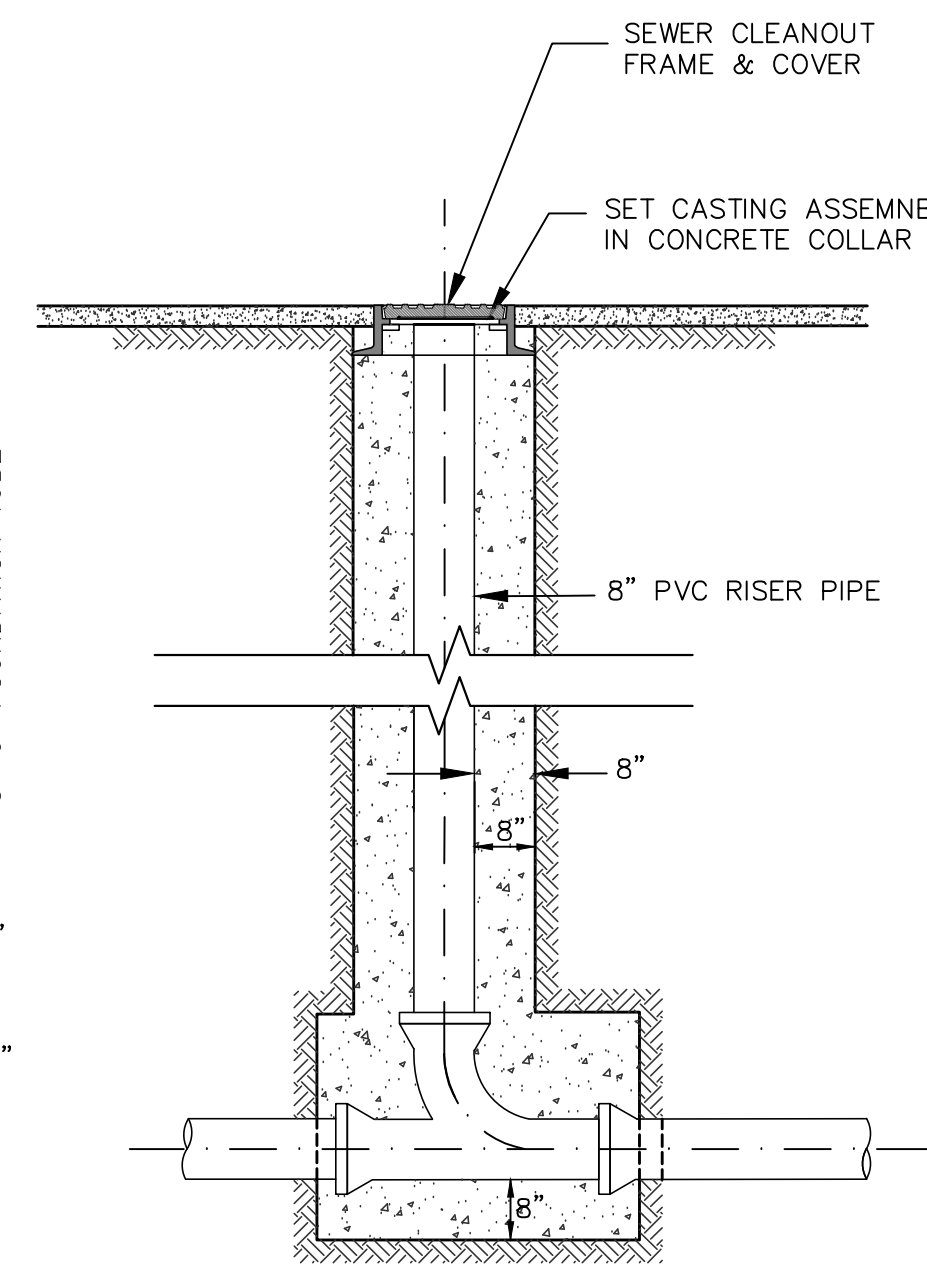
INFILTRATION/DETENTION SYSTEM — RECHARGER 330XLHD
TYPICAL CROSS SECTION
NOT TO SCALE



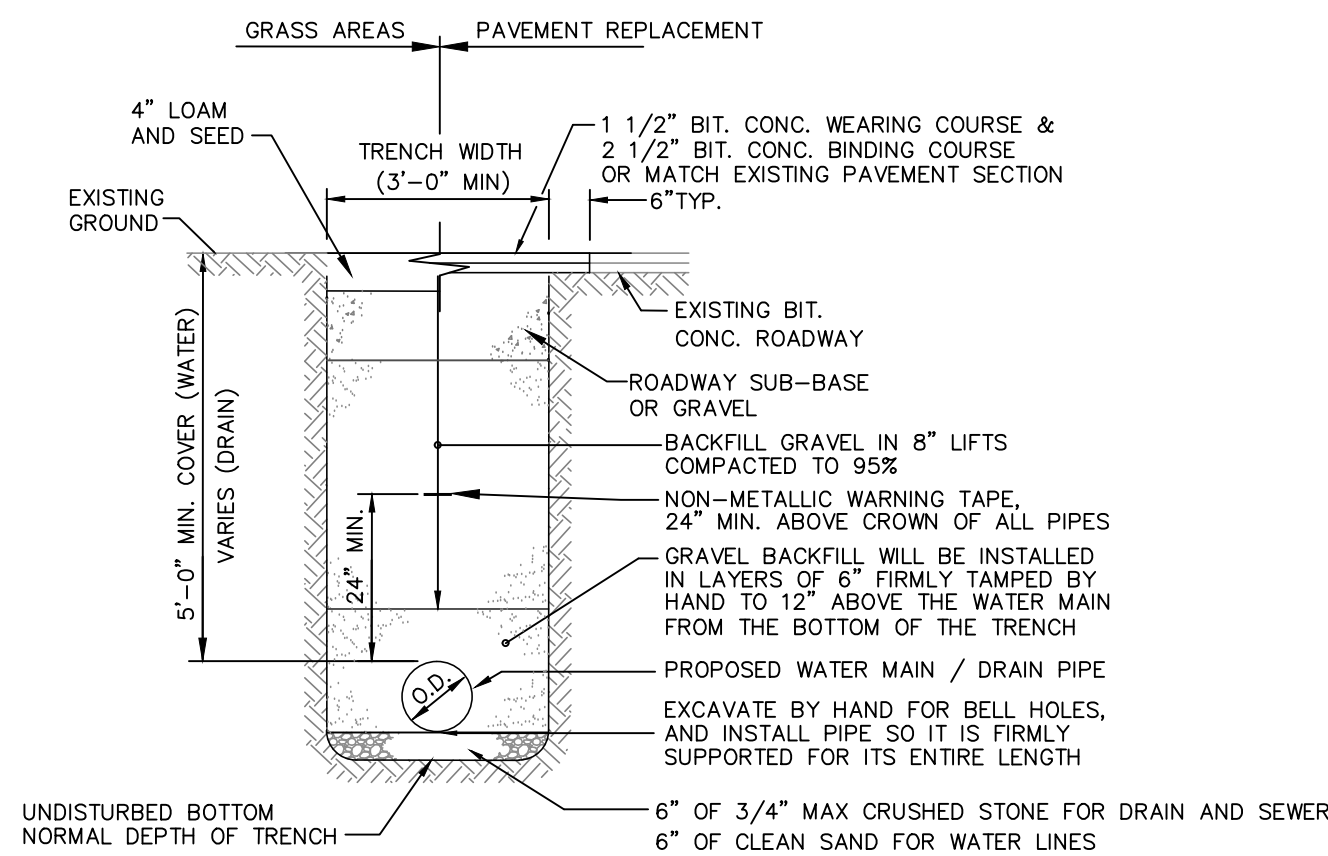
INTERNAL MANIFOLD DETAIL — RECHARGER 330XLHD
TYPICAL CROSS SECTION
NOT TO SCALE



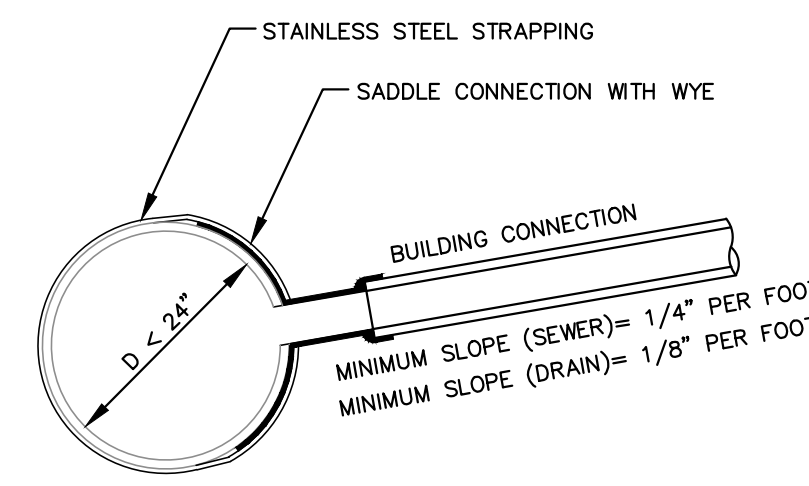
FLAG POLE FOUNDATION DETAIL
NOT TO SCALE



IN-LINE SEWER CLEANOUT DETAIL
NOT TO SCALE

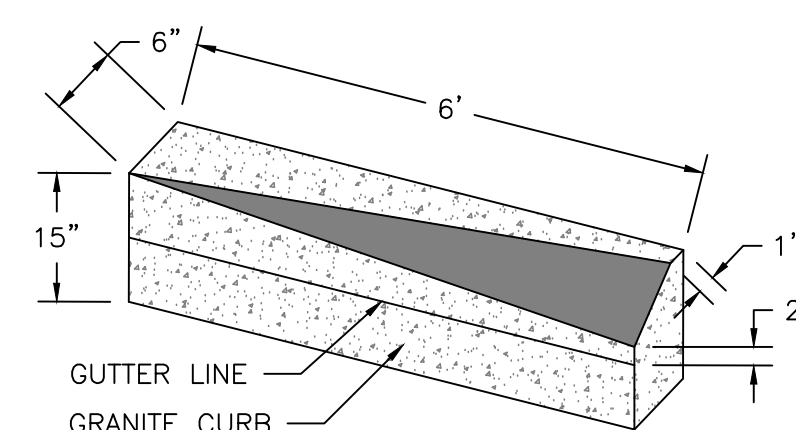


TYPICAL PIPE TRENCH DETAIL
NOT TO SCALE

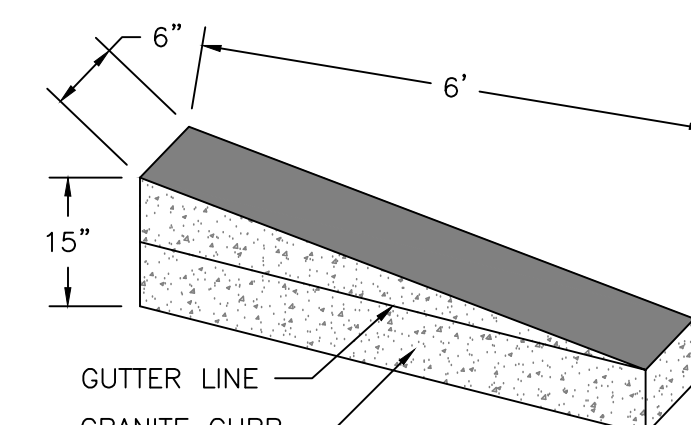


- NOTES:
1. FULL PVC OR IRON SADDLE MAY BE USED TO CONNECT TO EXISTING PVC, CLAY, CONCRETE OR IRON PIPE.
 2. SADDLES MUST HAVE RUBBER GASKETS AND SHALL BE TIGHTENED WITH STRAPS. SADDLES WILL NOT BE CEMENTED ONTO THE PIPE.
 3. FULL WYE CONNECTION FITTINGS MAY BE USED.
 4. PIPE SHALL BE CUT TO CONFORM TO THE OPENING IN THE SADDLE.
 5. CONNECTIONS DIRECTLY INTO THE EXISTING PIPE WITHOUT A SADDLE OR A FULL WYE FITTING ARE NOT ALLOWED.
 6. FOR PREVIOUSLY CIPP LINED PIPE, AN INSERTA-TEE (OR APPROVED EQUAL) IS REQUIRED FOR SERVICES THAT ARE LESS THAN HALF THE DIAMETER OF THE MAIN LINE OF THE PIPE. ALL OTHER CONNECTIONS MUST BE MADE BY CUTTING A RIGID WYE FITTING INTO THE LINER.

TYPICAL SADDLE CONNECTION TO EXISTING SEWER OR DRAIN
NOT TO SCALE



6' VERTICAL GRANITE CURB TO SLOPED GRANITE CURB TRANSITION CURB
NOT TO SCALE



6' VERTICAL GRANITE CURB TO FLUSH GRANITE CURB TRANSITION CURB
NOT TO SCALE

CONSTRUCTION DETAILS
LOCATED IN
140 LYNNWAY
REVERE, MA
PREPARED FOR
WINTER STREET ARCHITECTS

DATE: 5-23-2022

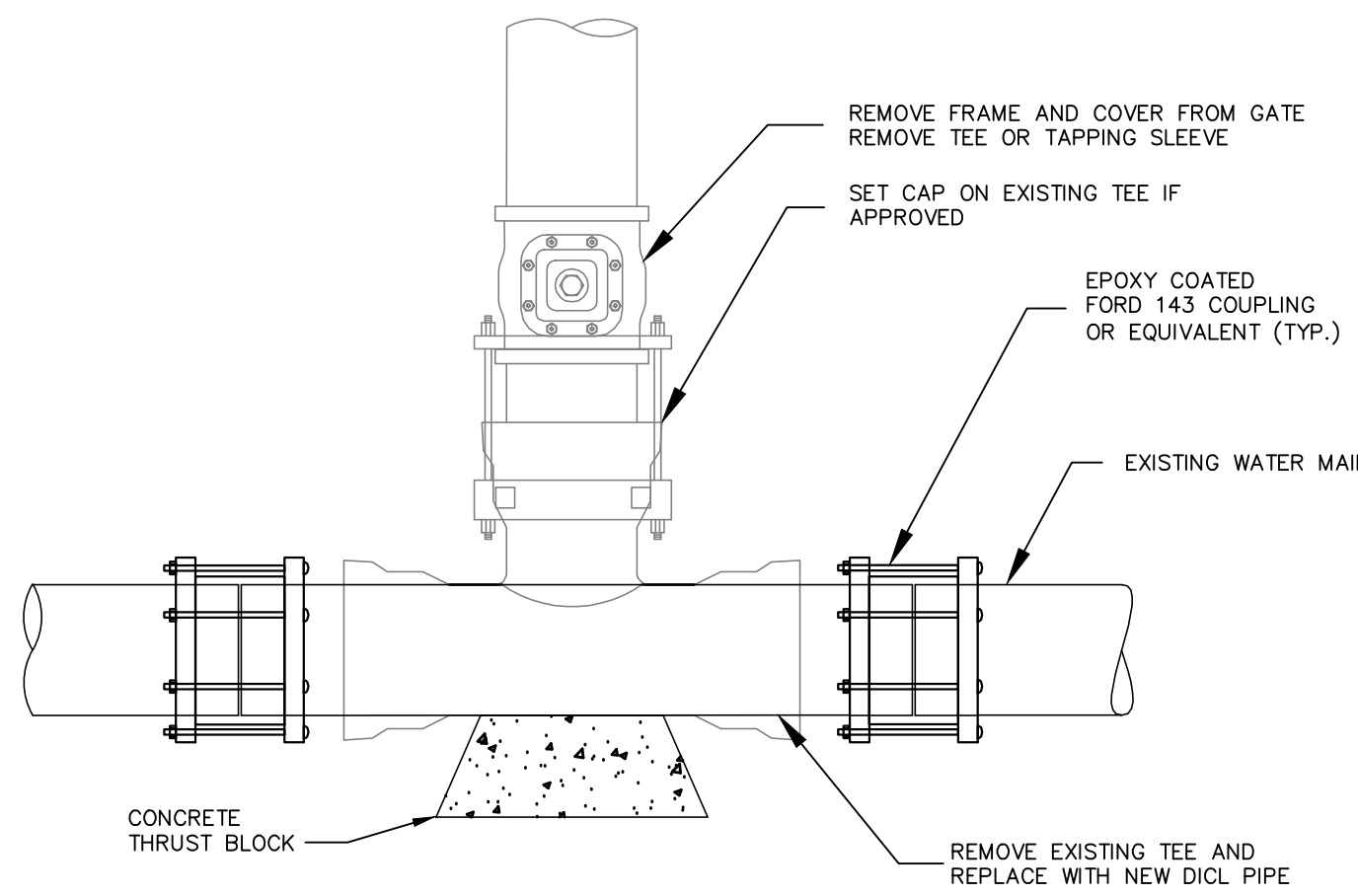
SCALE: 1" = 2'

Brennan Consulting
ENGINEERING · TRANSPORTATION · SURVEYING
24 RAY AVENUE, BURLINGTON, MA
PHONE: (781) 273-3434 FAX: (781) 273-3430

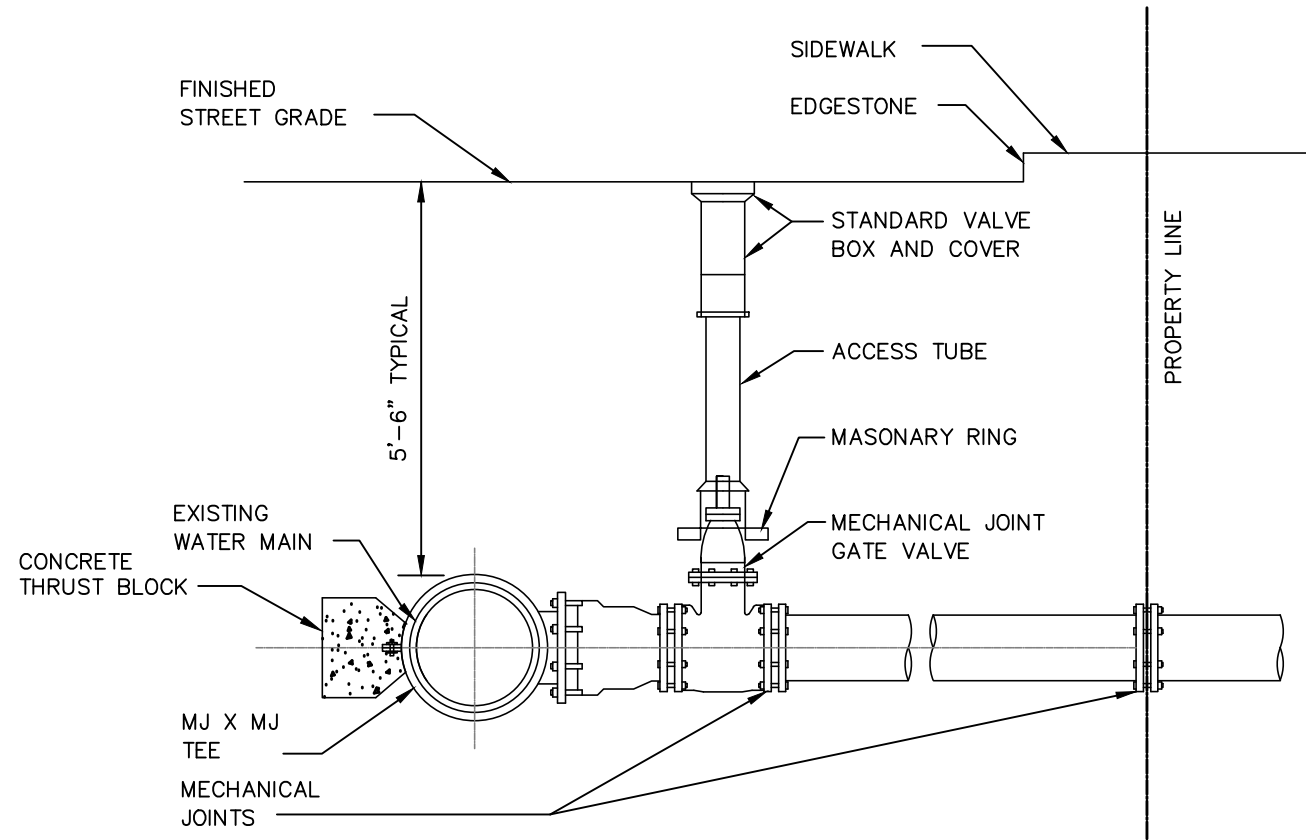
REVISIONS	NO.	DATE	DESCRIPTION	BY

CHECKED BY: CE
DRAWN BY: CG
PROJECT 19954B

C-07

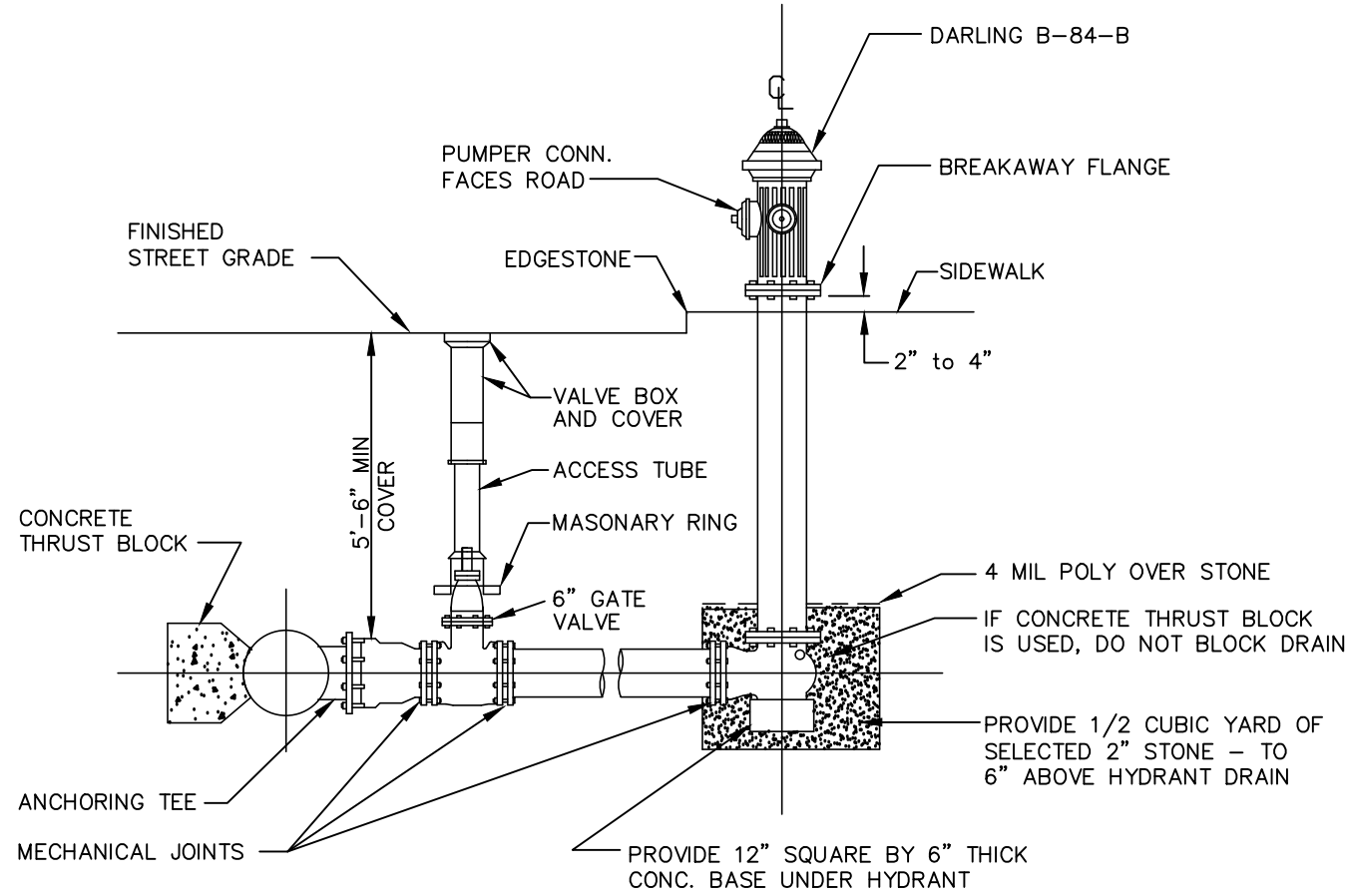


DETAIL OF CUT AND CAP
OF WATER CONNECTION 4" AND OVER
NOT TO SCALE

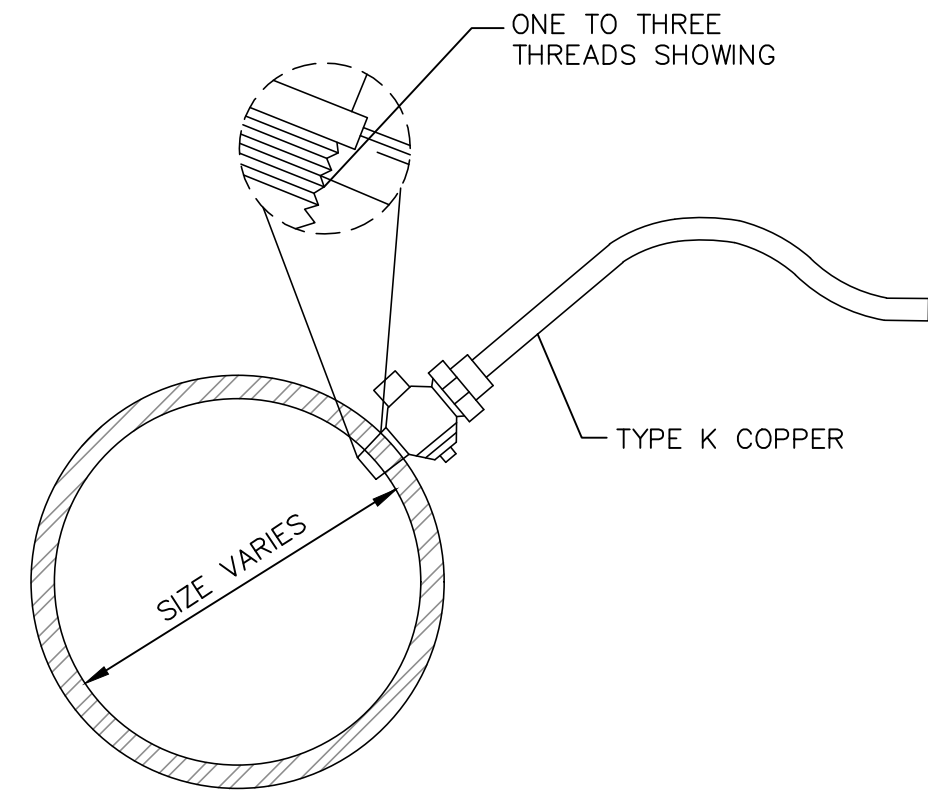


TYPICAL WATER PIPE CONNECTION WITH
MJ X MJ TEE & GATE VALVE DETAIL
NOT TO SCALE

NOTES:
- CONCRETE THRUST BLOCK TO BE USED ONLY WHERE IT WILL BEAR ON UNDISTURBED EARTH.
- USE RESTRAINED JOINT FITTINGS OR TIE RODS WHERE CONCRETE THRUST BLOCK IS UNACCEPTABLE.
- SIZE OF BLOCK OR MEGALUG TO BE DESIGNED FOR SPECIFIC CONDITIONS.

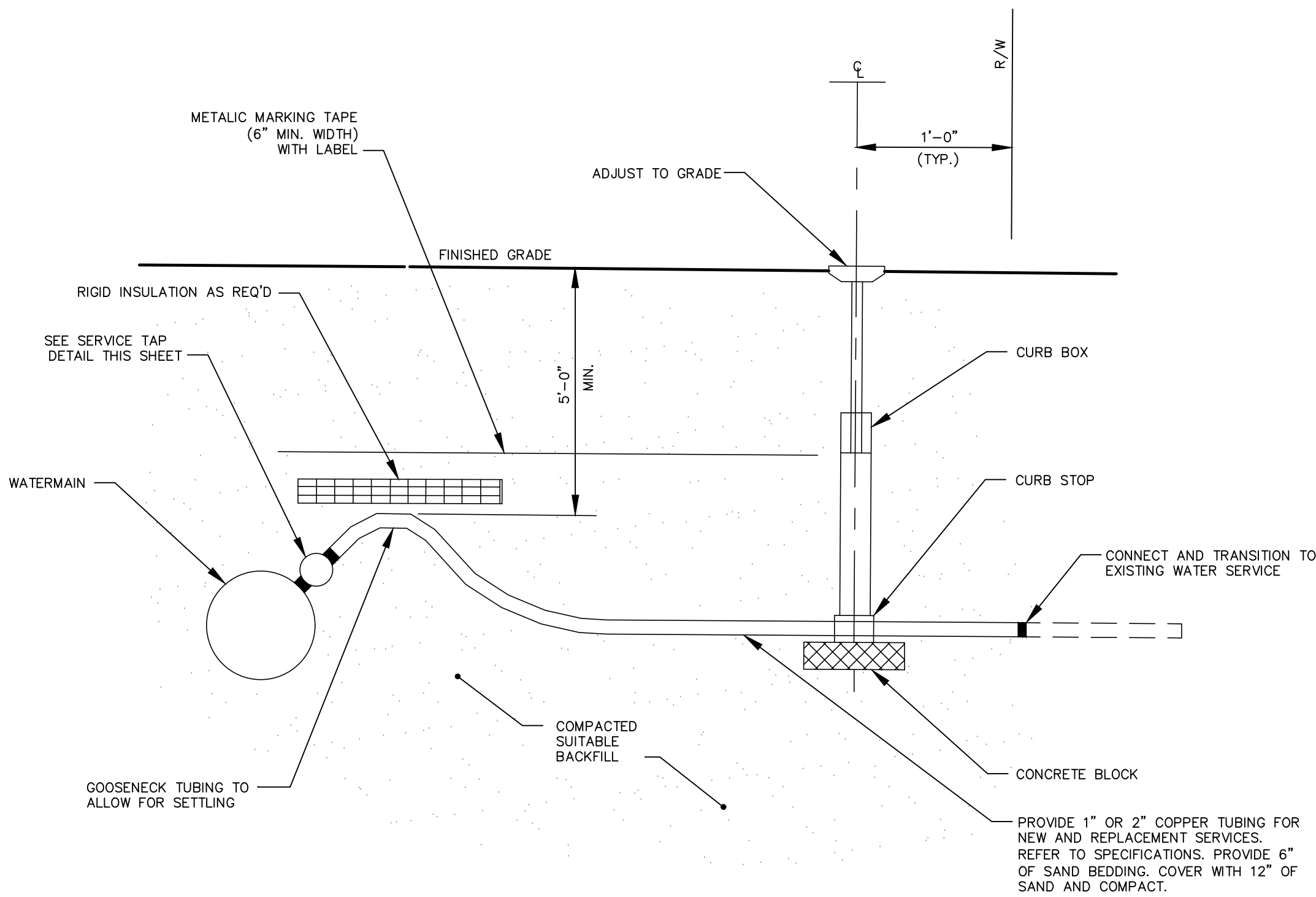


TYPICAL HYDRANT & VALVE DETAIL
NOT TO SCALE

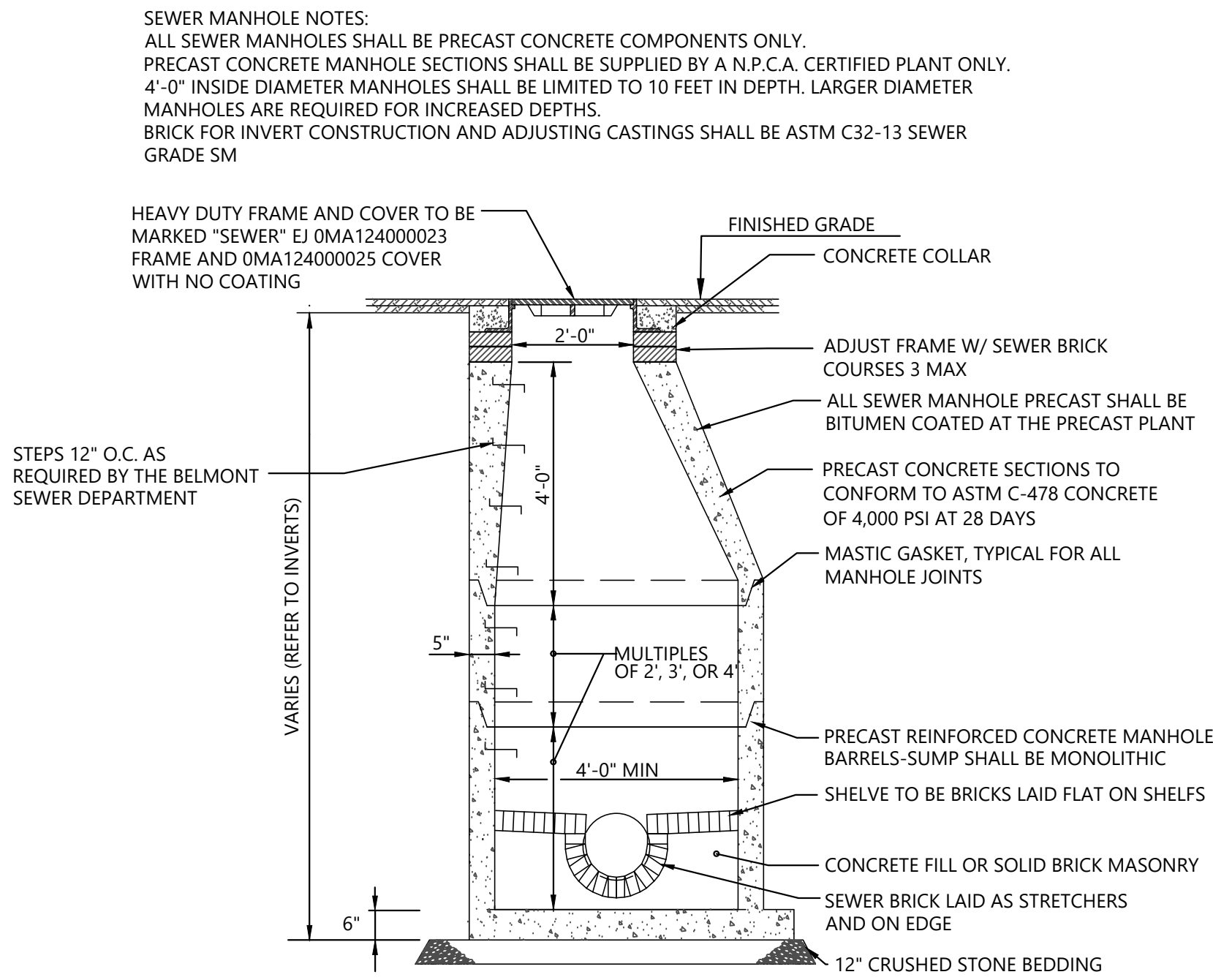


NOTES:
1. SERVICE CONNECTIONS WILL BE INSTALLED SO THAT THE OUTLET IS AT AN ANGLE OF NOT MORE THAN 45° ABOVE THE HORIZONTAL. ALWAYS PUT A BEND OR "GOOSENECK" IN THE SERVICE LINE PRIOR TO CONNECTING TO PROVIDE FLEXIBILITY AND "GIVE" TO COUNTER THE EFFECTS OF A LOAD DUE TO SETTLEMENT OR EXPANSION AND/OR CONTRACTION

SERVICE TAP
(1" AND 2" C.C. THREAD)
NOT TO SCALE

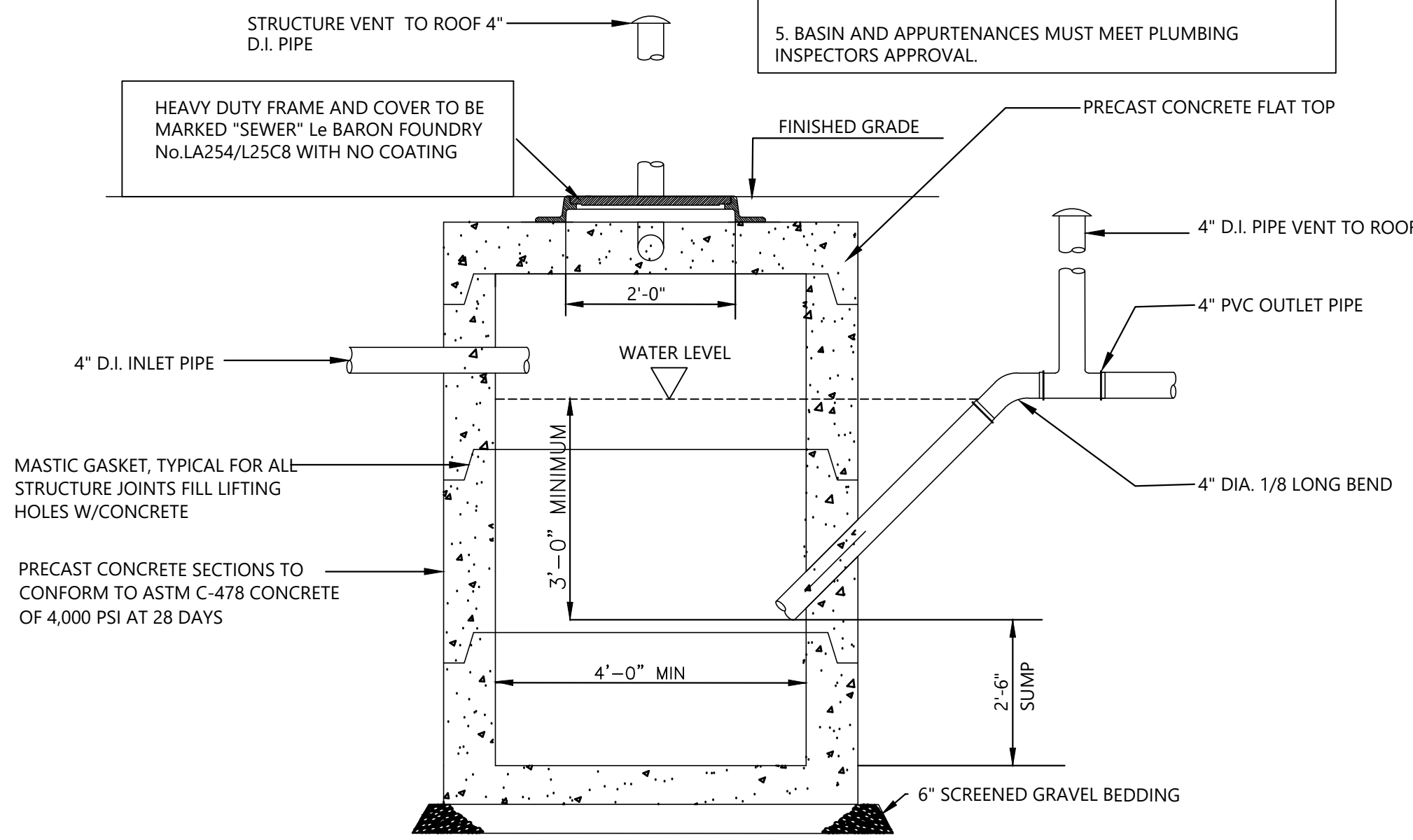


TYPICAL WATER SERVICE
NOT TO SCALE



SEWER MANHOLE DETAIL
NOT TO SCALE

NOTE:
SEWER PIPE CONNECTIONS MAY BE COMPRESSION TYPE CAST INTO THE PRECAST BASE OR SECTIONS BY THE MANUFACTURER IF AVAILABLE. FINAL CONNECTION OF ALL PIPES SHALL BE WATERTIGHT.



OIL/GASOLINE SEPARATOR
NOT TO SCALE

OIL/GASOLINE TRAP NOTES:
1. ALL PIPE BELOW FLOOR AND THROUGH BUILDING IS DUCTILE IRON NO-HUB WITH STAINLESS STEEL BAND CLAMPS.
2. USE PRECAST CONCRETE SECTIONS ONLY.
3. BASIN IS TO BE FILLED WITH CLEAN WATER BEFORE USING AND AFTER BEING EMPTIED FOR PERIODIC CLEANING.
4. ALL OIL AND GASOLINE MUST BE REMOVED BEFORE CLEANING AND MUST NOT BE DISCHARGED INTO THE SEWER SYSTEM.
5. BASIN AND APPURTENANCES MUST MEET PLUMBING INSPECTORS APPROVAL.

CONSTRUCTION DETAILS

LOCATED IN
140 LYNNWAY
REVERE, MA

PREPARED FOR
WINTER STREET ARCHITECTS

DATE: 5-23-2022

SCALE: 1" = 20'

Brennan Consulting
ENGINEERING · TRANSPORTATION · SURVEYING
24 RAY AVENUE, BURLINGTON, MA
PHONE: (781) 273-3434 FAX: (781) 273-3430

REVISIONS		NO.	DATE	DESCRIPTION	BY

CHECKED BY: CE
DRAWN BY: CG

PROJECT 19954B

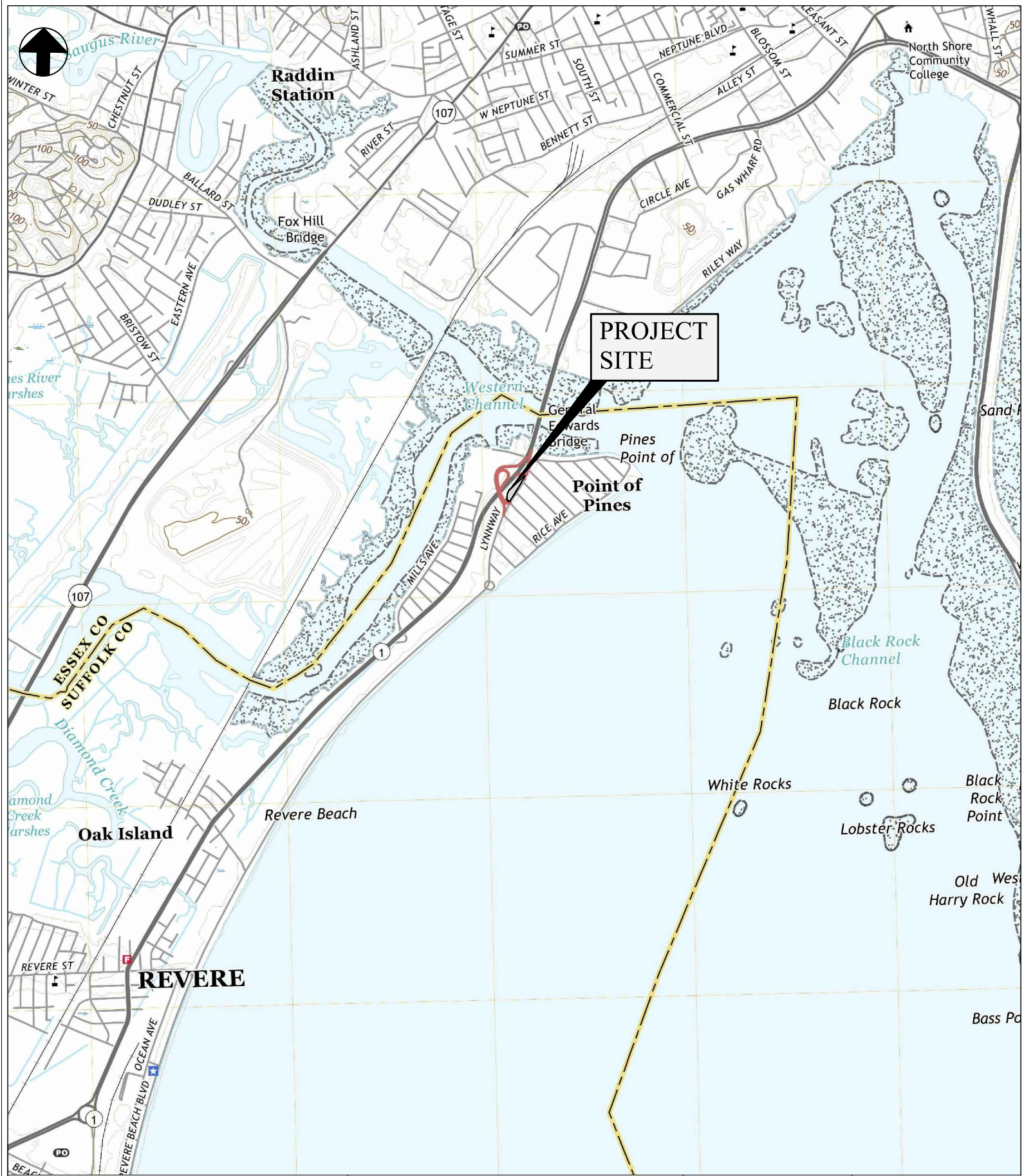
C-08





ATTACHMENT 3

USGS MAP



Project Civil Engineer

Brennan Consulting

ENGINEERING • TRANSPORTATION • SURVEYING

BRENNAN CONSULTING, INC.

24 Ray Avenue, Suite 203

Burlington, MA 01803

781.273.3434

www.brennanconsults.com

Project Location

ALDEN FIRE STATION

140 Lynnway

Revere, MA

SCALE: 1"=2000'

DRAWN BY: WCG

CHECKED BY: CE

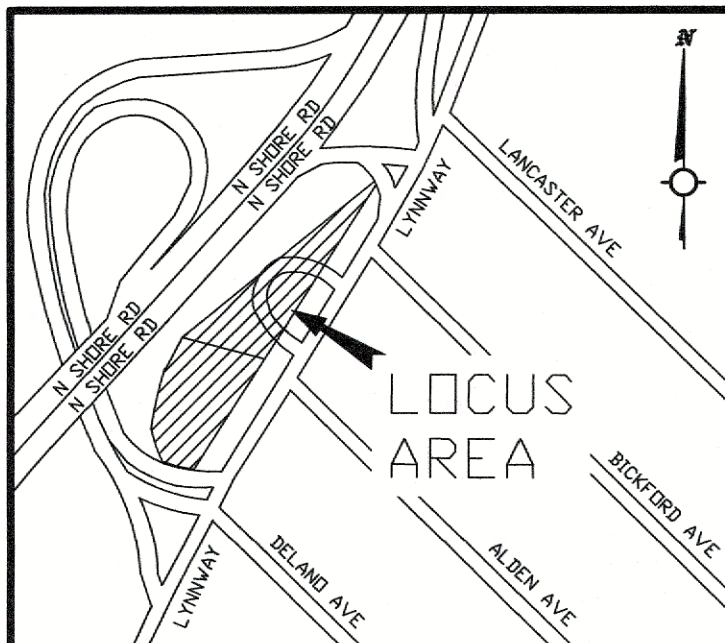
ISSUED: 03.31.21

REVISED:

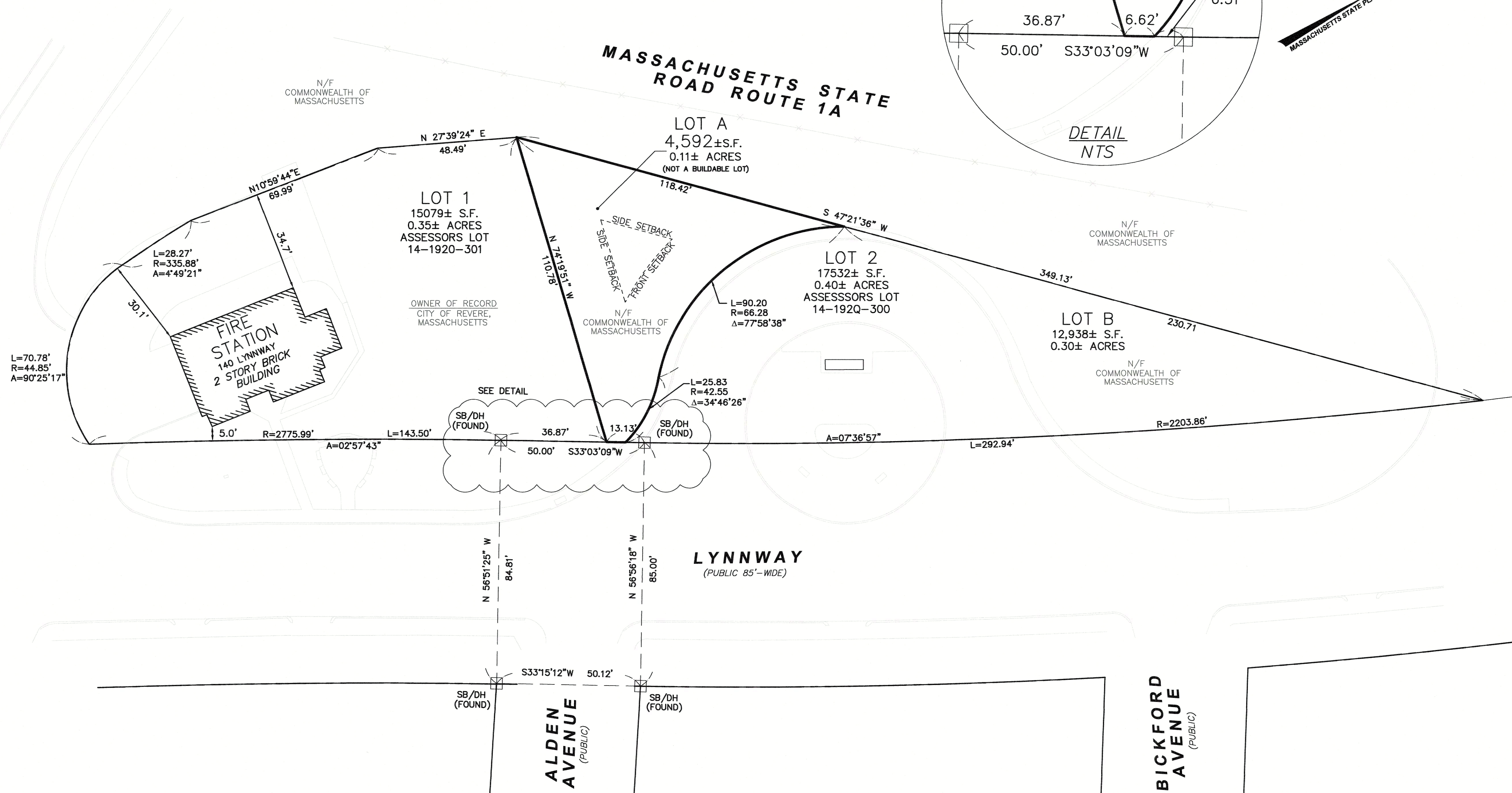
**LOCUS
MAP**

ATTACHMENT 4

ANR PLAN



LOCUS MAP:
NOT TO SCALE



RESERVED FOR REGISTRY ONLY

PLANS OF RECORD

-23333 V.T.
-MDC PLAN 174
-5227-1
-5927-2
-7604 PAGE 475

LOCUS DEED

BOOK 7604, PAGE 475

APPROVAL UNDER THE SUBDIVISION
CONTROL LAW NOT REQUIRED
CITY OF REVERE PLANNING BOARD

CURRENT ZONING INFORMATION:

ZONING DISTRICT: RA			
ZONING ORDINANCE OF THE CITY OF REVERE			
MINIMUM LOT AREA	6,000 SQ FT		
SETBACKS	SIDE YARD 20'	FRONT YARD 20'	REAR YARD 30'
FRONTAGE	60'		
USABLE OPEN SPACE (% OF TOTAL AREA)	35%		
MAXIMUM BUILDING COVERAGE	30%		
MAX HGT. (FT.)	30'		
MAX STORIES	2 1/2		

NOTES

- THIS SURVEY WAS PERFORMED ON THE GROUND BY BRENNAN CONSULTING INC. IN AUGUST OF 2019.
- THE HORIZONTAL DATUM REFERS TO NAD 83'.
- THE PURPOSE OF THIS PLAN IS TO DIVIDE CITY OF REVERE ASSESSORS LOT 14-1920-300 INTO TWO LOTS A AND B, LOT A BEING A NON BUILDABLE LOT TO BE COMBINED WITH CITY OF REVERE ASSESSORS LOT 14-1920-301 AS SHOWN HEREON.
- THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF BRENNAN CONSULTING ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO BRENNAN CONSULTING'S SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY BRENNAN CONSULTING.

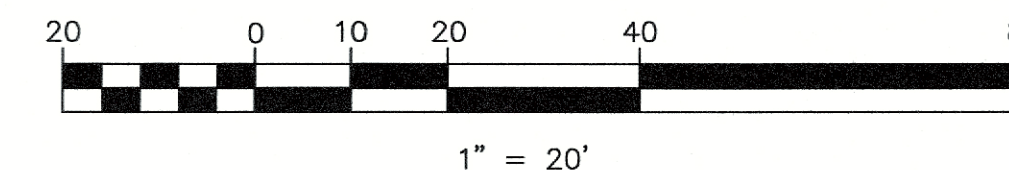
WE HEREBY CERTIFY THAT THIS PLAN WAS
PREPARED IN ACCORDANCE WITH THE RULES
AND REGULATIONS OF THE REGISTERS OF DEEDS.



PROFESSIONAL LAND SURVEYOR FOR BRENNAN CONSULTING

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D



APPROVAL NOT REQUIRED (ANR) PLAN
LOCATED IN
REVERE, MASSACHUSETTS
(SUFFOLK COUNTY)

PREPARED FOR
WINTER STREET ARCHITECTS
SCALE: 1"= 20' DATE: JUNE 8, 2021

Brennan Consulting
ENGINEERING • TRANSPORTATION • SURVEYING
24 RAY AVENUE, BURLINGTON, MA
PHONE: (781) 273-3434 FAX: (781) 273-3430

JUNE 8, 2021

PROJECT No. 19954B

ATTACHMENT 5
CITY OF REVERE ZONING MAP

[illegible]

S PARKWAY

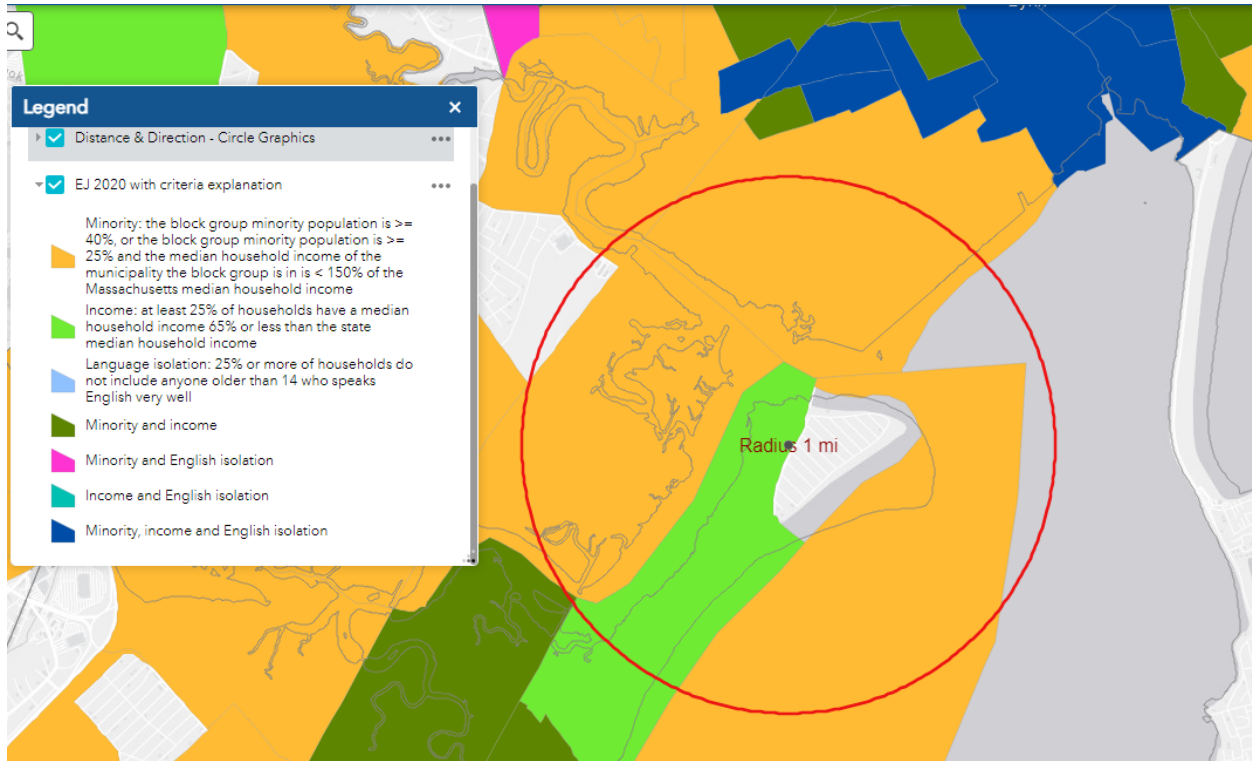
WONDERLAND TRANSIT-ORIENTED DEVELOPMENT

* THIS IS NOT THE OFFICIAL ZONING MAP

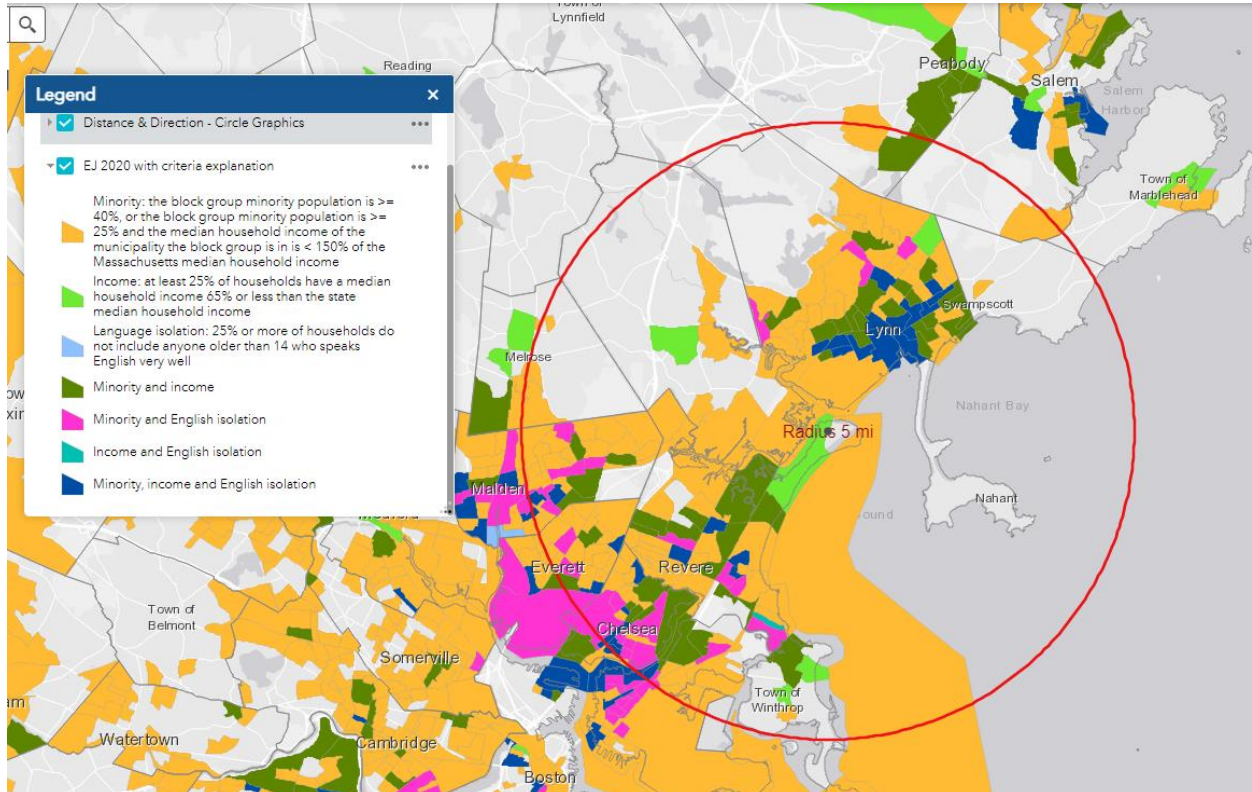
**ATTACHMENT 6
ENVIRONMENTAL JUSTICE
POPULATION MAP**

Brennan Consulting

ENGINEERING • TRANSPORTATION • SURVEYING

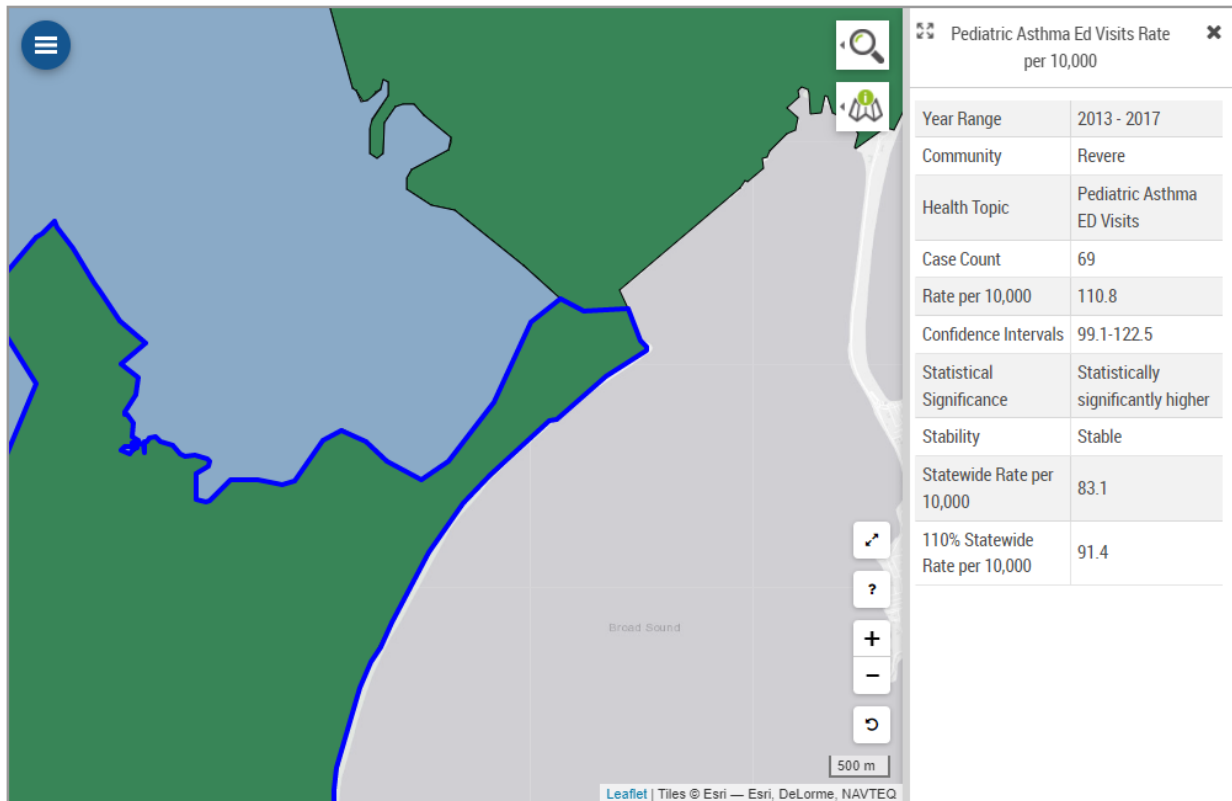


ENVIRONMENTAL JUSTICE POPULATION MAP – 1 MILE

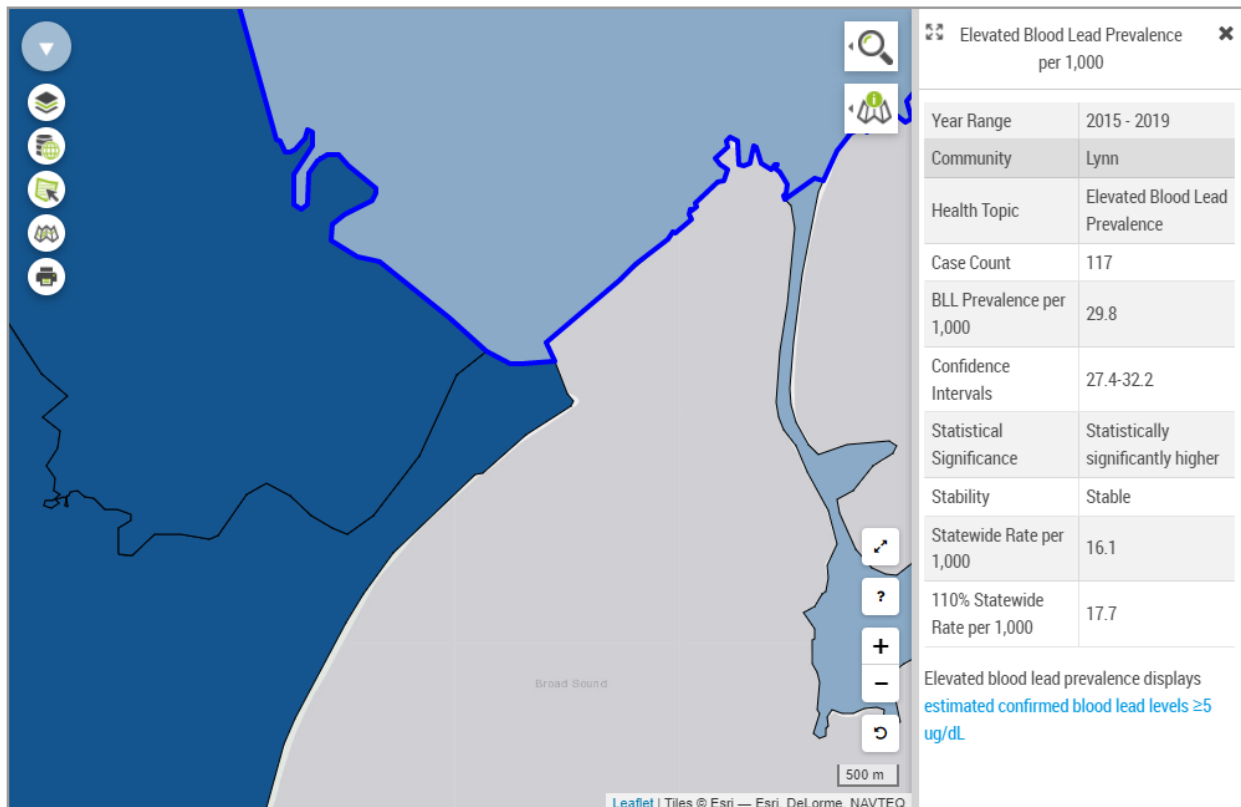


ENVIRONMENTAL JUSTICE POPULATION MAP – 5 MILES

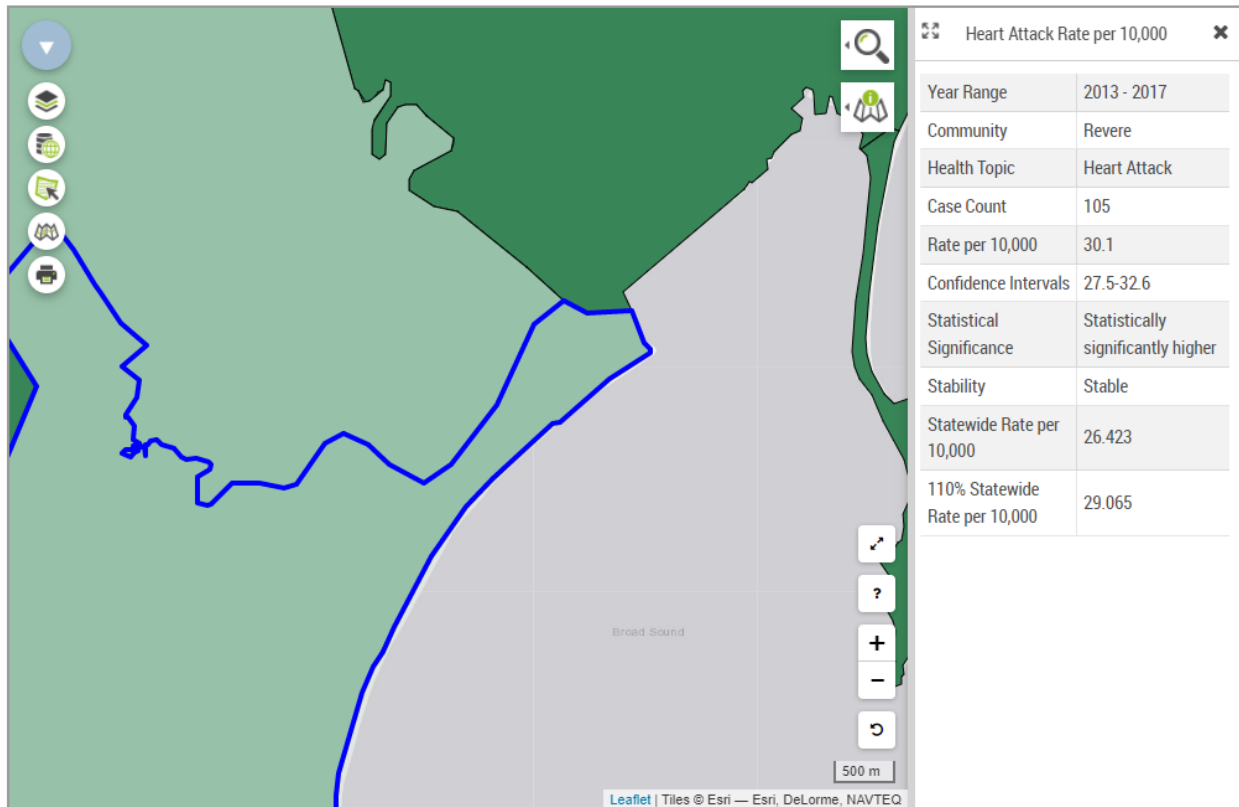
**ATTACHMENT 7
VULNERABLE HEALTH
EJ CRITERIA MAP**



PEDIATRIC ASTHMA RATES PER 10,000



ELEVATED BLOOD LEAD PREVALENCE PER 1,000

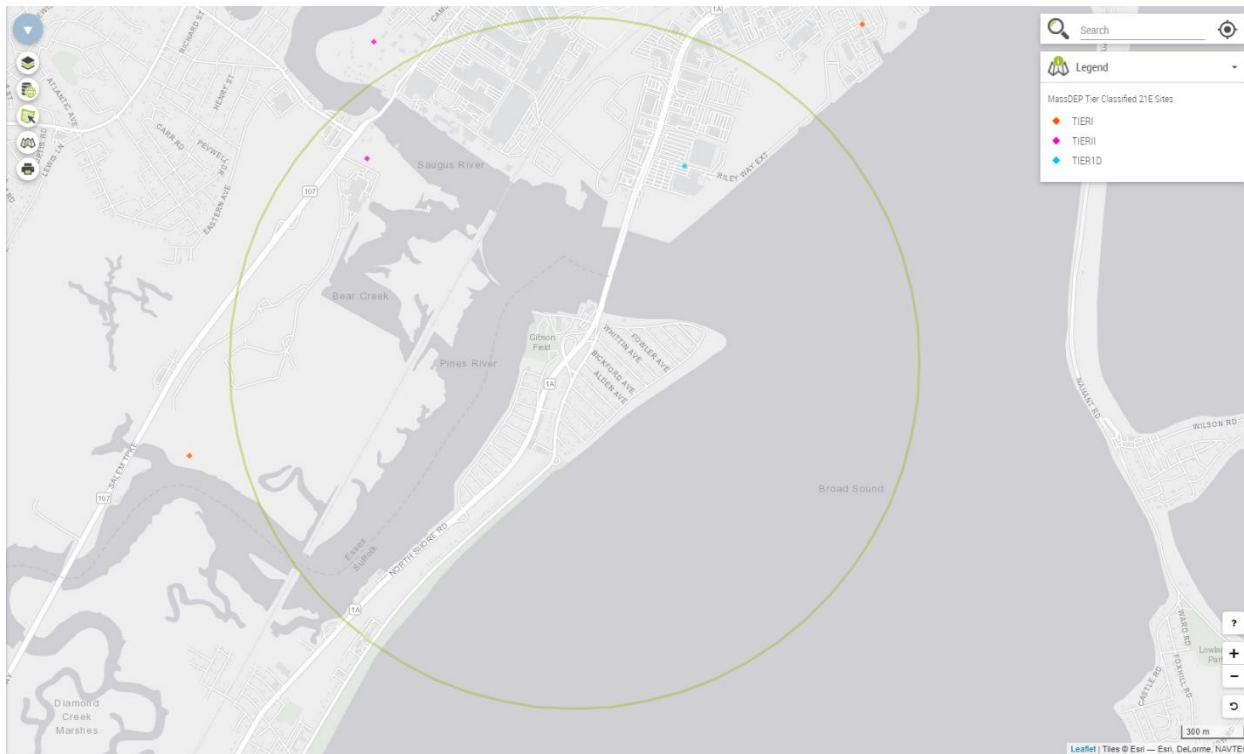


HEART ATTACK RATE PER 10,000



MAJOR AIR AND WASTE FACILITIES

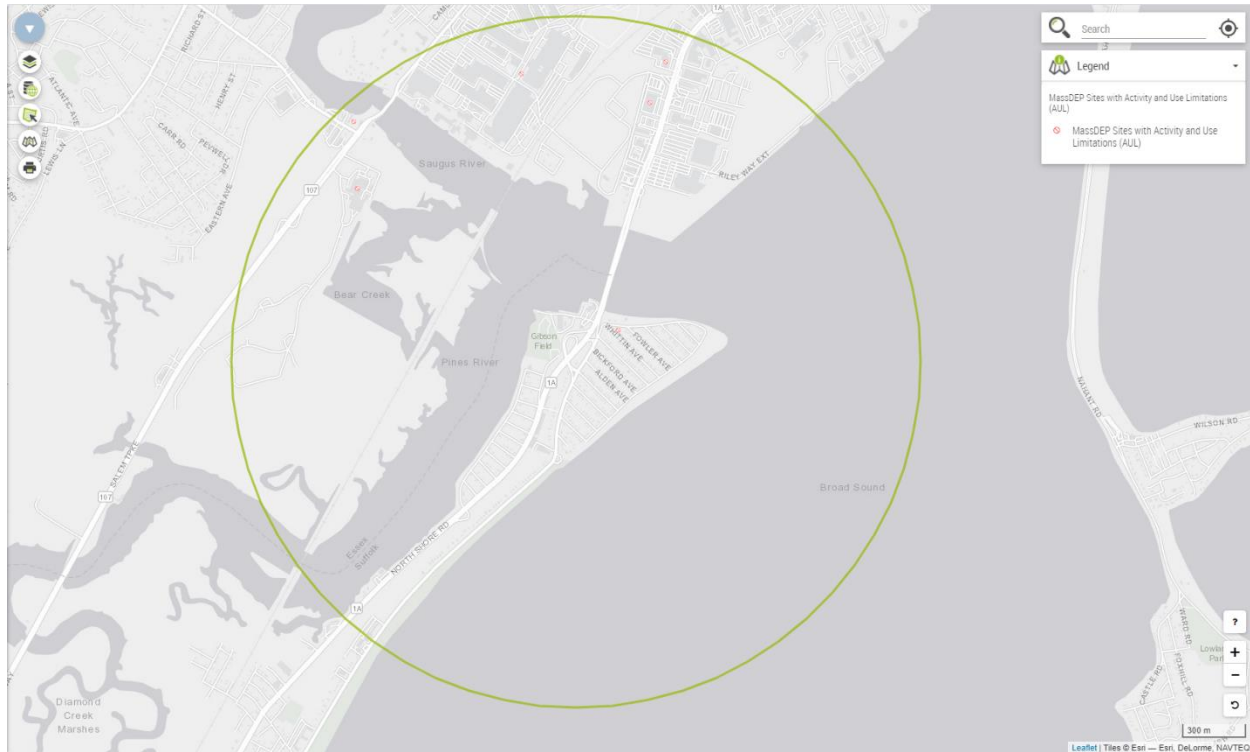
ENGINEERING • TRANSPORTATION • SURVEYING

**M.G.L. c. 21E SITE**

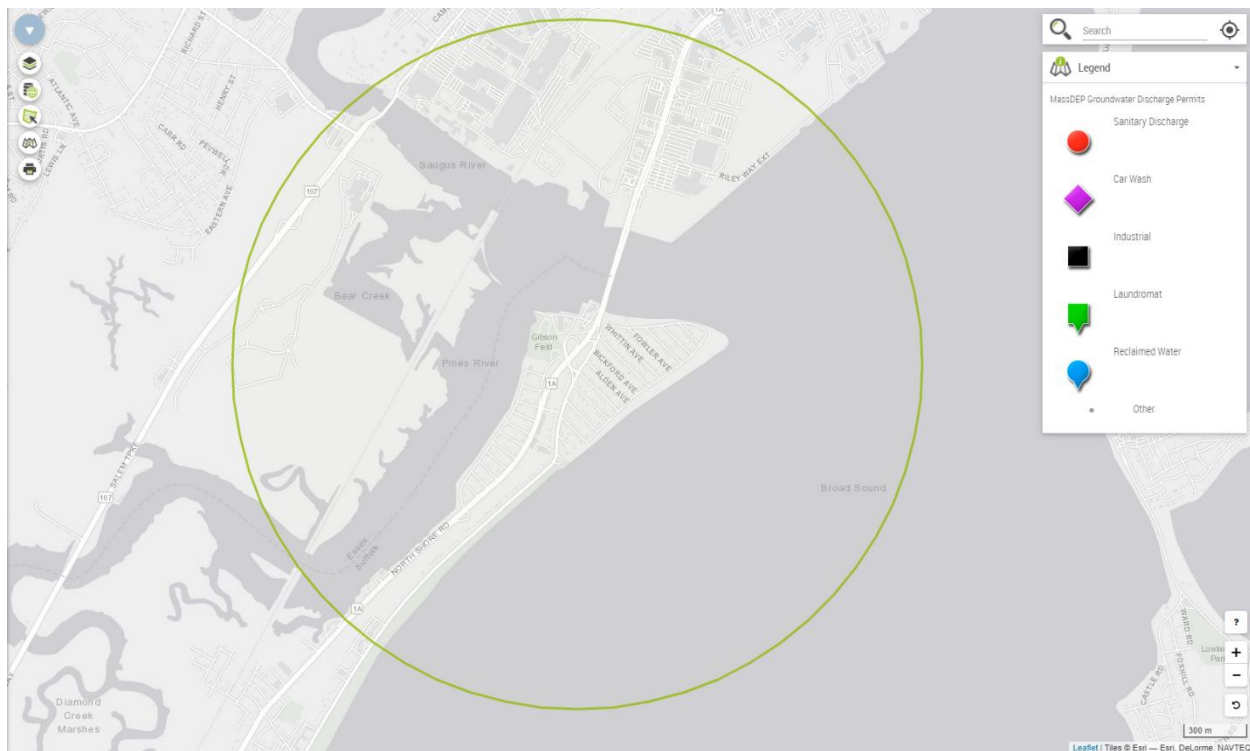
MASSDEP TIER II FACILITIES

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MASSDEP SITES WITH AUL



MASSDEP GROUNDWATER DISCHARGE PERMITS

Brennan Consulting

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WASTEWATER TREATMENT PLANTS



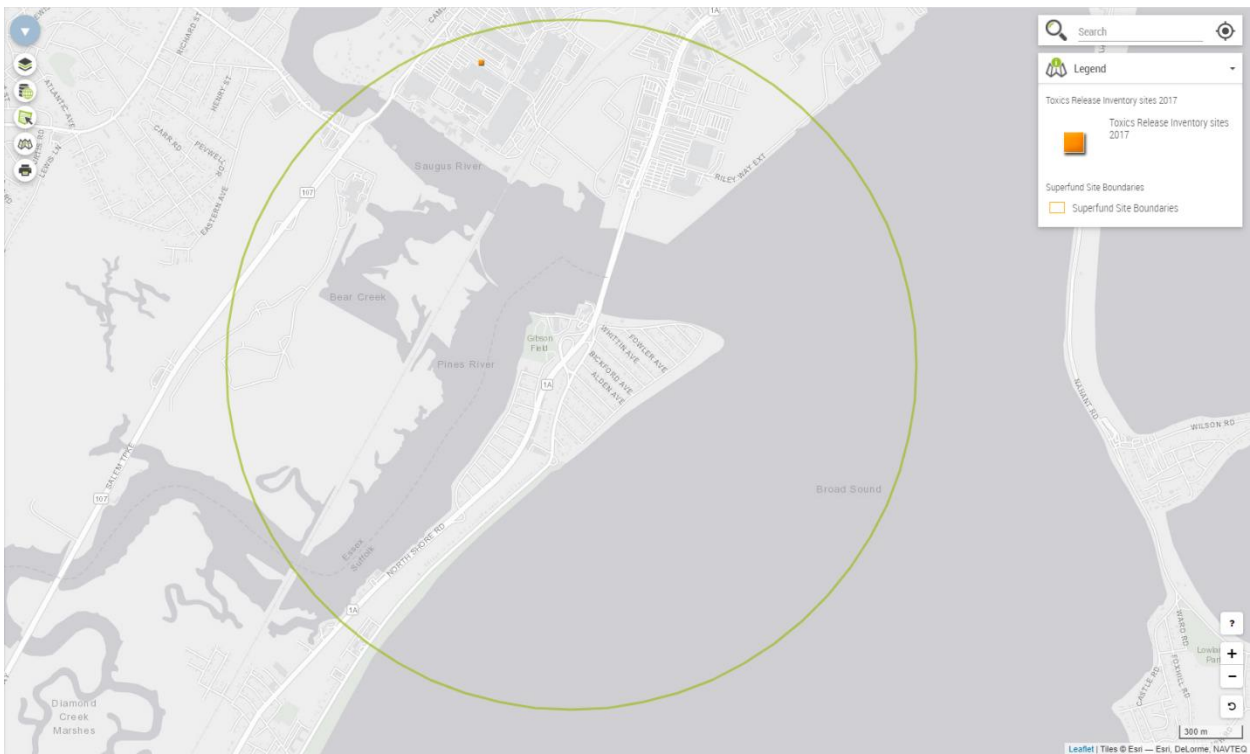
MASSDEP PUBLIC WATER SUPPLIERS

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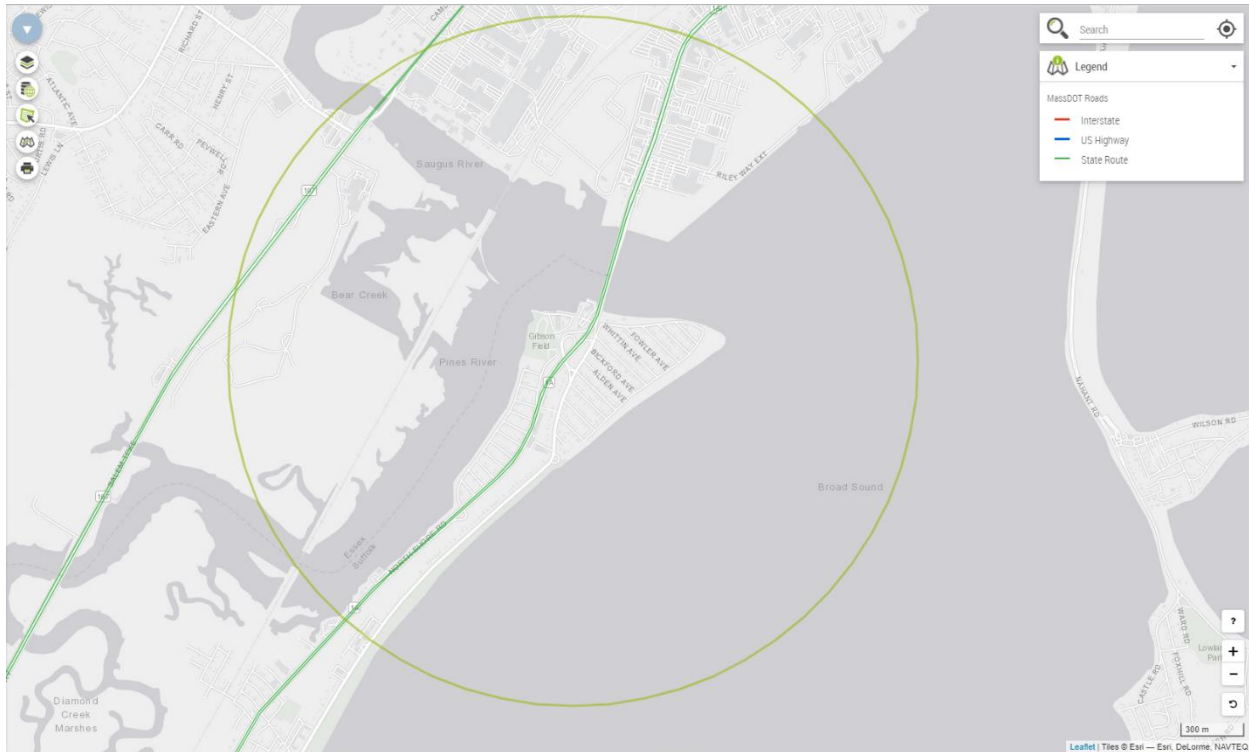
UNDERGROUND STORAGE TANKS



EPA FACILITIES

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ROAD INFRASTRUCTURE



MBTA BUS AND RAPID TRANSIT

Brennan Consulting

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OTHER TRANSPORTATION INFRASTRUCTURE



ENERGY GENERATION AND SUPPLY

ATTACHMENT 8
RMAT CLIMATE RESILIENCE DESIGN
STANDARDS TOOL PRINTOUT

RMAT Climate Resilience Design Standards Tool Project Report

140 Lynnway - Revere MA - Revised

Date Created: 2/24/2022 3:41:24 PM

Created By: cemilius

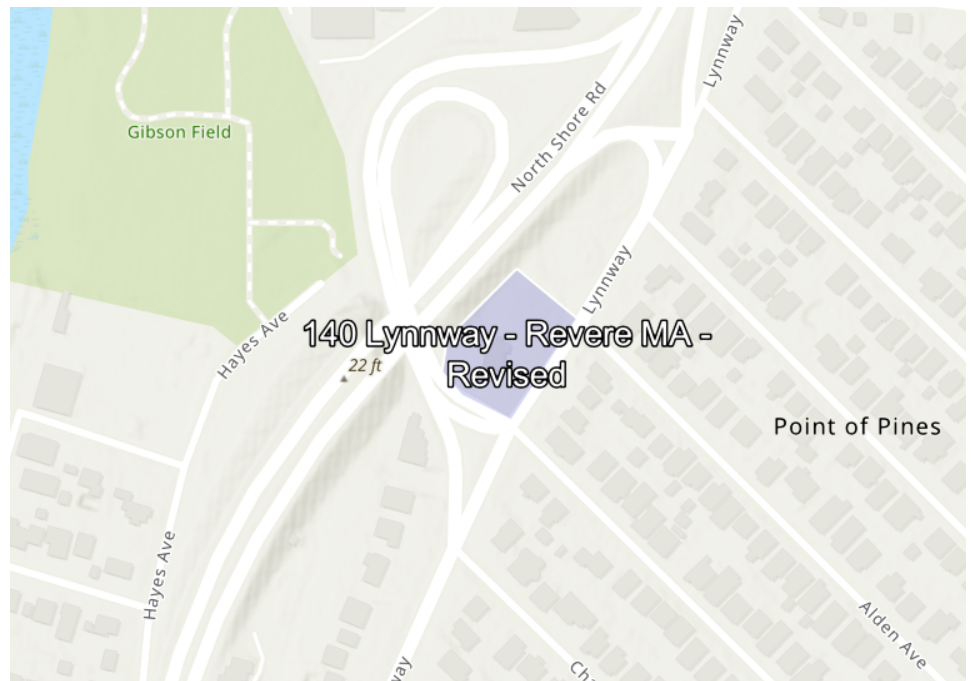
[Download](#)

Project Summary

[Link to Project](#)

Estimated Construction Cost: \$10400000.00
End of Life Year: 2072
Project within mapped Environmental Justice neighborhood: Yes

Ecosystem Benefits	Scores
Project Score	Low
Exposure	Scores
Sea Level Rise/Storm Surge	Moderate Exposure
Extreme Precipitation - Urban Flooding	High Exposure
Extreme Precipitation - Riverine Flooding	Not Exposed
Extreme Heat	High Exposure



Asset Summary

Number of Assets: 1

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
Alden Fire Department	High Risk	High Risk	Low Risk	High Risk

Project Outputs

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
Alden Fire Department	2070	2050		200-yr (0.5%)	Tier 3
Extreme Precipitation					
Alden Fire Department	2070			50-yr (2%)	Tier 3
Extreme Heat					
Alden Fire Department	2070		90th		Tier 3

Scoring Rationale - Exposure

Sea Level Rise/Storm Surge

This project received a "Moderate Exposure" because of the following:

- Exposed to the 1% annual coastal flood event as early as 2030
- Located within the 0.1% annual coastal flood event within the project's useful life
- Not located within the predicted mean high water shoreline by 2030

Extreme Precipitation - Urban Flooding

This project received a "High Exposure" because of the following:

- Increased impervious area
- Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life
- No historic flooding at project site

- Existing impervious area of the project site is between 10% and 50%

Extreme Precipitation - Riverine Flooding

This project received a "Not Exposed" because of the following:

- No historic riverine flooding at project site
- The project is not within a mapped FEMA floodplain [outside of the Massachusetts Coast Flood Risk Model (MC-FRM)]
- Project is more than 500ft from a waterbody
- Project is not likely susceptible to riverine erosion

Extreme Heat

This project received a "High Exposure" because of the following:

- 30+ days increase in days over 90 deg. F within project's useful life
- Increased impervious area
- Existing trees are being removed as part of the proposed project
- Less than 10% of the existing project site has canopy cover
- Located within 100 ft of existing water body

Scoring Rationale - Asset Risk Scoring

Asset - Alden Fire Department

Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Less than 10,000 people would be directly affected by the loss/inoperability of the asset
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would be expected to result in possible loss of life
- Inoperability is likely to significantly impact other facilities, assets, or buildings and will likely affect their ability to operate
- Impact on natural resources can be mitigated naturally with the inoperability of the asset

Project Design Standards Output

Asset: Alden Fire Department

Building/Facility

Sea Level Rise/Storm Surge

High Risk

Target Planning Horizon: 2070
Intermediate Planning Horizon: 2050
Return Period: 200-yr (0.5%)

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Tidal Datums: Yes

Note: The site is exposed to Sea Level Rise/Storm Surge, but projected Tidal Datums are not available within the site. Additional site-specific analyses are recommended to identify projected Tidal Datums for the recommended planning horizon. Consult a professional coastal engineer or modeler to estimate projected Tidal Datums based on the recommended Standards and additional outputs provided through this Tool.

Limitations: Tidal datums are recommended based on the user drawn polygon, user responses to the useful life of the selected asset, and intersection of the project polygon with the mean high water (MHW) polygon for 2030. Tidal datum values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the [link here](#). The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Water Surface Elevation: Yes

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Alden Fire Department	2050	0.5% (200-Year)	12.1	12	12.1
	2070		13.9	13.9	13.9

Limitations: Projected water surface elevations are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected water surface elevation values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass

Boston. For additional information on how these values were generated, review the [link here](#). The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Wave Action Water Elevation: Yes

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Alden Fire Department	2050	0.5% (200-Year)	13.6	12.1	13.1
	2070		15.8	14.3	15.5

Limitations: Projected dynamic flood elevations are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected dynamic flood elevation values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the [link here](#). The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Wave Heights: Yes

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(Feet)		
Alden Fire Department	2050	0.5% (200-Year)	2	0	1.3
	2070		2.5	0.5	2.1

Limitations: Projected wave heights are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected wave height values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the [link here](#). The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Duration of Flooding: Yes

Projected Design Flood Velocity: Yes

Projected Scour & Erosion: No

Extreme Precipitation

High Risk

Target Planning Horizon: 2070

Return Period: 50-yr (2%)

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: Yes

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
Alden Fire Department	2070	50-Year (2%)	9.6	Downloadable Methodology PDF

Limitations: While precipitation depth is useful for project planning and design, rainfall distribution and peak intensity of the design storm is recommended to also be considered. Lower-intensity, longer-duration storms allow time for infiltration and reduce the load on the infrastructure system over the duration of the storm. Higher-intensity, shorter-duration storms often have higher runoff volumes because the water does not have enough time to infiltrate and infrastructure systems (e.g., catch basins) and may overflow or back up during such storms. In the Northeast, short -duration high intensity rain events are becoming more frequent, and there is often little early warning for these events, making it difficult to plan operationally. These events can result in the rapid inundation of the asset project location. Design should consider both short- and long-duration precipitation events and how they may impact the asset.

The precipitation values provided by this Tool (version 1) are recommended to inform planning and design, but they do not guarantee that the asset will be protected from or be able to withstand an extreme precipitation event. The planning, design, and review guidance accompanying these values is general and projects are encouraged to do their own due diligence to understand the vulnerability of their asset.

Projected Riverine Peak Discharge & Peak Flood Elevation: No

Extreme Heat

High Risk

Target Planning Horizon: 2070

Percentile: 90th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: Yes

Projected Heat Index: Yes

Projected Growing Degree Days: No

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: Yes

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: Yes
Projected Cooling Degree Days & Heating Degree Days (base = 65°F): Yes

Project Inputs

Core Project Information

Name:	140 Lynnway - Revere MA - Revised
Given the expected useful life of the project, through what year do you estimate the project to last (i.e. before a major reconstruction/renovation)?	2072
Location of Project:	Revere
Estimated Capital Cost:	\$10,400,000
Who is the Submitting Entity?	City/Town Revere Cam Gosine (cgosine@brennanconsults.com)
Is this project identified as a priority project in the Municipal Vulnerability Preparedness (MVP) plan or the local or regional Hazard Mitigation Plan (HMP)?	No
Is this project being submitted as part of a state grant application?	No
Which grant program?	
What stage are you in your project lifecycle?	Permitting
Is climate resiliency a core objective of this project?	No
Is this project being submitted as part of the state capital planning process?	No
Is this project being submitted as part of a regulatory review process or permitting?	No
Brief Project Description:	Redeveloped fire station.
Project Submission Comments:	

Project Ecosystem Benefits

Factors Influencing Output

- ✓ Project reduces storm damage
- ✓ Project recharges groundwater
- ✓ Project filters stormwater using green infrastructure
- ✓ Project improves water quality

Factors to Improve Output

- ✓ Incorporate nature-based solutions that may provide flood protection
- ✓ Protect public water supply by reducing the risk of contamination, pollution, and/or runoff of surface and groundwater sources used for human consumption
- ✓ Incorporate strategies that reduce carbon emissions
- ✓ Incorporate nature-based solutions that sequester carbon carbon
- ✓ Increase biodiversity, protect critical habitat for species, manage invasive populations, and/or provide connectivity to other habitats
- ✓ Preserve, enhance, and/or restore coastal shellfish habitats
- ✓ Incorporate vegetation that provides pollinator habitat
- ✓ Identify opportunities to remediate existing sources of pollution
- ✓ Provide opportunities for passive and/or active recreation through open space
- ✓ Increase plants, trees, and/or other vegetation to provide oxygen production
- ✓ Mitigate atmospheric greenhouse gas concentrations and other toxic air pollutants through nature-based solutions
- ✓ Identify opportunities to prevent pollutants from impacting ecosystems
- ✓ Incorporate education and/or protect cultural resources as part of your project

Is the primary purpose of this project ecological restoration?

No

Project Benefits

Provides flood protection through nature-based solutions	No
Reduces storm damage	Yes
Recharges groundwater	Yes
Protects public water supply	No
Filters stormwater using green infrastructure	Yes
Improves water quality	Yes
Promotes decarbonization	No
Enables carbon sequestration	No
Provides oxygen production	No
Improves air quality	No
Prevents pollution	No
Remediates existing sources of pollution	No
Protects fisheries, wildlife, and plant habitat	No
Protects land containing shellfish	No
Provides pollinator habitat	No
Provides recreation	No
Provides cultural resources/education	No

Project Climate Exposure

Is the primary purpose of this project ecological restoration?	No
Does the project site have a history of coastal flooding?	No
Does the project site have a history of flooding during extreme precipitation events	No

(unrelated to water/sewer damages)?

Does the project site have a history of riverine flooding?

No

Does the project result in a net increase in impervious area of the site?

Yes

Are existing trees being removed as part of the proposed project?

Yes

Project Assets

Asset: Alden Fire Department

Asset Type: Typically Occupied

Asset Sub-Type: Emergency operations/response building (fire, police, etc.)

Construction Type: New Construction

Construction Year: 2022

Useful Life: 50

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.

Building must be accessible/operable at all times, even during natural hazard event

Identify the geographic area directly affected by permanent loss or significant inoperability of the building/facility.

Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss of use or inoperability of the building/facility.

Less than 10,000 people

Identify if the building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

If the building/facility became inoperable for longer than acceptable in Question 1, how, if at all, would it be expected to impact people's health and safety?

Inoperability of the building/facility would be expected to result in possible loss of life

If there are hazardous materials in your building/facility, what are the extent of impacts related to spills/releases of these materials?

There are no hazardous materials in the building/facility

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?

Significant – Inoperability is likely to impact other facilities, assets, or buildings and will likely affect their ability to operate

If this building/facility was damaged beyond repair, how much would it approximately cost to replace?

Less than \$10 million

Is this a recreational facility which can be vacated during a natural hazard event?

No

If the building/facility became inoperable for longer than acceptable in Question 1, what are the public and/or social services impacts?

Few alternative programs and/or services are available to support the community

If the building/facility became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?

Impact on natural resources can be mitigated naturally

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the building is not able to serve or operate its intended users or function)?

Loss of building may reduce the ability to maintain some government services, while a majority of services will still exist.

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts to loss of confidence in government (i.e. the building is not able to serve or operate its intended users or function)?

Reduced morale and public support

Report Comments

N/A

ATTACHMENT 9

SEIR DISTRIBUTION LIST

SEIR Distribution List

1. Massachusetts Environmental Policy Act (MEPA) Office

MEPA@mass.gov
MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02144

2. MassDEP – Boston Office

helena.boccadoro@mass.gov
Commissioner's Office
One Winter Street
Boston, MA 02108

3. MassDEP – Northeast Regional Office

john.d.viola@mass.gov
Attn: MEPA Coordinator
205B Lowell Street
Wilmington, MA 01887

4. MassDOT – Public/Private Development Unit

MassDOTPPDU@dot.state.ma.us
Public/Private Development Unit
10 Park Plaza, Suite #4150
Boston, MA 02116

5. MassDOT – District 4 Office

timothy.paris@dot.state.ma.us
Attn: MEPA Coordinator
519 Appleton Street
Arlington, MA 02476

6. Metropolitan Area Planning Council

mpillsbury@mapc.org
afelix@mapc.org
60 Temple Place, 6th Floor
Boston, MA 02111

7. Massachusetts Coastal Zone Management

robert.boeri@mass.gov
patrice.bordonaro@mass.gov
Coastal Zone Management
Attn: Project Review Coordinator
251 Causeway Street, Suite 800
Boston, MA 02114

8. Division of Marine Fisheries

DMF.EnvReview-North@mass.gov
DMF – North Shore
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930

9. Department of Conservation & Recreation

andy.backman@mass.gov
Attn: MEPA Coordinator
251 Causeway Street, Suite 600
Boston, MA 02114

10. EEA Environmental Justice Director - Rishi Reddi

MEPA-EJ@mass.gov
MEPA Office
Attn: EEA EJ Director
100 Cambridge Street, Suite 900
Boston, MA 02144

11. Department of Public Health

dphtoxicology@massmail.state.ma.us
Director of Environmental Health
250 Washington Street
Boston, MA 02115

12. Massachusetts Water Resource Authority

katherine.ronan@mwra.com
Attn: MEPA Coordinator
100 First Avenue
Charlestown Navy Yard
Boston, MA 02129

13. City of Revere:

a. City Council

Gerry Visconti
gvisconti@revere.org

b. Department of Planning and Community Development

Tech Leng
tleng@revere.org

c. Conservation Commission

concom@revere.org

d. Board of Health

Dr. Nathalee Kong
nkong@revere.org

e. Public Library

rev@noblenet.org

ATTACHMENT 10 GEOTECHNICAL REPORT

GEOTECHNICAL INVESTIGATION REPORT

PROPOSED ALDEN MILLS/POINT OF PINES FIRE STATION

140 Lynnway
Revere, Massachusetts

Prepared for:

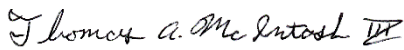
CBI Consultants, LLC
250 Dorchester Avenue
Boston, MA 02127

Prepared by:

John Turner Consulting, Inc.
356 Manchaug Road
Sutton, Massachusetts 01590

JTC Project No. 20-04-114

February 10, 2021



Thomas A. McIntosh III, PE
Senior Geotechnical Engineer
356 Manchaug Road
Sutton, MA 01590
Tmcintosh@consultjtc.com
Ph: (508) 446-6180



Judson Zachar, PE
Director of Geotechnical Engineering
356 Manchaug Road
Sutton, MA 01590
Judsonz@consultjtc.com
Ph: (508) 320-4668



February 10, 2021

Jennifer dos Santos, CDT, MCPPO, Associate A.I.A
Project Manager
CBI Consultants, LLC
250 Dorchester Ave.
Boston, Massachusetts 02127
D: 617.464.6965
C: 978.985.9317
F: 617.464.2971

**RE: Geotechnical Investigation Report
Proposed Alden Mills/Point of Pines Fire Station
140 Lynnway
Revere, Massachusetts**

Dear Ms. Dos Santos:

In accordance with our proposal and authorization to proceed, John Turner Consulting, Inc. (JTC) has performed a geotechnical investigation for the above captioned project. Presented herein and attached are the results of the site subsurface investigation, and our recommendations regarding the design and construction of the foundation, and other geotechnical related concerns or issues.

We appreciate the opportunity to assist you on this venture and we look forward to working with you on this project through its completion. Please do not hesitate to contact us if you have any questions or require additional information.

Sincerely,
JOHN TURNER CONSULTING, INC.

Thomas A. McIntosh III
Thomas A. McIntosh III, PE
Senior Geotechnical Engineer
356 Manchaug Road
Sutton, MA 01590
Tmcintosh@consultjtc.com
Ph: (508) 446-6180

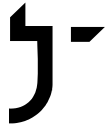
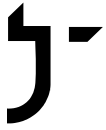


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1.0 INTRODUCTION

John Turner Consulting, Inc. (JTC) is pleased to present this *Geotechnical Investigation Report* for the proposed Fire Station to be located at 140 Lynnway in Revere, Massachusetts. JTC conducted geotechnical explorations and laboratory testing in January of 2021. Engineering evaluations were completed in general accordance with our proposed scope of services submitted to CBI Consultants, LLC on December 08, 2021. Our work was authorized on January 28, 2021.

The purpose of the geotechnical investigation was to obtain information on the subsurface conditions at the site and to provide geotechnical engineering recommendations to support the planning, design, and construction of the proposed development. This investigation did not include an assessment relative to oil, gasoline, solid waste, and/or other hazardous materials. Similarly, this investigation/evaluation did not include review of site design or construction issues such as infiltration systems, dry wells, underground utilities, protection of existing structures, retaining walls, temporary excavation support, and/or other site/temporary design issues unless specifically addressed herein.

This report summarizes available project information, presents the geotechnical exploration and laboratory testing programs, describes the subsurface conditions encountered, and provides geotechnical engineering recommendations to support the planning, design, and construction of the proposed development. The contents of this report are subject to the attached *Limitations*.

2.0 PROJECT INFORMATION

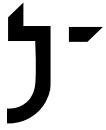
The following subsections provide general descriptions of the site, the regional geologic setting, and the proposed development.

2.1 Site Description

The site is presently occupied by the existing Fire Station and paved driveway, centrally located within a 15,283 s.f., irregularly shaped, property. The existing building will be demolished to make way for the new facility. The site is bounded by the Lynnway and MBTA access roadway to the south and east, the route 1A southbound on ramp to the west, and Massachusetts Route 1A to the north. The site is generally flat and level with grades ranging from EL.10.0± feet to EL. 12.0± feet. A highway berm rises approximately 18 feet from the northern edge of the property to the Route 1A roadway surface. The site is situated on a peninsula surrounded by the Atlantic Ocean.

2.2 Proposed Development

JTC understands the proposed development involves the construction of a new, 3-story facility, access road constructed at the north side of the building and connecting into the existing MBTA traffic circle, and associated parking areas. The existing fire station will be demolished. The intent is to support the building on conventional shallow spread footing foundations and a slab-on-



grade, i.e., no basement. The development will also include associated stormwater infiltration areas.

The site is generally flat and level and will require only minor cuts and/or fills of up to about 2 feet within the building site.

Preliminary structural loading has not been provided, however, based on JTC's experience with this type of construction we are anticipating the following approximate loading conditions:

- Exterior strip/wall footing loads will be on the order of 5 kips per linear foot or less;
- Column loads will range generally range from 100 to 150 kips;
- Live loads applied to the floor slab-on-grade will be on the order of 150 pounds per square foot (psf) or less.

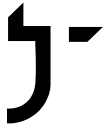
3.0 GEOTECHNICAL EXPLORATIONS

3.1 Subsurface Investigations

JTC subcontracted Soil Exploration Corp. to drill eight (8) geotechnical test borings (designated as B-1 through B-8, inclusive) via a truck-mounted Mobile B-57 drill rig. Test borings were drilled within close proximity to borings B-6 and B-7 for infiltration testing. Test boring B-4 was reinstated as a monitoring well with the well screen placed at 15.0 feet below the ground surface. JTC directed the drilling, testing, and sampling activities and logged the subsurface conditions encountered at each exploration location. The test boring locations were selected in relation to the existing site features and proposed development. The attached *Exploration Location Plan* depicts the approximate test boring locations.

The test borings were advanced to depths ranging from 9 to 27.0 feet below the ground surface (bgs) utilizing 4¼-inch inside-diameter continuous-flight hollow-stem-augers. As the borings were advanced, standard penetration tests (SPTs) were conducted at regular intervals and soil samples were obtained via 2-inch outside-diameter split-spoon samplers driven by a 140-pound safety (SAFE-T) hammer. SPTs were performed in general accordance with ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.

Selected soil samples were sealed in moisture-tight containers and returned to JTC's office for further review, classification, and/or geotechnical laboratory testing. Detailed records of the drilling/excavation, testing, sampling performed, and the soil, bedrock, and groundwater conditions observed at each test boring location are provided on the attached *Test Boring Logs*.



4.0 GEOTECHNICAL LABORATORY TESTING

JTC selected representative soil samples for geotechnical laboratory testing at our in-house laboratory. The following tests were performed:

- 7 Moisture contents;
- 7 Particle-size analyses;
- 2 Atterberg Limits tests;
- 4 hydrometer tests.

Geotechnical laboratory testing was performed in general accordance with ASTM procedures. Test results are provided on the attached *Geotechnical Laboratory Testing Reports*.

5.0 GEOTECHNICAL FIELD TESTING - INFILTRATION TESTING

JTC performed infiltration tests at the bottom of borings B-6 [IT-1] and B-7 [TP-2.] Testing was performed in accordance with the Massachusetts Stormwater Handbook: Volume 3, Chapter 1.

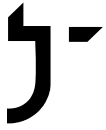
5.1 Testing Setup

At the bottom of each test pit, a clean, flat surface was prepared in the native soils approximately 4.75 feet bgs. A 4-inch diameter Schedule 40 PVC pipe was placed on the testing surface and the surrounding soils were tamped and secured around the pipe. Subsequently, JTC added approximately 2 inches of fine gravel inside the PVC pipe to prevent scouring and hydraulic conductivity laterally during testing. A 2 feet head of water was added to the pipe on January 19, 2021 and the soils left to soak for the next 24 hours.

5.2 Infiltration Test Procedure

JTC returned to the site the following day to perform infiltration testing at the prepared locations. The testing procedure consisted of:

- Filling the pipes with water to a depth of 2 feet above the bottom of pipe;
- Taking regular water level measurements over the following hour;
- Refilling the water after each hour and repeating the process for a total of four cycles.



5.3 Infiltration Test Results

The test results are summarized in the following tables:

Summary of Infiltration Testing

Infiltration Test #	Proximal Boring Designation	Depth (feet bgs)	Soil Type	Measured Infiltration Rate (in/hr)				Average Measured Rate (in/hr)
				Trial 1	Trial 2	Trial 3	Trial 4	
IT-1	B-6	4.75	SC-SM	0.125	0.125	0.125	0.125	0.125
IT-2	B-7	4.75	SC-SM	4.8	4.32	4.0	2.88	4.0

As presented in the tables above, JTC concludes that the silty clayey Sand (SC-SM) with gravel encountered at boring locations B-6/IT-1 and B-7/IT-2 exhibited infiltration rates of approximately 0.125 in/hr and 4.0 inches/hr, respectively.

No factors of safety have been applied to the measured rates presented in the table. JTC recommends applying a minimum safety factor of 2 to the measured rates for design purposes.

6.0 SUBSURFACE CONDITIONS

The following subsections describe the site soil, bedrock, and groundwater conditions encountered, based on results of the geotechnical explorations and laboratory testing. Detailed descriptions of the conditions observed at each test boring are provided on the attached *Test Boring Logs*.

6.1 Soils - Borings

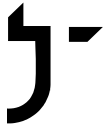
The overburden soils encountered at the test boring locations appear to be consistent with those described by the published geologic data. The primary soil strata are briefly described in the paragraphs below.

6.1.1 Asphalt-Concrete Pavement

Asphalt-concrete pavement was encountered at the ground surface of test boring B-8. The pavement was approximately 3 inches thick and was underlain by approximately 6 inches of granular pavement base.

6.1.2 Topsoil/Subsoil

Topsoil materials were encountered at the ground surface of borings B-1 through B-7. The Topsoil



consisted of brown sandy Silt (ML), with organics, rootlets and trace gravel. Where encountered, the thickness of the Topsoil was approximately 6 to 10 inches.

6.1.3 Fill

Fill materials were encountered beneath the asphalt-concrete pavement and/or topsoil at each test boring location. The Fill typically consisted of dark tan, silty clayey Sand (SC-SM) with gravel and dark, tan silty clayey Sand (SC-SM). Isolated layers of silty Sand (SM) with gravel and tan clayey Sand (SC) were observed in boring B-4 and B-5. Borings B-6 and B-7 were terminated in the fill at a depth of 9.0 feet bgs. The Fill was typically loose to medium dense based on SPT N-values.

6.1.4 Salt Marsh Deposits/Peat

Dark brown, fibrous Peat (PT) was observed within borings B-1 through B-4 from 7.5 feet to 10.0 feet bgs. Where encountered the peat was no more than 6 inches thick. The Peat was typically loose based on SPT N-values.

6.1.5 Marine Deposits

Marine Deposits consisting of grey Gravel with sand (GP); grey, silty Sand (SM); and grey Sand (SP-SC) with silty clay were encountered underlying the Fill to the full depth of boring at boring locations B-1 through B-5 and B-8. silty sand (SM) with little gravel were encountered beneath the Urban Fill in all boring locations with the exception of borings B-4 and B-4a. This stratum is interpreted to be Glacial Till and was about 2 to 8.5 feet thick. The Glacial Till was described as medium dense to very dense based on observations of drilling.

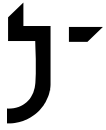
6.2 Bedrock

Practical refusal to further penetration of the augers and/or split-spoon sampler was not encountered at any boring location. Bedrock is not anticipated to impact construction.

6.3 Groundwater

Groundwater was encountered at all boring locations at a depth of 7.0 feet to 9.0 feet bgs at the time of drilling and upon completion of the drilling operations. Short-term (i.e., during drilling, upon completion of drilling, and/or a few hours after drilling) water levels observed in test borings performed in silty soils should be considered approximate.

JTC estimates that this investigation occurred during a period of seasonally normal to low ground water. Site groundwater levels should be expected to fluctuate seasonally and in response to precipitation events, construction activity, site use, and adjacent site use.



7.0 GEOTECHNICAL ANALYSIS & RECOMMENDATIONS

The evaluation of the site and the proposed development was based on the subsurface conditions encountered at the geotechnical test borings, results of geotechnical laboratory testing, preliminary site plans, and preliminary/assumed structural loading conditions, as described herein.

The Topsoil, Fill, and Peat materials are not suitable for direct support of shallow foundations. As such, JTC recommends that ground improvements [e.g., removal and replacement (R&R) of Existing Fill and/or installation of Aggregate Piers/Rigid Inclusions] be implemented to provide suitable bearing/support for shallow foundations and/or to minimize post-construction settlement of shallow foundations. Subsequent to the recommended ground improvements (i.e., R&R, Aggregate Piers/Rigid Inclusions, and/or equivalent), JTC believes that the proposed building can be supported on a system of continuous and/or isolated shallow spread footings bearing on Structural Fill and/or improved subgrade soils, provided that the design and construction recommendations presented herein are satisfied.

7.1 Removal and Replacement of Fill Option

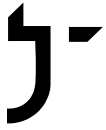
R&R of unsuitable soils within/beneath a proposed building pad is a common ground improvement method. R&R for the proposed development would involve the removal/excavation of all Existing Fill and Former Topsoil materials. These excavations/over-excavations would generally extend 7 to 10 feet bgs across the proposed building pad (i.e., footprint of the addition, plus about 5 to 10 feet laterally, as needed to accommodate the footing zone of influence, as described herein). These excavations/over-excavations may require temporary excavation to protect the existing site features and existing sidewalks.

The Fill material may be suitable to remain in place beneath the floor-slab-on-grade provided:

- The Existing Fill is subjected to proof-rolling densification with a minimum 10-ton vibratory roller utilizing a crisscross pattern of at least 8 passes. JTC should directly observe the proof-rolling/densification efforts to check for areas of instability, which are typically evidenced by pumping or weaving. Any unstable areas should be over-excavated and replaced with Structural Fill.
- JTC reviews the excavations/over-excavations for the footings/FZOI. Any organics, compressible matter, and other unsuitable materials observed will be subject to complete removal and replacement with Structural Fill.

7.2 Placement of Aggregate Piers and/or Rigid Inclusions Option

Alternatively, ground improvements consisting of Aggregate Piers and/or Rigid Inclusions may be considered. For this site, the boulders observed in the Fill may require selective excavation to facilitate the installation of Aggregate Piers and/or Rigid Inclusions. In general, Aggregate

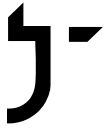


Pier/Rigid Inclusion foundation elements would be constructed by drilling (or displacing) 18-inch to 30-inch diameter cavities through the Fill and into the underlying native Glacial Till. The cavities are then backfilled with crushed stone that is densified with impact and/or vibratory compaction. The densification process pushes the crushed stone radially outward into the sidewalls of the cavities and thereby increasing the lateral stresses in the matrix soil surrounding the Aggregate Pier elements. The end product is the formation of very stiff aggregate elements that are extremely efficient in providing foundation support and reducing foundation settlement. Aggregate Piers are sometimes grouted (via Portland cement) where soft and/or organic soils are present. And, in some cases, the cavities are backfilled with concrete. The grouted and/or concrete elements are even stiffer than the traditional Aggregate Pier and are commonly referred to as Rigid Inclusions. Aggregate Piers and/or Rigid Inclusions are typically designed and constructed by a specialty design-build firm and/or Geo-Contractor. Some products included patented/licensed technology. The design of Aggregate Piers/Rigid Inclusions and/or equivalent should be completed by a Professional Engineer licensed in Massachusetts. The design should be provided as a *Technical Submittal*.

7.3 Site Preparation and Grading

Site preparation and grading should be performed in accordance with the following procedures:

- A geotechnical engineer should directly observe site preparation and grading activities;
- The site soils contain substantial proportions of fine sand, and silt, and may degrade and/or become unworkable when subjected to construction traffic or other disturbance during wet conditions. As such, site preparations, grading, and earthworks should be performed during a dry season if possible. The Contractor shall be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, grading (and compacting) exposed subgrades to promote surface water run-off, and maintaining an effective dewatering program, as necessary. Over-excavation to remove degraded or unworkable subgrade soils should be anticipated and budgeted (cost and schedule);
- Any existing buildings, structures, and/or associated foundations (including footings, foundation walls, slabs-on-grade, and/or basements) should be completely removed from proposed building and pavement areas and replaced/backfilled with properly placed and compacted *Structural Fill*;
- Any existing subsurface utilities and underground structures should be completely removed from the footprint of the proposed building and replaced/backfilled with properly placed and compacted *Structural Fill*. Any existing subsurface utilities in proposed pavement areas should be removed and/or appropriately abandoned in place (e.g., pressure grouting), as approved by the on-site geotechnical engineer;
- The site should be cleared and stripped of any existing asphalt-concrete pavement not



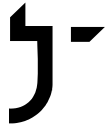
designated to remain; existing trees/vegetation not designated to remain; Topsoil, rootmat, forest mat; loamy/organic-laden Subsoil; and any otherwise unsuitable materials;

- In cut areas, the final foot of excavation should be performed using a smooth-edged cutting bucket (no teeth) to minimize subgrade disturbance;
- Following clearing, stripping, and/or cutting, the exposed subgrade soils should be proof-rolled with successive passes aligned perpendicularly. The proof-rolling/densification of the Existing Fill within the building pad (i.e., the building footprint plus about 5 feet laterally) should occur prior to the R&R operations for the proposed footings. Within the building pad, the exposed subgrade should be proof-rolled and subject to vibratory densification via at least 8 passes using a large (10-ton) smooth-drum roller and a crisscross pattern. Proof-rolling/densification should not be performed if/when the exposed subgrade soils are wet (i.e., due to presence of groundwater, stormwater, perched water, etc.) because this may result in soil pumping and instability. Therefore, the proof-rolling efforts, including the number of passes and whether to employ static or vibratory methods, should be directed by the on-site geotechnical engineer;
 - Any loose, soft, wet, and/or otherwise unsuitable soils (typically evidenced by rutting, pumping, and/or deflection of the subgrade) should be over-excavated to expose suitable soils, or other remedial measures should be taken, as approved by the on-site geotechnical engineer; and
 - The over-excavation should then be backfilled with properly placed and compacted *Structural Fill*.
- *Structural Fill* should be used for subgrade fill in the building pad. The placement of *Structural Fill* materials to achieve design subgrades in the building pad should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer;
- *Common Fill* is acceptable for subgrade fill in parking and driveway areas. The placement of *Common Fill* materials to achieve design subgrades in pavement areas should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer; and
- *Structural Fill* and *Common Fill* materials and placement and compaction requirements are provided in the attached Specifications.

7.4 Shallow Foundations and Foundation Walls

Based on the subsurface conditions encountered at the exploration locations and our current understanding and assumptions relative to the proposed development, the following foundation design recommendations are provided [note that the recommendations for shallow foundations assume that the recommended ground improvements (i.e. Remove & Replace, Aggregate Piers/Rigid Inclusions, and/or equivalent) will be completed:

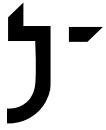
- The Urban Fill materials are not suitable for direct support of shallow foundations.



- The building can be supported on a system of continuous and/or isolated shallow spread footings bearing on improved Urban Fill and/or on *Structural Fill* or crushed stone built-up from properly prepared native soil subgrades;
- Following ground improvements (Rammed/Grouted Aggregate Piers and/or equivalent), shallow foundations may be designed using an allowable bearing pressure of approximately 5,000 psf. [An allowable bearing pressure of 3,000 psf may be used if the method of ground improvement is R&R only (i.e. Aggregate Piers/Rigid Inclusions are not used)]. Design bearing pressures may be increased by one-third ($\frac{1}{3}$) when considering seismic and or transient wind loading conditions;
- Continuous wall footings should have a minimum width of 2 feet. Isolated column footings should have a minimum width of 3 feet;
- Exterior footings should be founded at least 4 feet below the lowest adjacent grade to provide adequate frost protection. Interior footings in heated portions of the building should be founded at least 2 feet below FFE;
- Total post-construction settlements due to applied foundation loads are estimated to be on the order of 1 inch or less, based on strip footing widths and column footing widths of up to 3 feet and 5 feet, respectively. Differential settlements along continuous wall footings and/or between isolated column footings are estimated to be on the order of 0.5 inches or less. The estimated settlements and resulting angular distortion are anticipated to be within the allowable limits for this type of structure; and
- Recommended lateral earth pressures and friction factors for unbalanced/basement walls are provided in the attached *Specifications*.

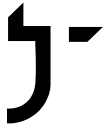
Recommendations for shallow foundation subgrade preparation and construction are provided as follows:

- A geotechnical engineer or his/her representative should directly observe foundation subgrade preparation activities;
- If shallow and/or perched groundwater is encountered, it must be continuously maintained at least 2 feet below the bottom of excavation and subsequent construction grade until the backfilling is complete;
- The native foundation subgrade soils will be sensitive to moisture and will readily disturb or soften if exposed to wet conditions during construction activities. Therefore, the final foot, at a minimum, of excavation for foundations should be performed using a smooth-edged cutting bucket (no teeth) to minimize subgrade disturbance. Furthermore, the exposed foundation subgrade should be protected with an 8-inch (minimum) thick layer of $\frac{3}{4}$ -inch minus crushed stone encased in a geotextile fabric (e.g., Mirafi 140N or equal). The crushed stone shall be placed immediately upon exposure of the native foundation subgrade soils and densified with a plate compactor until exhibiting stable conditions. The purpose of the crushed stone is to protect the fine-grained subgrade soils from disturbance, facilitate construction dewatering (if necessary), and provide a dry/stable



subgrade upon which to progress construction

- Prior to setting forms and placing reinforcing steel, a geotechnical engineer should directly observe footing subgrades;
 - Footing subgrades should be level or suitably benched and free of standing water and/or debris;
 - Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
 - Over-excavations should be backfilled with properly placed and compacted *Structural Fill* as approved by the on-site geotechnical engineer.
- Foundation subgrade soils should be protected against physical disturbance, precipitation, and/or frost throughout construction. Surface water run-on/run-off should be diverted away from open foundation excavations. The Contractor shall ultimately be responsible for the means and methods to protect the foundation subgrade during construction;
- Interior footings, piers, and/or walls and the interior side of balanced perimeter foundation walls should be backfilled with *Clean Granular Fill* and/or 3-inch minus material meeting the requirements of *Structural Fill*, as described in the attached *Tables*;
- Exterior footings, piers, and the exterior side of balanced foundation walls should be backfilled with non-frost-susceptible fill in order to mitigate potential adverse effects of frost. Backfill for exterior footings, piers, and foundation walls should consist of well-graded, free-draining, granular soil conforming to the requirements of *Clean Granular Fill*, as described in the attached *Specifications*. Alternatively, a suitable bond break (such as rigid polystyrene insulation) may be provided as approved by the on-site geotechnical engineer. In this case, footings and walls (excluding unbalanced/basement walls) may be backfilled with *Common Fill* (see attached *Specifications*) having a maximum particle-size of 3 inches, as approved by the on-site geotechnical engineer;
- Should bedrock be encountered during excavation for interior or exterior footings, JTC recommends that the bedrock be overexcavated a minimum of 12" and backfilled with compacted *Structural Fill* (see attached *Specifications*) to provide a "cushion" and level bearing surface for the proposed footing.
- Backfill for footings and foundation walls should be placed in uniform horizontal lifts having a maximum loose lift thickness of 8 inches and compacted to 95 percent of its modified proctor maximum dry density (MPMDD; per ASTM D1557). Thinner lifts may be required in order to achieve the required compaction criteria; and
- To minimize the potential for foundation wall damage during the backfill and compaction activities, it is recommended that foundation wall backfill be placed in a manner that maintains a balanced fill height on both sides of the wall (up to the final exterior grade).



7.5 Floor Slab-On-Grade

Design recommendations for the floor slab-on-grade are provided as follows:

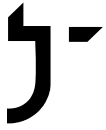
- A modulus of vertical subgrade reaction, k_{vi} , of 125 pounds per cubic inch (pci) should be available for structural design of the floor slabs-on-grade, provided that the subgrade, *Structural Fill*, and the *Crushed Stone Base* are prepared as recommended in Subsections 7.0, 7.1, 7.2, and 7.3;
- Basement floor slabs-on-grade should be underlain by a minimum 9-inch thick layer of 1-inch minus *Crushed Stone* to provide a capillary break and a stable working surface. Non-basement floor slabs-on-grade may be underlain by a minimum 9-inch thick layer of *Clean Granular Fill* to provide a capillary break and a stable working surface.
- The floor slab should be isolated structurally from foundation walls and columns/piers to allow for differential movement; and
- The need/desire to provide a moisture/vapor barrier beneath floor slab-on-grade should be evaluated by the architect and/or the structural engineer, based on the building's specific interior usage requirements.

During construction, we expect that much of the building footprint will be excavated or disturbed during site preparation and grading (Subsection 7.3), excavations for shallow foundations (Subsection 7.4), and/or excavations for new underground utilities. It is imperative that the subgrade beneath the floor slab-on-grade be reinstated with properly placed and compacted *Structural Fill* and/or prepared as recommended herein. Additionally:

- A geotechnical engineer should directly observe the subgrade soils prior to the placement of the recommended *Crushed Stone* base course;
 - The subgrade should be level and free of standing water and/or debris;
 - Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
 - Over-excavations should be backfilled with properly placed and compacted *Structural Fill*.
- The *Crushed Stone* base course should not be placed until the subgrade has been reviewed by the on-site geotechnical engineer. Subsequently, the Clean Granular Fill should be compacted to the satisfaction of the geotechnical engineer to 95% of its MPMDD.

7.6 Seismic Considerations

Earthquake loadings must be considered under the requirements of the current edition of the Massachusetts Building Code (MA-Code) which refer to the 2015 edition of the International Building Code (IBC). IBC Table 1613.5.2 is used to establish the site class based on the average



soil properties and soil profile. Site class is then used to determine the site coefficient and mapped spectral response for a given structure. Based on the conditions encountered at the test boring locations, the site is classified as:

Site Class D: Stiff Soil Profile.

Liquefaction refers to the loss of strength in saturated cohesionless soils due to the buildup of pore water pressures during cyclic or seismic loading. Based on the conditions encountered at the test boring locations, the site is NOT considered to be susceptible to liquefaction.

7.7 Re-Use of Site Soils

The Topsoil and Fill materials encountered at the exploration locations are not expected to be suitable for re-use as *Structural Fill*, *Clean Granular Fill*.

Some of the Fill encountered at the test boring locations may be suitable for re-use as *Common Fill*, provided that it is appropriately segregated from excessively silty fill, oversized boulders, debris/fragments, and/or otherwise unsuitable materials.

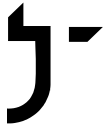
7.8 Construction Monitoring and Quality Control Testing

A qualified engineer or representative should be retained to review the site and subgrade operations, as required by Section 1705 of the Massachusetts State Building Code (MA-Code). Similarly, quality control testing, including in-place field density and moisture tests, should be performed to confirm that the specified compaction is achieved. It is recommended that JTC be retained to provide earthwork construction monitoring and quality control testing services.

Quality control testing recommendations are provided as follows:

- During site grading and foundation subgrade preparation, 3 field density tests should be performed for every 4,000 square feet (per lift) of *Structural Fill* placement, at a minimum. At least 3 tests should be performed on each lift of material even if the lift is less than 4,000 square feet;
- During foundation wall backfilling, 3 field density tests should be performed for every 100 linear feet (per lift) of fill placement, at a minimum. At least 3 tests should be performed on each lift of material even if the lift is less than 100 linear feet;
- During placement and compaction of *Clean Granular Fill* as the base course below sidewalks, 3 field density tests should be performed for every 4,000 square feet of placement. At least 3 tests should be performed on each lift of material even if the lift is less than 4,000 square feet;
- During backfilling of utility trenches, at least 1 test should be conducted on *Structural Fill* per 50 linear feet (per lift) of trench; and

During site grading and pavement subgrade preparation, 3 field density tests should be



performed for every 4,000 square feet (per lift) of *Common Fill*, at a minimum. At least 3 tests should be performed on each lift even if the lift is less than 4,000 square feet.

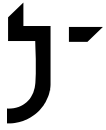
7.9 Additional Considerations

Additional design recommendations are provided as follows:

- Exterior concrete sidewalks shall be underlain by at least 12 inches of *Clean Granular Fill*. The thickness of the *Clean Granular Fill* shall be increased to no less than 18 inches for exterior concrete slabs located adjacent to exterior doorways and ramps to provide additional frost protection at building entry/exit points;
- Roof drains or similar features should be provided to collect roof run-off and prevent ponding near the building. Roof drains and other stormwater controls should not discharge to foundation drains;
- The exterior ground surface adjacent to the building should be sloped away from the building to provide for positive drainage. Similarly, the final surface materials adjacent to the building should be relatively impermeable to reduce the volume of precipitation infiltrating into the subsurface proximate to building foundations. Such impermeable materials include cement concrete, bituminous concrete, and/or vegetated silty/clayey topsoil; and
- Permanent fill or cut slopes should have a maximum slope of 2.5H:1V (horizontal to vertical) or flatter for dry conditions. Permanent fill or cut slopes should be no steeper than 3H:1V for wet/submerged conditions (e.g., stormwater basin) unless a properly designed surface slope stabilization system (e.g. rip rap, geosynthetics) is provided.

Additional construction considerations/recommendations are provided as follows:

- Safe temporary excavation and/or fill slopes are the responsibility of the Contractor. Excavations should be conducted in accordance with local, state, and federal (OSHA) requirements, at a minimum. If an excavation cannot be properly sloped or benched due to space limitations, adjacent structures, and/or seepage, the Contractor should install an engineered shoring system to support the temporary excavation;
- Subgrade conditions will be influenced by excavation methods, precipitation, stormwater management, groundwater control(s), and/or construction activities. Most of the site soils are poorly-drained, moisture-sensitive, and considered susceptible to disturbance when exposed to wet conditions and construction activities. As such, the Contractor shall be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, and maintaining an effective dewatering program, as necessary;
- Proper groundwater control and stormwater management are necessary to maintain site

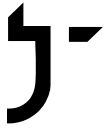


stability. Groundwater should be continuously maintained at least 2 feet below the working construction grade until earthworks and/or backfilling are complete;

- If groundwater seepage and/or wet soils due to shallow groundwater are observed, a $\frac{3}{4}$ -inch minus crushed stone base should be placed atop the exposed subgrade soils. The stone should be immediately placed atop the undisturbed subgrade and then tamped with a plate compactor until exhibiting stable conditions. The stone shall be protected, as required, with a geotextile filter fabric such as Mirafi 140N or equal. The purpose of the stone base is to protect the wet subgrade, facilitate dewatering, and provide a dry/stable base upon which to progress construction; and
- All slopes should be protected from erosion during (and after) construction.

8.0 CLOSING

We trust the contents of this report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.



APPENDIX A: LIMITATIONS

Explorations

1. The analyses and recommendations presented in this report are based in part upon the data obtained from widely-spaced subsurface explorations. Subsurface conditions between exploration locations may vary from those encountered at the exploration locations. The nature and extent of variations between explorations may not become evident until construction. If variations appear, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely-spaced explorations and samples; actual strata transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

Review

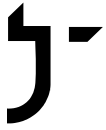
4. It is recommended that John Turner Consulting, Inc. be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the geotechnical engineering recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and conclusions of the report modified or verified in writing by John Turner Consulting, Inc.

Construction

6. It is recommended that John Turner Consulting, Inc. be retained to provide geotechnical engineering services during the installation phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Use of Report

7. This report has been prepared for the exclusive use of CBI Consultants, LLC for specific application to the project located at 140 Lynnway - Revere, Massachusetts. All considerations are based on the available information and is in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
8. This report has been prepared for this project by John Turner Consulting, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to preliminary geotechnical design considerations.



APPENDIX B: RECOMMENDED SOIL GRADATION & COMPACTION SPECIFICATIONS

TABLE 1: Structural Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
5-inch	100
¾-inch	60 - 100
No. 4	20 - 80
No. 200	0 - 10

NOTES:

1. For use as structural load support below foundations and within the building pad. Structural Fill placed beneath building foundations should include the Footing Zone of Influence which is defined as that area extending laterally one foot from the edge of the footing then outward and downward at a 1:1.5 (H:V) splay.
2. ¾-inch crushed stone may be used in wet conditions.
3. Structural Fill should be free of construction and demolition debris, frozen soil, organic soil, peat, stumps, brush, trash, and refuse;
4. Structural Fill should not be placed on soft, saturated, or frozen subgrade soils;
5. Structural Fill should be placed in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
6. Place and compact within $\pm 3\%$ of optimum moisture content.
7. Compact to at least 95% relative compaction per ASTM D1557.
8. The adequacy of the compaction efforts should be verified by field density testing.

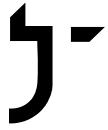


TABLE 2: Clean Granular Fill

Clean SIEVE SIZE	PERCENT PASSING BY WEIGHT
3-inch	100
¾-inch	60 – 90
No. 4	20 – 70
No. 200	2 – 8

NOTES:

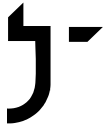
1. For minimum 9-inch base below floor slab-on-grade.
2. For minimum 18-inch base for exterior concrete slabs exposed to frost.
3. For minimum 24-inch base at exterior ramps, aprons, and loading bays adjacent to entrances/exit ways.
4. For use as footing and foundation wall backfill.
5. For use as backfill behind unbalanced foundation/retaining walls.
6. Place in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
7. Place and compact within $\pm 3\%$ of optimum moisture content.
8. Compact to at least 95% relative compaction per ASTM D1557.
9. Compaction efforts should be verified by field density testing.
10. Compact to at least 95% relative compaction per ASTM D1557 when placed as foundation wall backfill in conjunction with a bond break.
11. Compaction efforts should be verified by field density testing.

TABLE 3: Common Fill

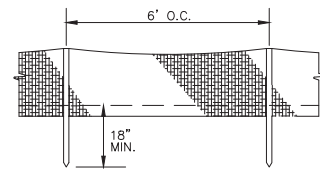
SIEVE SIZE	PERCENT PASSING BY WEIGHT
6-inch	100
¾-inch	60 – 100
No. 4	20 – 85
No. 200	0 – 25

NOTES:

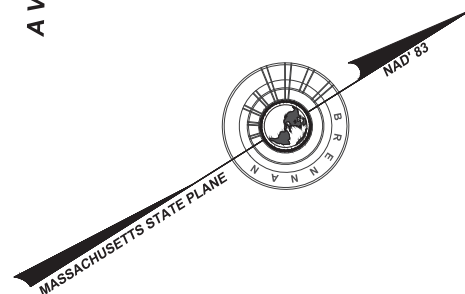
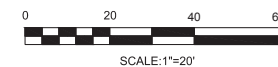
1. For use as common/subgrade fill in parking areas and roadway embankments.
2. For use as foundation wall backfill if used in conjunction with a bond break and sized/screened to 3-inch minus.
3. Place in lifts not exceeding 12 inches.
4. Maximum stone size should not exceed $\frac{1}{2}$ the actual lift thickness.
5. Compact to at least 92% relative compaction per ASTM D1557 when placed as subgrade fill in parking areas or roadway embankments.
6. Compact to at least 95% relative compaction per ASTM D1557 when placed as foundation wall backfill in conjunction with a bond break.
7. Compaction efforts should be verified by field density testing.



APPENDIX C: SITE PLAN & TEST BORING LOCATION PLAN



2' CONTOUR	----- 298 -----
10' CONTOUR	----- 300 -----
PROPERTY LINE	-----
BUILDING SETBACK LINE	-----
EDGE OF PAVEMENT	-----
EDGE OF GRAVEL	-----
STONE WALL	-----
FENCE	-----○-----
TREELINE	-----
STORM DRAIN LINE	-----
WATER LINE	-----
UNDERGROUND TELEPHONE	----- UG _T -----
GAS LINE	-----
OVERHEAD WIRES	-----
DRAIN MANHOLE	⊕
CATCH BASIN	□
FIRE HYDRANT	⋈
WATER VALVE	WV
WATER GATE	WV
GAS VALVE	GV
UTILITY POLE	⌚
GUY WIRE	UP-#
DI	DUCTILE IRON
RD	ROOF DRAIN
LSA	LANDSCAPED AREA
BOC	BOTTOM OF CURB
TOC	TOP OF CURB
PS	PARTICLE SEPARATOR
WCR	WHEELCHAIR RAMP



1. CONTRACTOR SHALL CONTACT DIG SAFE AT 1-888-DIG-SAFE AT LEAST SEVEN DAYS PRIOR TO ANY CONSTRUCTION ACTIVITIES.
2. INSTALL EROSION AND SILTATION DEVICES AS INDICATED ON THE DRAWINGS.
3. LEGALLY DISPOSE OF ALL DEMOLISHED MATERIALS OFF SITE. STOCKPILED TOPSOIL SHALL BE SCREENED FOR RE-USE AND EXCESS MATERIAL REMOVED FROM SITE.
4. TOPSOIL REMOVAL AND SUBGRADE EXPOSURE SHALL BE PERFORMED IN STAGES TO CONTROL EROSION AND SEDIMENT TRANSFER FROM SITE.
5. CONTRACTOR SHALL INSPECT EROSION CONTROL MEASURES DAILY AND PRIOR TO ANY PREDICTED STORM EVENT AND REPAIR AS NECESSARY.
6. ALL WORK SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS OF THE CITY OF REVERE AND SHALL BE BUILT IN A WORKMANLIKE MANNER IN ACCORDANCE WITH THE PLANS AND THE CITY OF REVERE STANDARD DETAILS AND SPECIFICATIONS.
7. GRANITE CURB REMOVED AND STACKED SHALL BE OFFERED TO THE DEPARTMENT OF CONSERVATION AND RECREATION FOR SALVAGE.

PROJECT 19954B

C-02

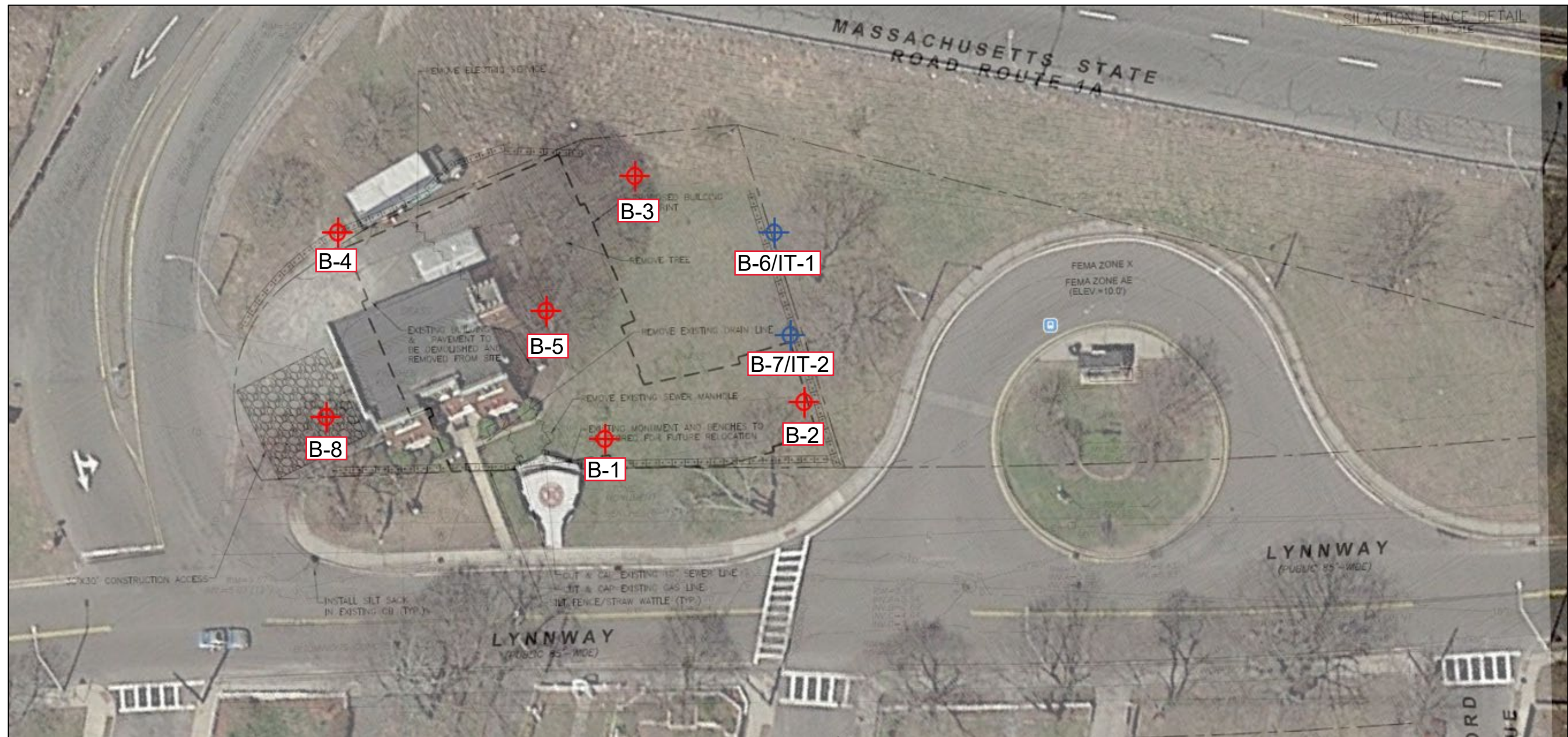
ATION & DEMO
LOCATED IN
140 LYNNWAY
REVERE, MA

PREPARED FOR

PREPARED FOR
WINTER STREET ARCHITECTS

DATE: X-X-2020

SCALE: 1" = 20'



Notes:

1. Test borings were performed on January 19 & 20, 2021 under the direction of JTC. Test boring locations should be considered approximate.
2. Refer to the Test Boring Logs for the subsurface conditions encountered at each exploration location.
3. Basemap source(s): 2020 “Boring Site Preparation and Demolition Plan”, prepared by Brennan Consulting – Burlington, MA.
4. Not to Scale.

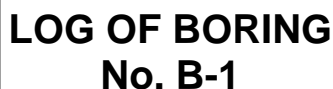
**CBI Consultants, LLC
250 Dorchester Avenue
Boston, Massachusetts 02127**

**Proposed Fire Station
140 Lynnway
Revere, Massachusetts**



TEST BORING LOCATION PLAN

APPENDIX D: TEST BORING LOGS & KEY TO SYMBOLS AND DESCRIPTIONS



PROJECT:	Alden Mills/Point of Pines - Proposed Fire Station	PROJECT NO.:	21-04-008
CLIENT:	Revere Fire Department		
PROJECT LOCATION:	140 Lynnway - Revere, MA		
LOCATION:	Refer To Test Boring Location Plan	ELEVATION:	G.S.
DRILLER:	Soil Exploration Corp.	LOGGED BY:	TMc
DRILLING METHOD:	4.25" ID HSA	DATE:	01-19-21
DEPTH TO - WATER> INITIAL:	8.0	AFTER 24 HOURS:	

[illegible]

Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-1

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-19-21
DEPTH TO - WATER> INITIAL: 8.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS
							Plastic Limit ——— Liquid Limit Water Content - • Penetration -
	-becomes loose -noxious odor observed			SS08	3 3 4 8		
	Grey, poorly graded, Sand (SP-SC) with silty clay; loose						
	Boring terminated at 27 ft.						
28							
31.5							
35							
38.5							
42							
45.5							
49							

Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-2

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-19-21
DEPTH TO - WATER> INITIAL: 8.5 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	TEST RESULTS				
						Plastic Limit ——— Liquid Limit Water Content - ● Penetration -				
0	[TOPSOIL] Dark brown, sandy Silt (ML), trace gravel, rootlets, organics; medium dense -no sample recovery;			SS01	3 6 8 13					
3.5				SS02	13 13 12 13					
5	[FILL] Dark tan, silty clayey Sand (SC-SM) with gravel; loose			SS03	5 5 2 4					
7				SS04	3 4 5 9					
8.5	[ORGANICS] Dark brown, Peat (PT); loose; wet									
10.5	[MARINE DEPOSITS] Dark grey, Gravel (GP-GM) with sand; medium dense			SS05	3 4 8 10					
14										
17.5	-becomes dense			SS06	12 15 15 27					
21	Grey, silty Sand (SM); medium dense			SS07	4 5 6 9					
24.5										





Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-2

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-19-21
DEPTH TO - WATER> INITIAL: 8.5 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit	—	Liquid Limit	Water Content - •	Penetration - 
							10	20	30	40	50
	-becomes loose -noxious odor observed			SS08	2 3 4 5						
	Grey, poorly graded, Sand (SP-SC) with silty clay; loose		26								
	Boring terminated at 27 ft.										
28											
31.5											
35											
38.5											
42											
45.5											
49											


Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-3

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-19-21
DEPTH TO - WATER> INITIAL: 9.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit	—	Liquid Limit	Water Content - •	Penetration - 
0	[TOPSOIL] Dark brown, sandy Silt (ML), trace gravel, rootlets, organics; loose			SS01	3 4 5 6						
3.5	[FILL] Dark tan, silty clayey Sand (SC-SM) with gravel; medium dense -red mottling observed in sample			SS02	6 7 7 8						
7	-becomes loose -shattered rock in spoon -orange color mottling observed in sample			SS03	4 4 4 4						
10.5	[ORGANICS] Dark brown, Peat (PT); medium dense; wet		10	SS05	12 9 12 18						
14	[MARINE DEPOSITS] Dark grey, Gravel (GP-GM) with sand; medium dense;		10.5								
17.5	Grey, silty Sand (SM); medium dense		16	SS06	6 9 15 18						
21				SS07	4 6 11 12						
24.5											


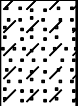
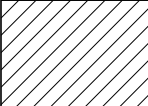
Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-3

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-19-21
DEPTH TO - WATER> INITIAL: 9.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS
							Plastic Limit Liquid Limit Water Content - • Penetration -  10 20 30 40 50
25	Grey, poorly graded, Sand (SP-SC) with silty clay; loose			SS08	6 11 12 14		
28	Boring terminated at 27 ft.						
31.5							
35							
38.5							
42							
45.5							
49							

Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-4

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-20-21
DEPTH TO - WATER> INITIAL: 7.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit	—	Liquid Limit	Water Content - ●	Penetration -
0	[TOPSOIL] Dark brown, sandy Silt (ML), trace gravel, rootlets, organics; medium dense			SS01	3 5 7 9						
	[FILL] Dark tan, silty clayey Sand (SC-SM) with gravel; medium dense		0.67	SS02	9 8 11 9						
3.5	-shattered rock in spoon			SS03	4 100/3						
7	Tan-grey, clayey Sand (SC); loose			SS04	1 2 3 6						
	[ORGANICS] Dark brown, Peat (PT); loose; wet		8.5								
10.5	[MARINE DEPOSITS] Dark grey, Gravel (GP-GM) with sand; medium dense; -peat observed in sample		10	SS05	5 11 11 11						
14				SS06	6 10 11 12						
17.5											
21	Grey, silty Sand (SM); medium dense			SS07	4 6 8 10						
24.5											

Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-4

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-20-21
DEPTH TO - WATER> INITIAL: 7.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS
							Plastic Limit ——— Liquid Limit Water Content - • Penetration -
	-noxious odor observed				3		
	Grey, poorly graded, Sand (SP-SC) with silty clay; medium dense		26.4	SS08	8		
	Boring terminated at 27 ft.				19		
					18		
28							
31.5							
35							
38.5							
42							
45.5							
49							














Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-5

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-20-21
DEPTH TO - WATER> INITIAL: 8.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit	—	Liquid Limit	Water Content - •	Penetration - 
0	[TOPSOIL] Dark brown, sandy Silt (ML), trace gravel, rootlets, organics; medium dense			SS01	3 4 7 9						
	[FILL] Tan-brown, silty Sand (SM) with gravel; medium dense -shattered rock in spoon tip			SS02	14 10 10 9						
3.5				SS03	5 5 6 10						
7	Dark tan, silty clayey Sand (SC-SM) with gravel; medium dense; wet			SS04	5 5 6 8						
10.5	[MARINE DEPOSITS] Dark grey, Gravel (GP-GM) with sand; medium dense;			SS05	5 10 11 10						
14				SS06	5 7 21 29						
17.5				SS07	5 10 15 12						
21	Grey, silty Sand (SM); medium dense										
24.5											

Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-5

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-20-21
DEPTH TO - WATER> INITIAL: 8.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS
							Plastic Limit ——— Liquid Limit Water Content - • Penetration -
	25'			SS08	6 10 9 9		10 20 30 40 50
	Grey, poorly graded, Sand (SP-SC) with silty clay; medium dense -noxious odor observed						
28	Boring terminated at 27 ft.						
31.5							
35							
38.5							
42							
45.5							
49							

Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-6/IT-1

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-20-21
DEPTH TO - WATER> INITIAL: 8.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	TEST RESULTS				
						% < #200	Plastic Limit	—	Liquid Limit	Water Content - •
0	[TOPSOIL] Dark brown, sandy Silt (ML), trace gravel, rootlets, organics; medium loose		0.67	SS01	5 4 5 15					
	[FILL] Dark tan, silty clayey Sand (SC-SM) with gravel; medium dense -becomes medium dense			SS02	22 9 9 9					
3.5	-becomes loose			SS03	4 4 4 4					
7	Tan, silty clayey Sand (SC-SM); medium dense		7	SS04	3 4 3 4					
	Boring terminated at 9 ft.									
10.5										
14										
17.5										
21										
24.5										

Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-7/IT-2

PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-20-21
DEPTH TO - WATER> INITIAL: 8.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit	—	Liquid Limit	Water Content - •	Penetration -
0	[TOPSOIL] Dark brown, sandy Silt (ML), trace gravel, rootlets, organics; loose			SS01	2 4 5 12						
3.5	[FILL] Dark tan, silty clayey Sand (SC-SM) with gravel; loose -becomes medium dense -shattered rock in spoon		0.83	SS02	14 14 12 9						
7	Tan, silty clayey Sand (SC-SM); traces of topsoil and roots in sample; dense -shattered rock in spoon -becomes medium dense			SS03	5 22 9 9						
				SS04	6 10 6 6						
10.5	Boring terminated at 9 ft.										
14											
17.5											
21											
24.5											














Test boring backfilled with soil cuttings upon completion.



LOG OF BORING No. B-8




























PROJECT: Alden Mills/Point of Pines - Proposed Fire Station **PROJECT NO.:** 21-04-008
CLIENT: Revere Fire Department
PROJECT LOCATION: 140 Lynnway - Revere, MA
LOCATION: Refer To Test Boring Location Plan **ELEVATION:** G.S.
DRILLER: Soil Exploration Corp. **LOGGED BY:** TMc
DRILLING METHOD: 4.25" ID HSA **DATE:** 01-20-21
DEPTH TO - WATER> INITIAL: 7.0 **AFTER 24 HOURS:**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit ——— Liquid Limit Water Content - • Penetration - 				
0	[PAVEMENT] 3" bituminous concrete pavement			SS01	8 7 7 9						
	[PAVEMENT BASE] Brown, silty Sand (SM) with gravel; medium dense		-0.25								
	[FILL] Dark tan, silty clayey Sand (SC-SM) with gravel; medium dense		-0.75	SS02	3 4 10 8						
3.5	-becomes loose										
	Tan-brown, silty Sand (SM) with gravel; loose		6	SS03	2 2 5 9						
7	[MARINE DEPOSITS] Dark grey, Gravel (GP-GM) with sand; medium dense; -peat observed in sample		7	SS04	9 10 6 6						
10.5				SS05	5 5 8 10						
	Boring terminated at 12 ft.										
14											
17.5											
21											
24.5											

Test boring backfilled with soil cuttings upon completion.

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS OVER 50% > No.200 SIEVE SIZE	GRAVELS MORE THAN 1/2 OF COARSE FRACTION > No.4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVELS WITH OVER 15% FINES	GM	Silty gravels, gravel-sand mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS MORE THAN 1/2 OF COARSE FRACTION < No.4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW	Well-graded sand or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH OVER 15% FINES	SM	Silty sand, sand-silt mixtures
				SC
FINE-GRAINED SOILS OVER 50% < No.200 SIEVE SIZE	SILTS & CLAYS LIQUID LIMIT 50% OR LESS		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
			HIGHLY ORGANIC SOILS	

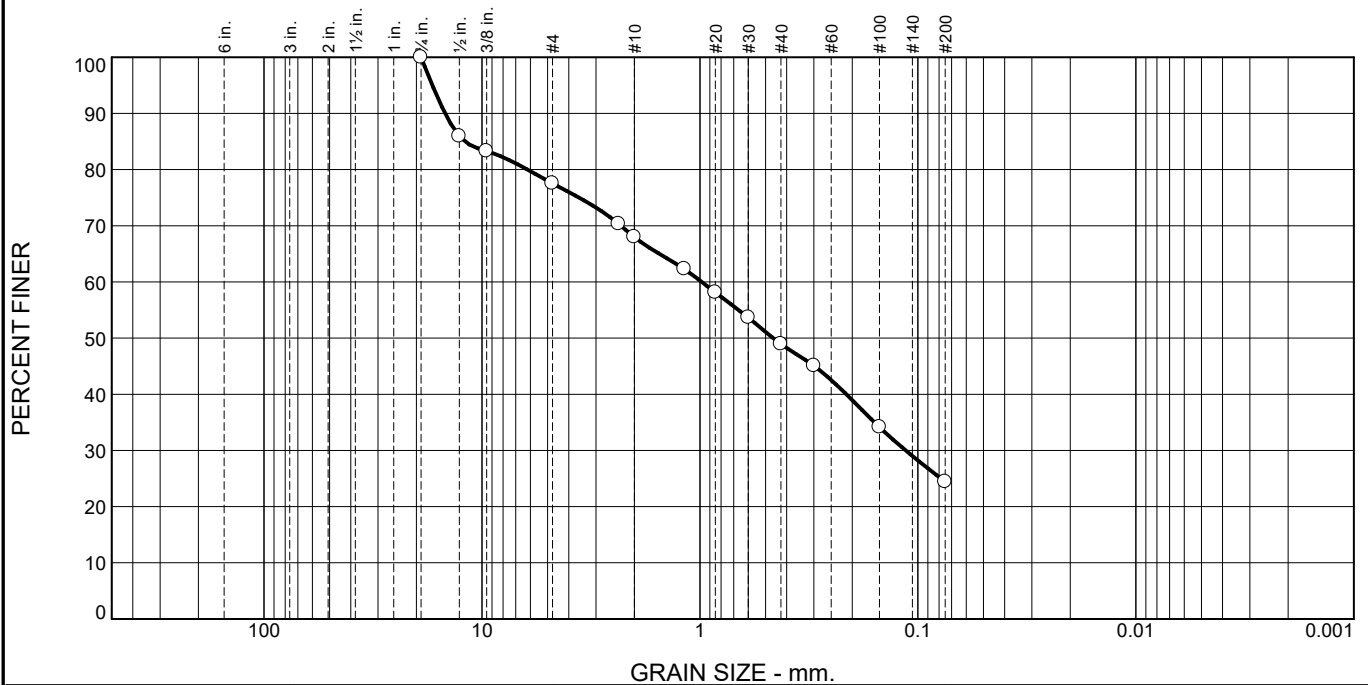
	
KEY TO SYMBOLS AND DESCRIPTIONS	
 Shelby Tube  Standard Split Spoon Sample  Rock Core  Vane Shear  Geoprobe Sample  Water Table (at time of drilling)	 Auger Cuttings  3" Split Spoon Sample  Dynamic Cone Penetrometer  Bulk/Grab Sample  Sonic or Vibro-Core Sample  Water Table (after 24 hours)
 Recessed Cover Set in Concrete  Top of Well, Recessed Pipe  Covered Riser  Capped Riser w/ Locking Cover  Pipe Riser  Concrete Seal  Gravel Backfill  Assorted Cuttings  Bentonite Slurry  Bentonite Pellets  Silica Sand, blank PVC  Slotted Pipe w/ Sand  Endcap on Pipe Packed in Sand  Silica Sand, No Pipe (End Plug)	
TYPICAL SYMBOLS	
SOIL MOISTURE MODIFIERS	
Term	Description
Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water
The descriptor "damp" should not be used (use "moist"). The descriptor "saturated" should not be used (use "wet").	
WELL SYMBOLS	

CLASSIFICATION	RANGE OF GRAIN SIZES		RELATIVE DENSITY/CONSISTENCY					PERCENT OR PORTIONS OF SOIL	
	U.S. Standard Sieve Size	Grain Size in Millimeters	Gravel, Sand, and Silt (nonplastic)		Silt (plastic) and Clay			Term	Description
BOULDERS	Above 12"	Above 305	N-Value	Relative Density	N-Value	Su	Consistency	Parting:	> 1/16 in.
COBBLES	12" to 3"	305 to 76.2	0 - 4	Very Loose	0 - 2	0 - 250	Very Soft	Seam:	0.5 in. to 1/16 in.
GRAVEL coarse fine	3" to No. 4 3" to 3/4" 3/4" to No. 4	76.2 to 4.75 76.2 to 19.1 19.1 to 4.75	5 - 10	Loose	3 - 4	251 - 500	Soft	Layer:	12 in. to 0.5 in.
			11-30	Medium Dense	5 - 8	501 - 1000	Medium Stiff	Stratum:	> 12 in.
			31 - 50	Dense	9 - 15	1001 - 2000	Stiff	Pocket:	Small erratic deposit
SAND coarse medium fine	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200	4.75 to 0.075 4.75 to 2.00 2.00 to 0.425 0.425 to 0.075	51 +	Very Dense	16 - 30	2001 - 4000	Very Stiff	Lens:	Lenticular deposit
					31 +	4001+	Hard	Occasional:	One or less per foot of thickness
			Standard Penetration Testing (SPT) N ₆₀ based on blows per 12 inches. WR = Weight of Rods; WH = Weight of Hammer					Frequent	More than one per foot of thickness
SILT & CLAY	Below No. 200	Below 0.075						Varved	Alternating seams or layers of silt and/or clay and sometimes f. sand

REFERENCE: UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488-93

APPENDIX E: GEOTECHNICAL LABORATORY TESTING REPORTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	22.5	9.5	19.1	24.5	24.4	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	86.0		
3/8"	83.3		
#4	77.5		
#8	70.3		
#10	68.0		
#16	62.3		
#20	58.1		
#30	53.6		
#40	48.9		
#50	45.1		
#100	34.1		
#200	24.4		

* (no specification provided)

Material Description

Dark brown silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= - LL= - PI= -

Classification

USCS (D 2487)= SM AASHTO (M 145)= -

Coefficients

D₉₀= 14.7642 D₈₅= 11.9693 D₆₀= 0.9811
D₅₀= 0.4619 D₃₀= 0.1137 D₁₅=
D₁₀= C_u= C_c=

Remarks

Moisture content 10.7%

Date Received: 1/22/2021 Date Tested: 1/26/2021

Tested By: Matt Watson

Checked By: Rob Faria

Title: Lab Manager

Location: B-5 SS02

Sample Number: 3521-047

Depth: 2'-4'

Date Sampled: 1/22/2021



Client: City of Revere
Project: Alden Mills/Point of Pines Fire Station
Revere, MA

Project No: 20-04-114

Figure 047A

PERCENT FINER

GRAIN SIZE - mm.

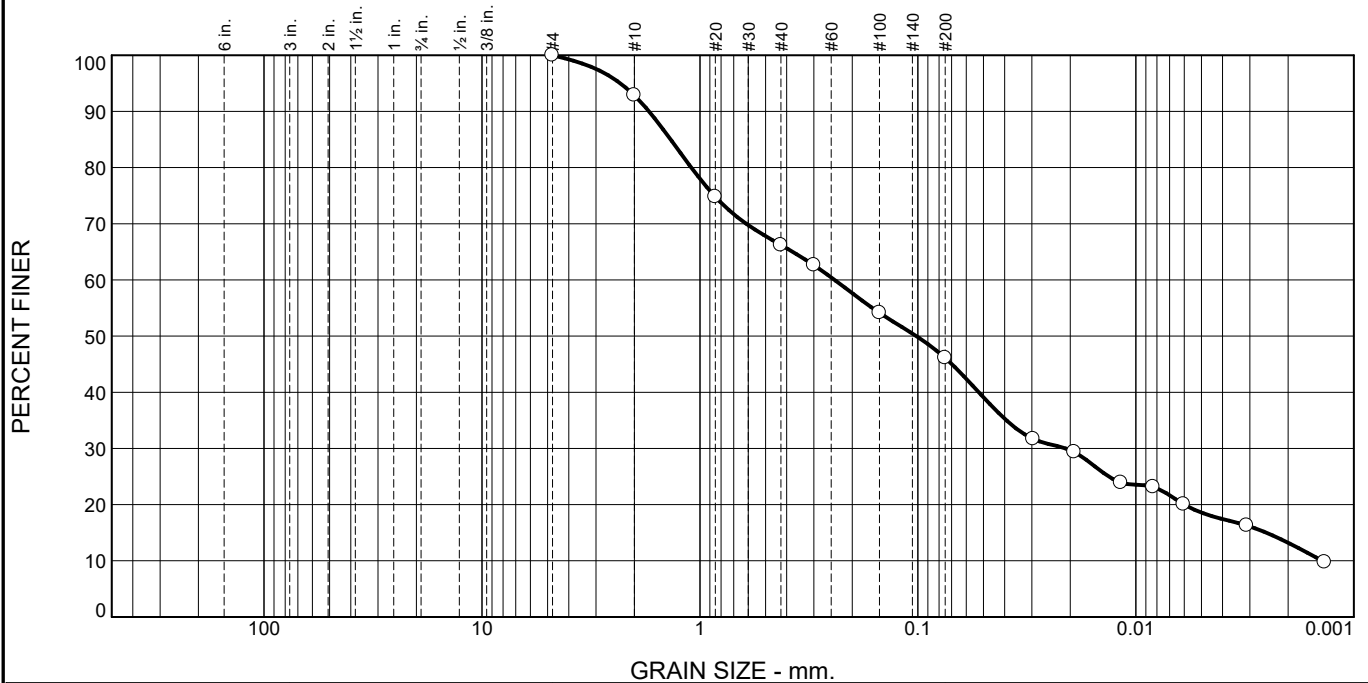
Grain Size (mm)	Percent Finer (%)
6 in.	100
3 in.	100
2 in.	100
1 1/2 in.	100
1 in.	100
3/4 in.	90
1/2 in.	83
3/8 in.	78
#4	60
#10	46
#20	43
#30	40
#40	37
#60	32
#100	27
#140	19
#200	18
0.075 mm (#200)	15
0.06 mm (#250)	14
0.05 mm (#300)	12
0.0425 mm (#40)	11
0.03 mm (#60)	9
0.025 mm (#60)	8

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	88.8		
1/2"	82.9		
3/8"	77.8		
#4	58.8		
#10	45.6		
#20	42.6		
#40	38.8		
#50	36.8		
#100	31.6		
#200	26.5		
0.0318 mm.	18.8		
0.0203 mm.	18.2		
0.0121 mm.	15.2		
0.0087 mm.	13.5		
0.0063 mm.	11.1		
0.0032 mm.	8.8		
0.0014 mm.	5.6		

Title: Lab Manager

Figure 045A

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	7.1	26.7	20.1	27.5	18.6

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	92.9		
#20	74.8		
#40	66.2		
#50	62.6		
#100	54.1		
#200	46.1		
0.0295 mm.	31.7		
0.0192 mm.	29.3		
0.0117 mm.	23.9		
0.0083 mm.	23.1		
0.0060 mm.	20.1		
0.0031 mm.	16.3		
0.0014 mm.	9.8		

* (no specification provided)

Material Description

Light brown silty, clayey sand

Atterberg Limits (ASTM D 4318)

PL= 15 LL= 21 PI= 6

Classification

USCS (D 2487)= SC-SM AASHTO (M 145)= -

Coefficients

D₉₀= 1.7136 D₈₅= 1.3628 D₆₀= 0.2410
D₅₀= 0.1017 D₃₀= 0.0210 D₁₅= 0.0025
D₁₀= 0.0014 C_u= 172.44 C_c= 1.31

Remarks

Moisture content 14.6%

Date Received: 1/22/2021 Date Tested: 1/29/2021

Tested By: Matt Watson

Checked By: Rob Faria

Title: Lab Manager

Location: B-7/ IT-2 SS03

Sample Number: 3521-046

Depth: 5'-7'

Date Sampled: 1/22/2021

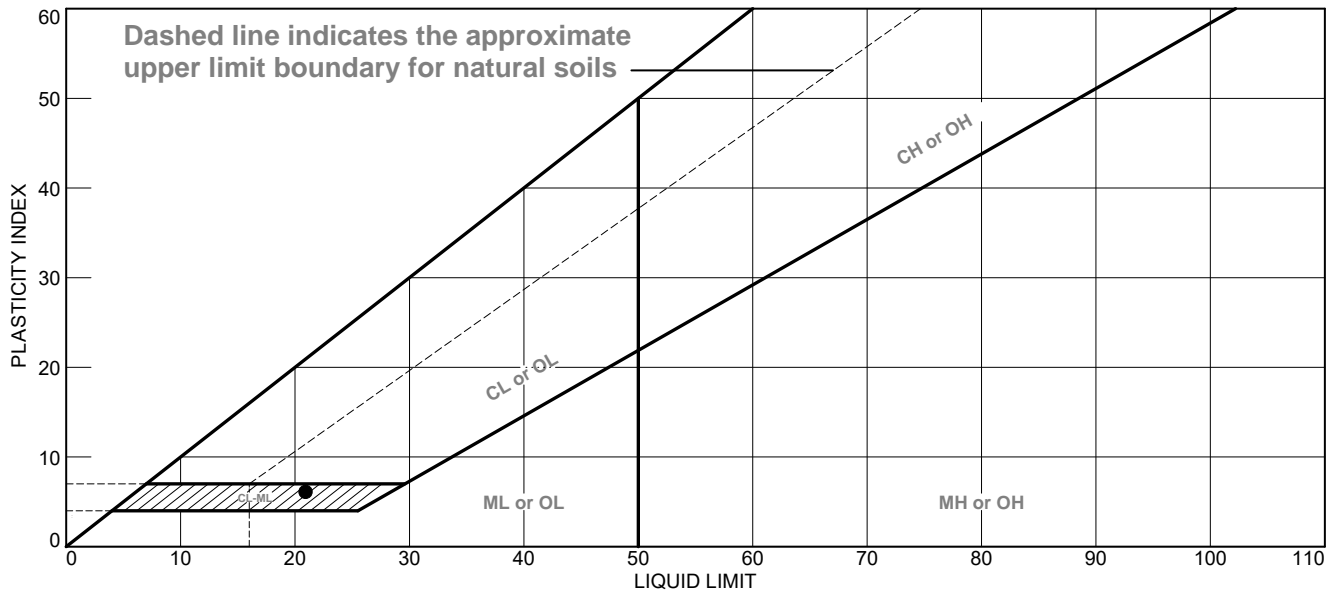


Client: City of Revere
Project: Alden Mills/Point of Pines Fire Station
Revere, MA

Project No: 20-04-114

Figure 046A

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light brown silty, clayey sand	21	15	6	66.2	46.1	SC-SM

Project No. 20-04-114 **Client:** City of Revere
Project: Alden Mills/Point of Pines Fire Station
 Revere, MA
Location: B-7/ IT-2 SS03
Sample Number: 3521-046 **Depth:** 5'-7'

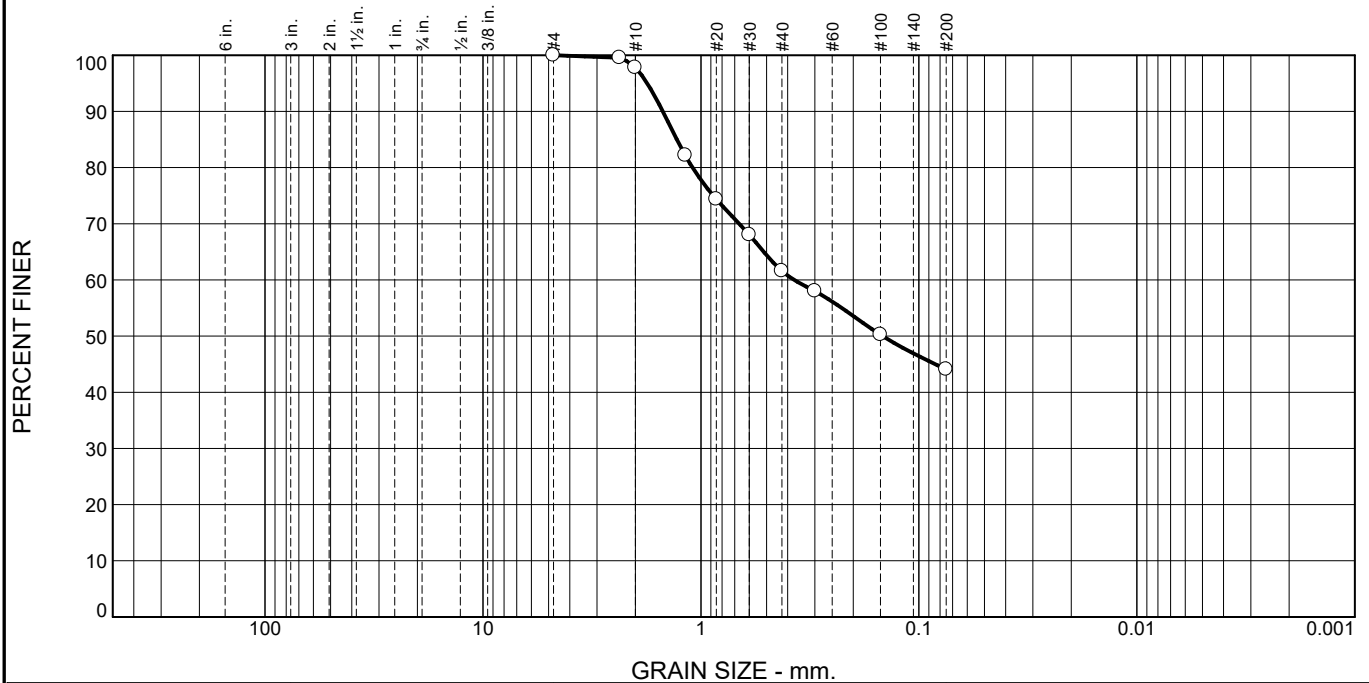


Remarks:

Figure 046B

Tested By: Matt Watson **Checked By:** Rob Faria

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.2	36.2	17.5	44.1	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.5		
#10	97.8		
#16	82.2		
#20	74.4		
#30	68.0		
#40	61.6		
#50	58.0		
#100	50.3		
#200	44.1		

* (no specification provided)

Material Description		
Light gray clayey sand		
Atterberg Limits (ASTM D 4318)		
PL= 15	LL= 24	PI= 9
Classification		
USCS (D 2487)= SC	AASHTO (M 145)= -	
Coefficients		
D ₉₀ = 1.4969	D ₈₅ = 1.2903	D ₆₀ = 0.3737
D ₅₀ = 0.1465	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
Remarks		
Moisture content 15.2%		
Date Received: 1/21/2021		Date Tested: 1/29/2021
Tested By: Matt Watson		
Checked By: Rob Faria		
Title: Lab Manager		

Location: B-4 SS04
Sample Number: 3521-048 Depth: 7'-9'

Date Sampled: 1/21/2021

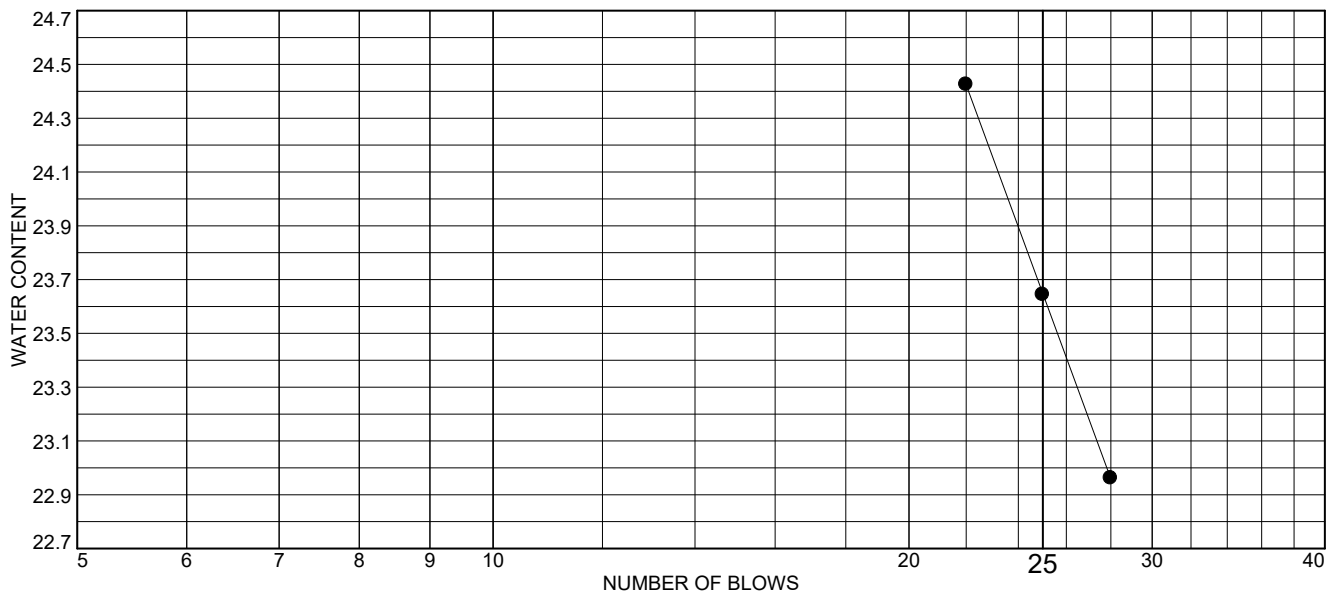
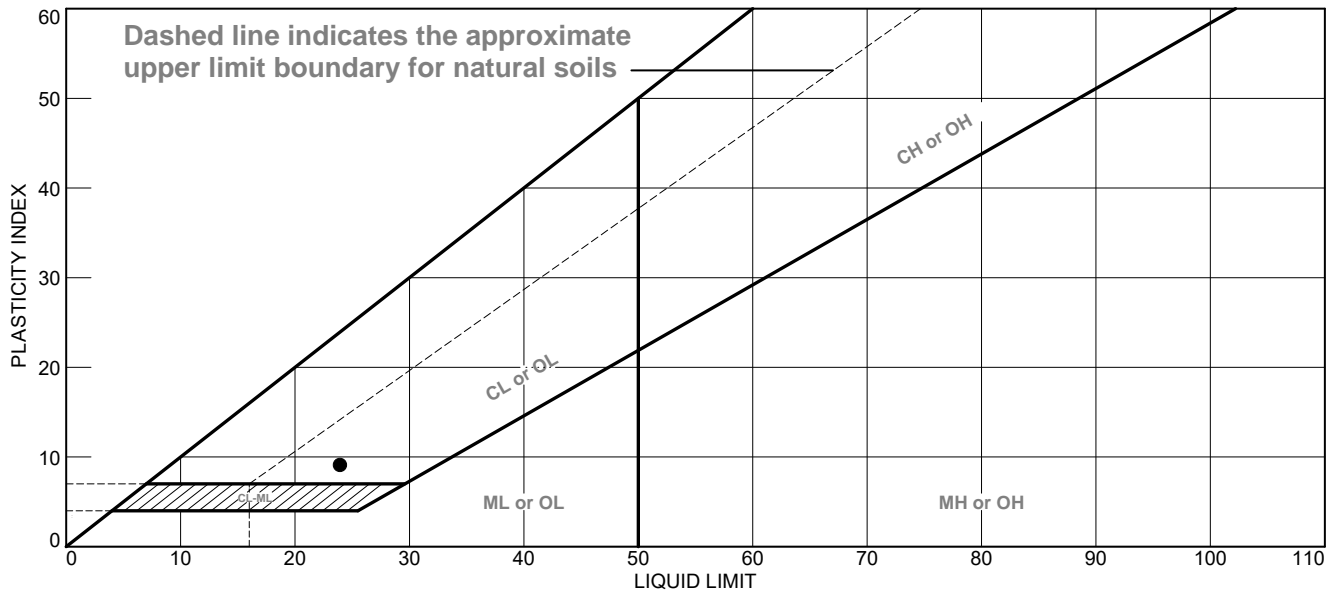


Client: City of Revere
Project: Alden Mills/Point of Pines Fire Station
Revere, MA

Project No: 20-04-114

Figure 048A

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light gray clayey sand	24	15	9	61.6	44.1	SC

Project No. 20-04-114 **Client:** City of Revere
Project: Alden Mills/Point of Pines Fire Station
 Revere, MA
Location: B-4 SS04
Sample Number: 3521-048 **Depth:** 7'-9"

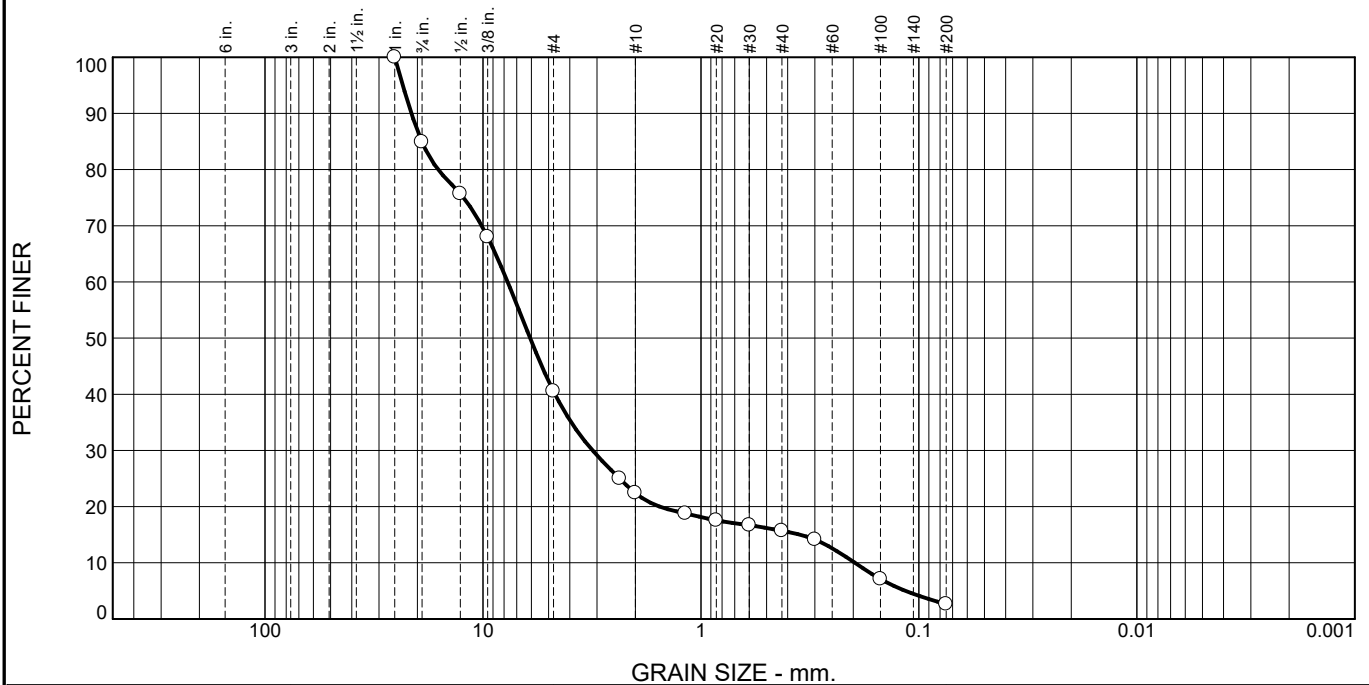


Remarks:

Figure 048B

Tested By: Matt Watson **Checked By:** Rob Faria

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.1	44.4	18.1	6.7	13.1	2.6	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	84.9		
1/2"	75.7		
3/8"	68.0		
#4	40.5		
#8	25.0		
#10	22.4		
#16	18.8		
#20	17.5		
#30	16.7		
#40	15.7		
#50	14.1		
#100	7.1		
#200	2.6		

* (no specification provided)

Material Description
Dark brown grayish gravel with sand

Atterberg Limits (ASTM D 4318)
PL= - LL= - PI= -

Classification
USCS (D 2487)= GP AASHTO (M 145)= -

Coefficients
D₉₀= 21.2981 D₈₅= 19.0981 D₆₀= 7.7125
D₅₀= 6.0784 D₃₀= 3.1418 D₁₅= 0.3512
D₁₀= 0.1968 C_u= 39.19 C_c= 6.50

Remarks
Moisture content 6.5%

Date Received: 1/21/2021 **Date Tested:** 1/29/2021

Tested By: Matt Watson

Checked By: Rob Faria

Title: Lab Manager

Location: B-1 SS05

Sample Number: 3521-049

Depth: 10'-12'

Date Sampled: 1/21/2021

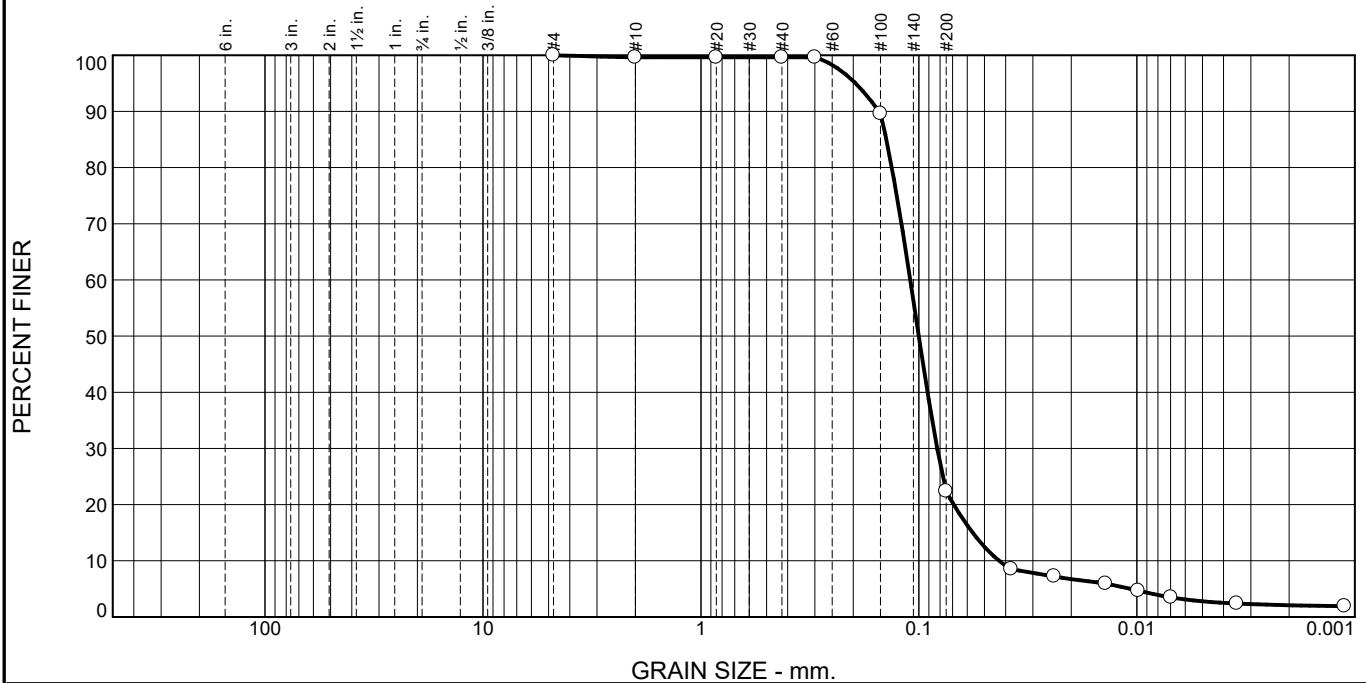


Client: City of Revere
Project: Alden Mills/Point of Pines Fire Station
Revere, MA

Project No: 20-04-114

Figure 049A

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	0.0	77.2	19.6	2.8

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.6		
#20	99.6		
#40	99.6		
#50	99.6		
#100	89.6		
#200	22.4		
0.0375 mm.	8.5		
0.025 mm.	7.2		
0.015 mm.	5.9		
0.009 mm.	4.7		
0.0075 mm.	3.5		
0.0035 mm.	2.4		
0.0015 mm.	1.9		

* (no specification provided)

Material Description		
Light gray silty sand		
Atterberg Limits (ASTM D 4318)		
PL= -	LL= -	PI= -
Classification		
USCS (D 2487)= SM	AASHTO (M 145)= -	
Coefficients		
D ₉₀ = 0.1524	D ₈₅ = 0.1410	D ₆₀ = 0.1096
D ₅₀ = 0.1002	D ₃₀ = 0.0824	D ₁₅ = 0.0567
D ₁₀ = 0.0429	C _u = 2.56	C _c = 1.44
Remarks		
Moisture content 30.1%		
Date Received: 1/21/2021 Date Tested: 1/29/2021		
Tested By: Matt Watson		
Checked By: Rob Faria		
Title: Lab Manager		

Location: B-3 SS07

Sample Number: 3521-050

Depth: 20'-22'

Date Sampled: 1/21/2021

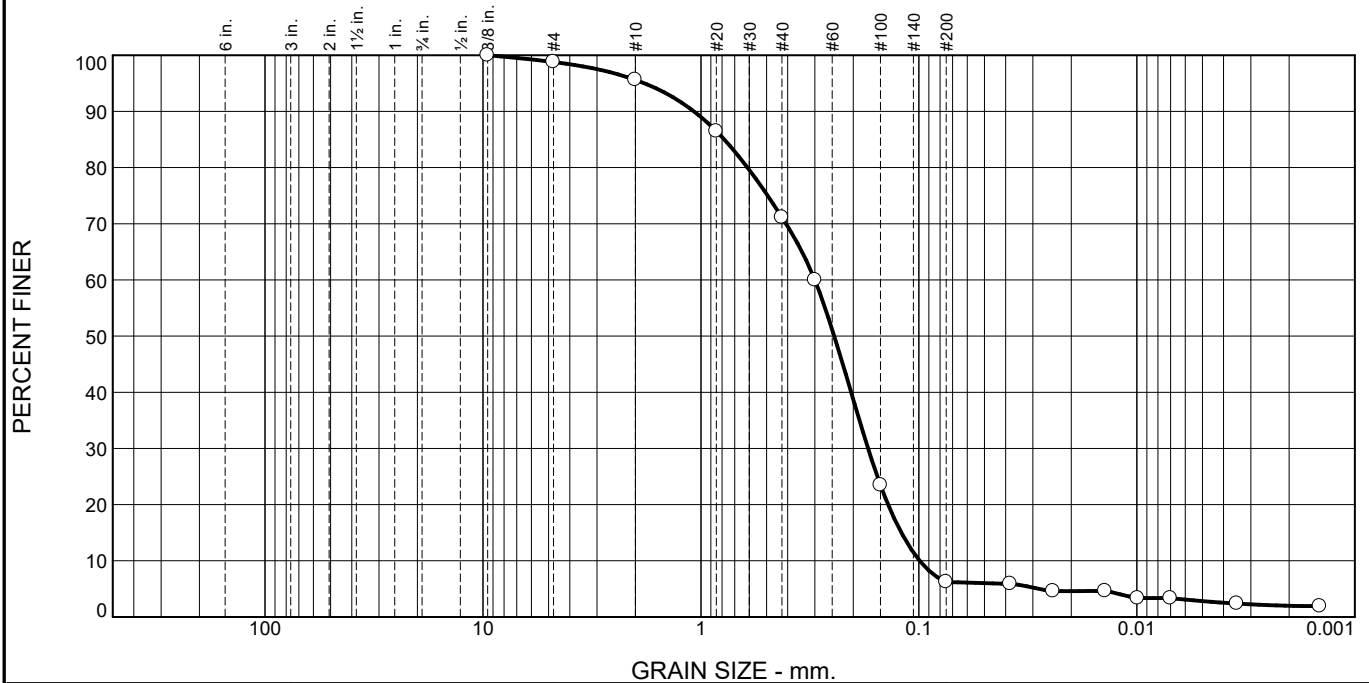


Client: City of Revere
Project: Alden Mills/Point of Pines Fire Station
 Revere, MA

Project No: 20-04-114

Figure 050A

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.2	3.2	24.5	64.9	3.4	2.8

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	98.8		
#10	95.6		
#20	86.5		
#40	71.1		
#50	60.0		
#100	23.5		
#200	6.2		
0.0381 mm.	5.9		
0.0242 mm.	4.6		
0.0140 mm.	4.6		
0.0099 mm.	3.4		
0.0070 mm.	3.4		
0.0035 mm.	2.4		
0.0014 mm.	1.9		

* (no specification provided)

Material Description

Light gray sand with silty clay

Atterberg Limits (ASTM D 4318)

PL= - LL= - PI= -

Classification

USCS (D 2487)= SP-SC AASHTO (M 145)= -

Coefficients

D₉₀= 1.0766 D₈₅= 0.7814 D₆₀= 0.3001
D₅₀= 0.2445 D₃₀= 0.1710 D₁₅= 0.1204
D₁₀= 0.0992 C_u= 3.03 C_c= 0.98

Remarks

Moisture content 23.9%

Date Received: 1/21/2021 Date Tested: 1/29/2021

Tested By: Matt Watson

Checked By: Rob Faria

Title: Lab Manager

Location: B-2 SS08

Sample Number: 3521-051

Depth: 25'-27'

Date Sampled: 1/21/2012



Client: City of Revere
Project: Alden Mills/Point of Pines Fire Station
Revere, MA

Project No: 20-04-114

Figure 051A

APPENDIX F: SITE PHOTOGRAPHS

**Proposed Fire Station
140 Lynnway
Revere, Massachusetts**

SITE PHOTOGRAPHS



Existing Fire Station



Site Facing West - Typical Drill Rig Setup



Sample of Fill – Silty Clayey Sand (SC-SM) with gravel



Sample of Peat (PT)



Sample of Native Gravel (GP-GM) with Sand

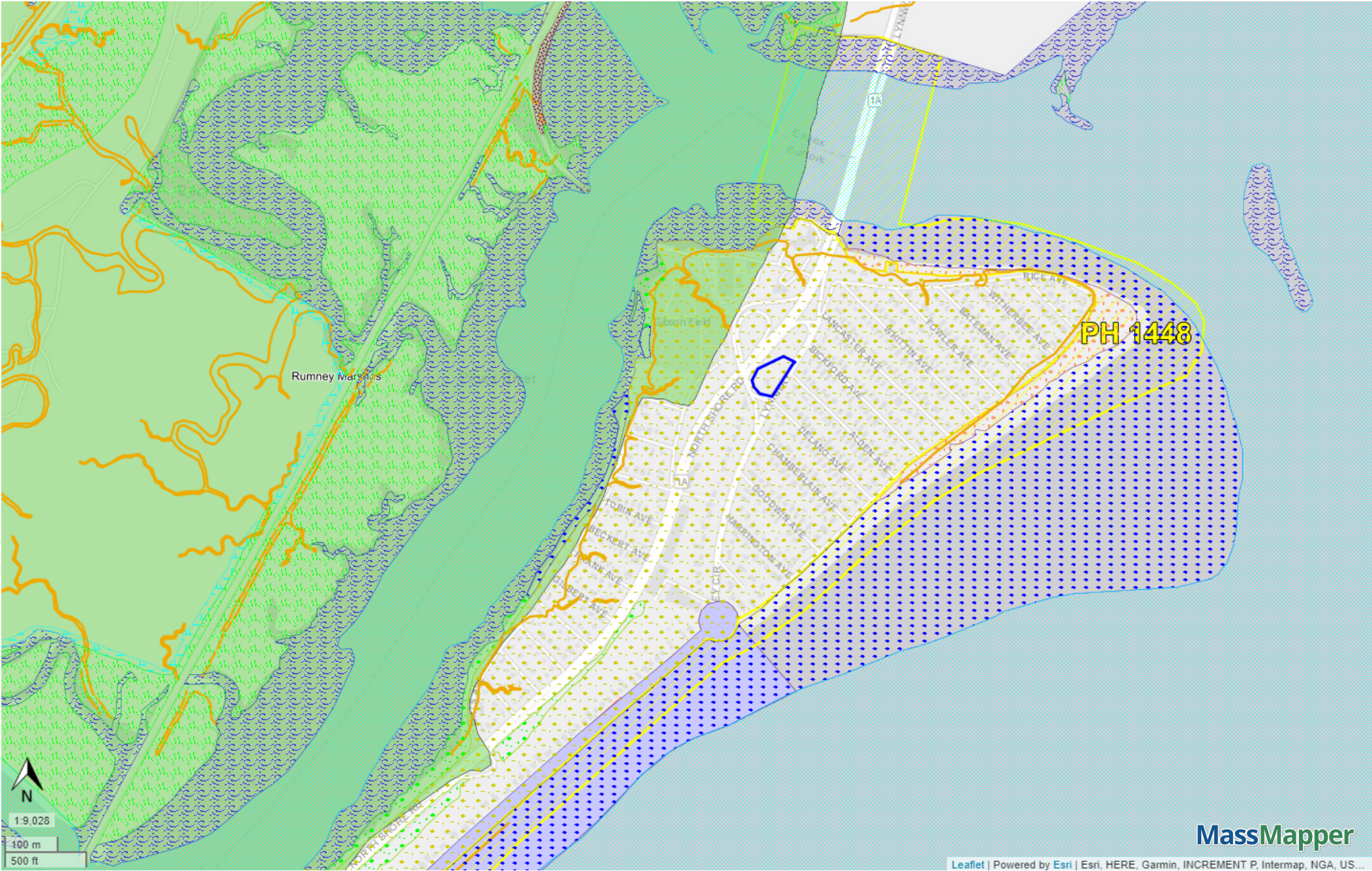


Sample of Native Silty Sand (SM)

ATTACHMENT 11

ENVIRONMENTAL CONSTRAINTS MAP

140 Lynnway Revere - Environmental Constraints



DEP Wetlands Detailed With Outlines

- Barrier Beach System
- Barrier Beach-Deep Marsh
- Barrier Beach-Wooded Swamp Mixed Trees
- Barrier Beach-Coastal Beach
- Barrier Beach-Coastal Dune
- Barrier Beach-Marsh
- Barrier Beach-Salt Marsh
- Barrier Beach-Shrub Swamp
- Barrier Beach-Wooded Swamp Coniferous
- Barrier Beach-Wooded Swamp Deciduous
- Bog
- Coastal Bank Bluff or Sea Cliff
- Coastal Beach
- Coastal Dune
- Cranberry Bog
- Deep Marsh
- Barrier Beach-Open Water
- Open Water
- Rocky Intertidal Shore
- Salt Marsh
- Shallow Marsh Meadow or Fen
- Shrub Swamp
- Tidal Flat
- Wooded Swamp Coniferous
- Wooded Swamp Deciduous
- Wooded Swamp Mixed Trees

Tidelands Jurisdiction Chapter 91 Jurisdiction

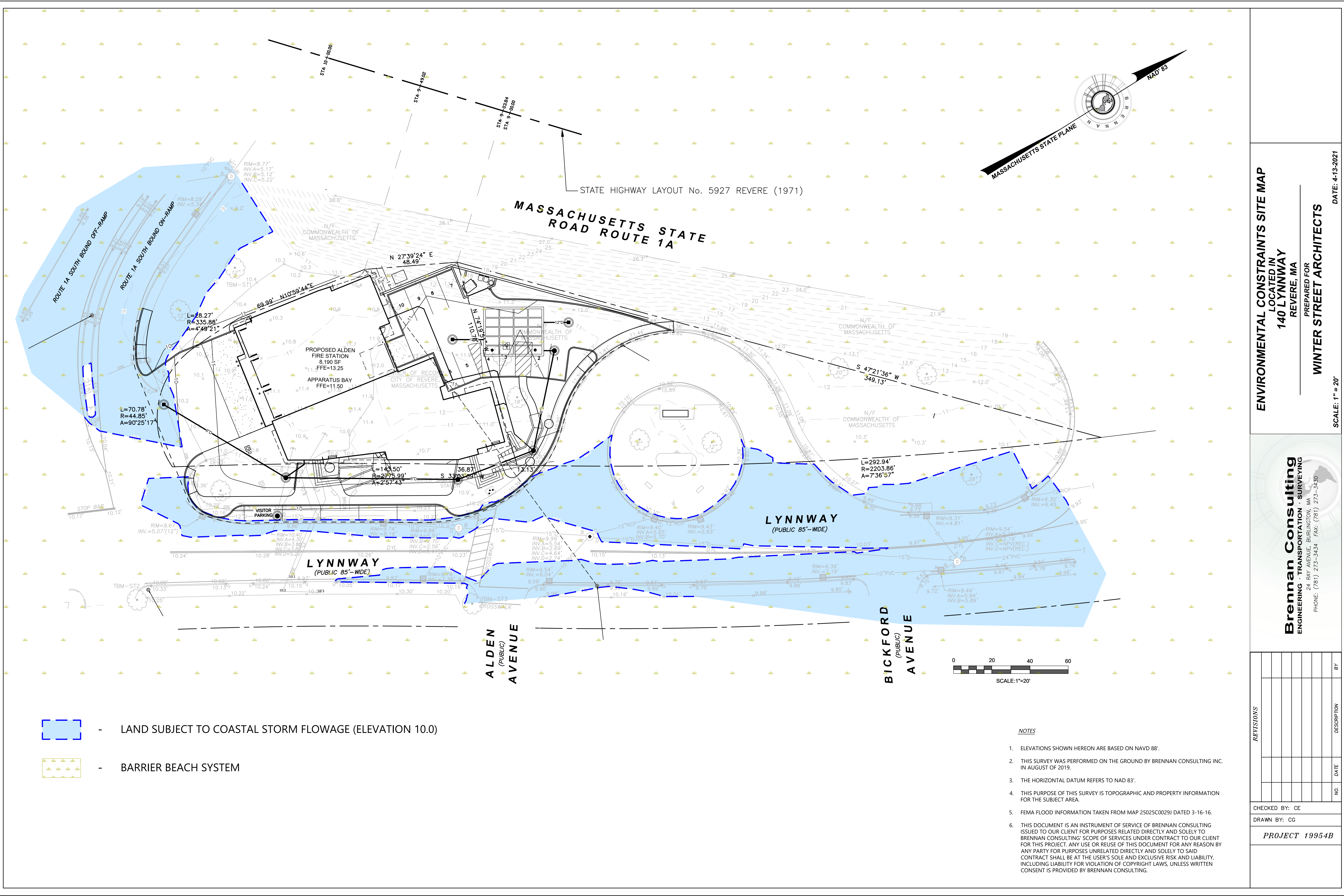
- Areas of Critical Environmental Concern ACECs Transparent Green



NHESP Priority Habitats of Rare Species

-

MassHistoric Commission Inventory (Areas)

- National Register of Historic Places
- Preservation Restriction
- Massachusetts Historic Landmark
- Local Historic District
- NRHP and LHD
- Inventoried Property



-  - LAND SUBJECT TO COASTAL STORM FLOWAGE (ELEVATION 10.0)
-  - BARRIER BEACH SYSTEM

NOTES

- ELEVATIONS SHOWN HEREON ARE BASED ON NAVD 88'.
- THIS SURVEY WAS PERFORMED ON THE GROUND BY BRENNAN CONSULTING INC. IN AUGUST OF 2019.
- THE HORIZONTAL DATUM REFERS TO NAD 83'.
- THIS PURPOSE OF THIS SURVEY IS TOPOGRAPHIC AND PROPERTY INFORMATION FOR THE SUBJECT AREA.
- FEMA FLOOD INFORMATION TAKEN FROM MAP 25025C0029J DATED 3-16-16.
- THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF BRENNAN CONSULTING ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO BRENNAN CONSULTING' SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY BRENNAN CONSULTING.

ENVIRONMENTAL CONSTRAINTS SITE MAP

LOCATED IN
140 LYNNWAY
REVERE, MA

PREPARED FOR
WINTER STREET ARCHITECTS

DATE: 4-13-2021

Brennan Consulting

ENGINEERING · TRANSPORTATION · SURVEYING
24 RAY AVENUE, BURLINGTON, MA
PHONE: (781) 273-3434 FAX: (781) 273-3430

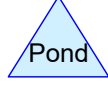
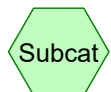
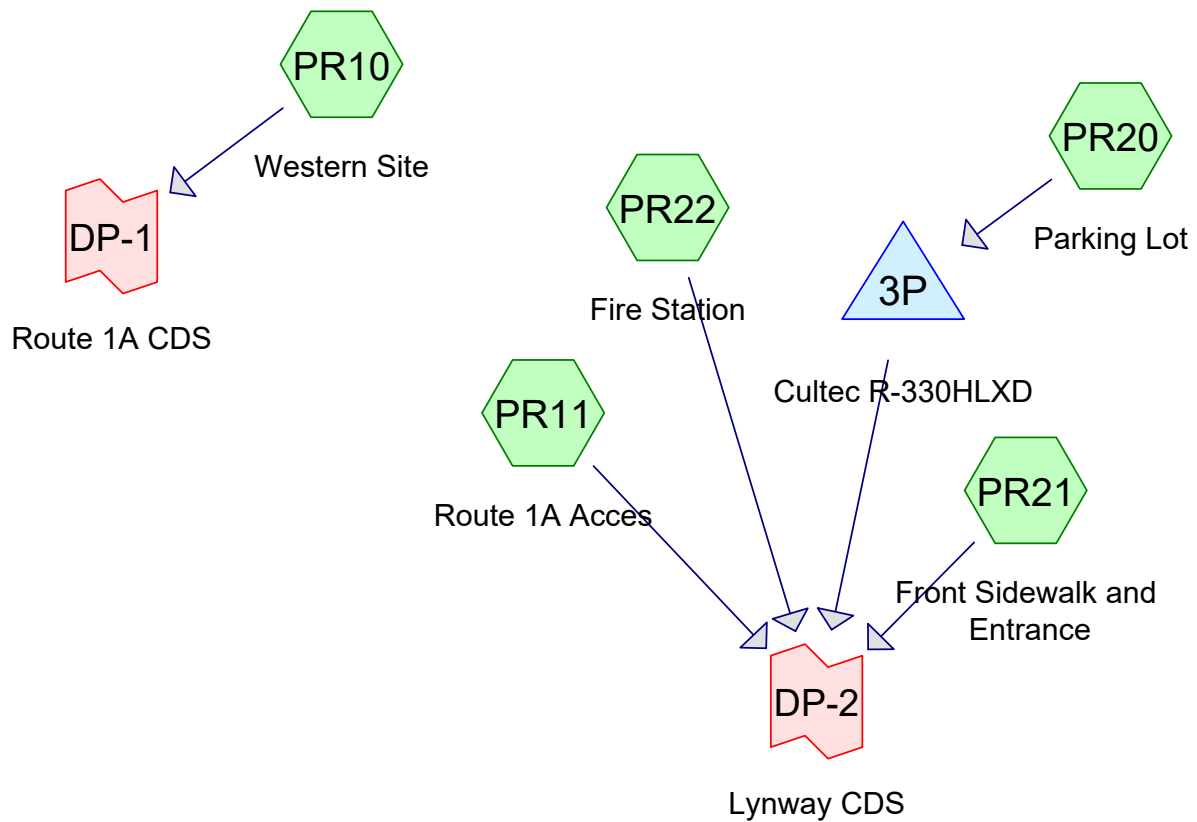
REVISIONS

NO.	DATE	DESCRIPTION	BY

CHECKED BY: CE
DRAWN BY: CG

PROJECT 19954B

ATTACHMENT 12 HYDROCAD REPORT



19954B-PR - NOAA - New

Prepared by Microsoft

Printed 6/15/2022

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Page 2

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	100-YR	Type III 24-hr		Default	24.00	1	7.06	2
2	2050 50-YR	Type III 24-hr		Default	24.00	1	7.62	2
3	2070 50-YR	Type III 24-hr		Default	24.00	1	9.60	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
9,076	39	>75% Grass cover, Good, HSG A (PR10, PR11, PR20, PR21)
12,878	98	Paved parking, HSG A (PR10, PR11, PR20, PR21)
8,665	98	Roofs, HSG A (PR22)
30,619	81	TOTAL AREA

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
30,619	HSG A	PR10, PR11, PR20, PR21, PR22
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
30,619		TOTAL AREA

19954B-PR - NOAA - New

Prepared by Microsoft

Printed 6/15/2022

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Page 5

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
9,076	0	0	0	0	9,076	>75% Grass cover, Good	
12,878	0	0	0	0	12,878	Paved parking	
8,665	0	0	0	0	8,665	Roofs	
30,619	0	0	0	0	30,619	TOTAL AREA	

19954B-PR - NOAA - New

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Printed 6/15/2022

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Page 6

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	3P	6.00	5.00	100.0	0.0100	0.012	6.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR10: Western Site	Runoff Area=1,859 sf 89.13% Impervious Runoff Depth>6.11" Tc=6.0 min CN=92 Runoff=0.28 cfs 947 cf
Subcatchment PR11: Route 1A Acces	Runoff Area=2,072 sf 65.73% Impervious Runoff Depth>4.53" Tc=6.0 min CN=78 Runoff=0.25 cfs 781 cf
Subcatchment PR20: Parking Lot	Runoff Area=11,907 sf 46.37% Impervious Runoff Depth>3.25" Tc=6.0 min CN=66 Runoff=1.02 cfs 3,223 cf
Subcatchment PR21: Front Sidewalk and	Runoff Area=6,116 sf 70.93% Impervious Runoff Depth>4.86" Tc=6.0 min CN=81 Runoff=0.77 cfs 2,475 cf
Subcatchment PR22: Fire Station	Runoff Area=8,665 sf 100.00% Impervious Runoff Depth>6.82" Tc=6.0 min CN=98 Runoff=1.35 cfs 4,922 cf
Pond 3P: Cultec R-330HLXD	Peak Elev=9.04' Storage=1,643 cf Inflow=1.02 cfs 3,223 cf Discarded=0.02 cfs 965 cf Primary=0.10 cfs 669 cf Outflow=0.12 cfs 1,634 cf
Link DP-1: Route 1A CDS	Inflow=0.28 cfs 947 cf Primary=0.28 cfs 947 cf
Link DP-2: Lynway CDS	Inflow=2.36 cfs 8,848 cf Primary=2.36 cfs 8,848 cf

Total Runoff Area = 30,619 sf Runoff Volume = 12,349 cf Average Runoff Depth = 4.84"
29.64% Pervious = 9,076 sf 70.36% Impervious = 21,543 sf

Summary for Subcatchment PR10: Western Site

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 947 cf, Depth> 6.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.06"

Area (sf)	CN	Description
202	39	>75% Grass cover, Good, HSG A
1,657	98	Paved parking, HSG A
1,859	92	Weighted Average
202		10.87% Pervious Area
1,657		89.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR11: Route 1A Acces

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 781 cf, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.06"

Area (sf)	CN	Description
710	39	>75% Grass cover, Good, HSG A
1,362	98	Paved parking, HSG A
2,072	78	Weighted Average
710		34.27% Pervious Area
1,362		65.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR20: Parking Lot

Runoff = 1.02 cfs @ 12.10 hrs, Volume= 3,223 cf, Depth> 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.06"

Area (sf)	CN	Description
6,386	39	>75% Grass cover, Good, HSG A
5,521	98	Paved parking, HSG A
11,907	66	Weighted Average
6,386		53.63% Pervious Area
5,521		46.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR21: Front Sidewalk and Entrance

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 2,475 cf, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.06"

Area (sf)	CN	Description
1,778	39	>75% Grass cover, Good, HSG A
4,338	98	Paved parking, HSG A
6,116	81	Weighted Average
1,778		29.07% Pervious Area
4,338		70.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR22: Fire Station

Runoff = 1.35 cfs @ 12.09 hrs, Volume= 4,922 cf, Depth> 6.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.06"

Area (sf)	CN	Description
8,665	98	Roofs, HSG A
8,665		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Pond 3P: Cultec R-330HLXD

Inflow Area = 11,907 sf, 46.37% Impervious, Inflow Depth > 3.25" for 100-YR event
Inflow = 1.02 cfs @ 12.10 hrs, Volume= 3,223 cf
Outflow = 0.12 cfs @ 12.97 hrs, Volume= 1,634 cf, Atten= 88%, Lag= 52.6 min
Discarded = 0.02 cfs @ 10.75 hrs, Volume= 965 cf
Primary = 0.10 cfs @ 12.97 hrs, Volume= 669 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 9.04' @ 12.95 hrs Surf.Area= 809 sf Storage= 1,643 cf

Plug-Flow detention time= 243.6 min calculated for 1,631 cf (51% of inflow)
Center-of-Mass det. time= 125.0 min (963.7 - 838.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	6.00'	706 cf	25.67'W x 31.50'L x 3.54'H Field A 2,863 cf Overall - 1,099 cf Embedded = 1,764 cf x 40.0% Voids
#2A	6.50'	1,099 cf	Cultec R-330XLHD x 20 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		1,805 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	6.00'	1.030 in/hr Exfiltration over Surface area
#2	Primary	6.00'	6.0" Round Culvert L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 6.00' / 5.00' S= 0.0100 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#3	Device 2	9.00'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 10.75 hrs HW=6.04' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.09 cfs @ 12.97 hrs HW=9.04' (Free Discharge)

↑ **2=Culvert** (Passes 0.09 cfs of 1.03 cfs potential flow)

↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 0.09 cfs @ 0.56 fps)

Summary for Link DP-1: Route 1A CDS

Inflow Area = 1,859 sf, 89.13% Impervious, Inflow Depth > 6.11" for 100-YR event
 Inflow = 0.28 cfs @ 12.09 hrs, Volume= 947 cf
 Primary = 0.28 cfs @ 12.09 hrs, Volume= 947 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Lynway CDS

Inflow Area = 28,760 sf, 69.14% Impervious, Inflow Depth > 3.69" for 100-YR event
 Inflow = 2.36 cfs @ 12.09 hrs, Volume= 8,848 cf
 Primary = 2.36 cfs @ 12.09 hrs, Volume= 8,848 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR10: Western Site	Runoff Area=1,859 sf 89.13% Impervious Runoff Depth>6.66" Tc=6.0 min CN=92 Runoff=0.30 cfs 1,032 cf
Subcatchment PR11: Route 1A Acces	Runoff Area=2,072 sf 65.73% Impervious Runoff Depth>5.04" Tc=6.0 min CN=78 Runoff=0.27 cfs 870 cf
Subcatchment PR20: Parking Lot	Runoff Area=11,907 sf 46.37% Impervious Runoff Depth>3.69" Tc=6.0 min CN=66 Runoff=1.16 cfs 3,666 cf
Subcatchment PR21: Front Sidewalk and	Runoff Area=6,116 sf 70.93% Impervious Runoff Depth>5.38" Tc=6.0 min CN=81 Runoff=0.85 cfs 2,742 cf
Subcatchment PR22: Fire Station	Runoff Area=8,665 sf 100.00% Impervious Runoff Depth>7.38" Tc=6.0 min CN=98 Runoff=1.45 cfs 5,326 cf
Pond 3P: Cultec R-330HLXD	Peak Elev=9.10' Storage=1,660 cf Inflow=1.16 cfs 3,666 cf Discarded=0.02 cfs 984 cf Primary=0.32 cfs 1,074 cf Outflow=0.34 cfs 2,058 cf
Link DP-1: Route 1A CDS	Inflow=0.30 cfs 1,032 cf Primary=0.30 cfs 1,032 cf
Link DP-2: Lynway CDS	Inflow=2.58 cfs 10,012 cf Primary=2.58 cfs 10,012 cf

Total Runoff Area = 30,619 sf Runoff Volume = 13,636 cf Average Runoff Depth = 5.34"
29.64% Pervious = 9,076 sf 70.36% Impervious = 21,543 sf

Summary for Subcatchment PR10: Western Site

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 1,032 cf, Depth> 6.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2050 50-YR Rainfall=7.62"

Area (sf)	CN	Description
202	39	>75% Grass cover, Good, HSG A
1,657	98	Paved parking, HSG A
1,859	92	Weighted Average
202		10.87% Pervious Area
1,657		89.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR11: Route 1A Acces

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 870 cf, Depth> 5.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2050 50-YR Rainfall=7.62"

Area (sf)	CN	Description
710	39	>75% Grass cover, Good, HSG A
1,362	98	Paved parking, HSG A
2,072	78	Weighted Average
710		34.27% Pervious Area
1,362		65.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR20: Parking Lot

Runoff = 1.16 cfs @ 12.09 hrs, Volume= 3,666 cf, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2050 50-YR Rainfall=7.62"

Area (sf)	CN	Description
6,386	39	>75% Grass cover, Good, HSG A
5,521	98	Paved parking, HSG A
11,907	66	Weighted Average
6,386		53.63% Pervious Area
5,521		46.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR21: Front Sidewalk and Entrance

Runoff = 0.85 cfs @ 12.09 hrs, Volume= 2,742 cf, Depth> 5.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2050 50-YR Rainfall=7.62"

Area (sf)	CN	Description
1,778	39	>75% Grass cover, Good, HSG A
4,338	98	Paved parking, HSG A
6,116	81	Weighted Average
1,778		29.07% Pervious Area
4,338		70.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR22: Fire Station

Runoff = 1.45 cfs @ 12.09 hrs, Volume= 5,326 cf, Depth> 7.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2050 50-YR Rainfall=7.62"

Area (sf)	CN	Description
8,665	98	Roofs, HSG A
8,665		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Pond 3P: Cultec R-330HLXD

Inflow Area = 11,907 sf, 46.37% Impervious, Inflow Depth > 3.69" for 2050 50-YR event
Inflow = 1.16 cfs @ 12.09 hrs, Volume= 3,666 cf
Outflow = 0.34 cfs @ 12.52 hrs, Volume= 2,058 cf, Atten= 71%, Lag= 25.3 min
Discarded = 0.02 cfs @ 10.50 hrs, Volume= 984 cf
Primary = 0.32 cfs @ 12.52 hrs, Volume= 1,074 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 9.10' @ 12.52 hrs Surf.Area= 809 sf Storage= 1,660 cf

Plug-Flow detention time= 211.2 min calculated for 2,058 cf (56% of inflow)
Center-of-Mass det. time= 97.0 min (931.9 - 835.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	6.00'	706 cf	25.67'W x 31.50'L x 3.54'H Field A 2,863 cf Overall - 1,099 cf Embedded = 1,764 cf x 40.0% Voids
#2A	6.50'	1,099 cf	Cultec R-330XLHD x 20 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		1,805 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	6.00'	1.030 in/hr Exfiltration over Surface area
#2	Primary	6.00'	6.0" Round Culvert L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 6.00' / 5.00' S= 0.0100 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#3	Device 2	9.00'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 10.50 hrs HW=6.04' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.27 cfs @ 12.52 hrs HW=9.08' (Free Discharge)

↑ **2=Culvert** (Passes 0.27 cfs of 1.04 cfs potential flow)

↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 0.27 cfs @ 0.81 fps)

Summary for Link DP-1: Route 1A CDS

Inflow Area = 1,859 sf, 89.13% Impervious, Inflow Depth > 6.66" for 2050 50-YR event
 Inflow = 0.30 cfs @ 12.09 hrs, Volume= 1,032 cf
 Primary = 0.30 cfs @ 12.09 hrs, Volume= 1,032 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Lynway CDS

Inflow Area = 28,760 sf, 69.14% Impervious, Inflow Depth > 4.18" for 2050 50-YR event
 Inflow = 2.58 cfs @ 12.09 hrs, Volume= 10,012 cf
 Primary = 2.58 cfs @ 12.09 hrs, Volume= 10,012 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR10: Western Site	Runoff Area=1,859 sf 89.13% Impervious Runoff Depth>8.62" Tc=6.0 min CN=92 Runoff=0.38 cfs 1,336 cf
Subcatchment PR11: Route 1A Acces	Runoff Area=2,072 sf 65.73% Impervious Runoff Depth>6.88" Tc=6.0 min CN=78 Runoff=0.37 cfs 1,188 cf
Subcatchment PR20: Parking Lot	Runoff Area=11,907 sf 46.37% Impervious Runoff Depth>5.35" Tc=6.0 min CN=66 Runoff=1.68 cfs 5,306 cf
Subcatchment PR21: Front Sidewalk and	Runoff Area=6,116 sf 70.93% Impervious Runoff Depth>7.26" Tc=6.0 min CN=81 Runoff=1.13 cfs 3,700 cf
Subcatchment PR22: Fire Station	Runoff Area=8,665 sf 100.00% Impervious Runoff Depth>9.35" Tc=6.0 min CN=98 Runoff=1.83 cfs 6,754 cf
Pond 3P: Cultec R-330HLXD	Peak Elev=9.37' Storage=1,748 cf Inflow=1.68 cfs 5,306 cf Discarded=0.02 cfs 1,046 cf Primary=1.16 cfs 2,631 cf Outflow=1.18 cfs 3,676 cf
Link DP-1: Route 1A CDS	Inflow=0.38 cfs 1,336 cf Primary=0.38 cfs 1,336 cf
Link DP-2: Lynway CDS	Inflow=3.31 cfs 14,273 cf Primary=3.31 cfs 14,273 cf

Total Runoff Area = 30,619 sf Runoff Volume = 18,284 cf Average Runoff Depth = 7.17"
29.64% Pervious = 9,076 sf 70.36% Impervious = 21,543 sf

Summary for Subcatchment PR10: Western Site

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 1,336 cf, Depth> 8.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2070 50-YR Rainfall=9.60"

Area (sf)	CN	Description
202	39	>75% Grass cover, Good, HSG A
1,657	98	Paved parking, HSG A
1,859	92	Weighted Average
202		10.87% Pervious Area
1,657		89.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR11: Route 1A Acces

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 1,188 cf, Depth> 6.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2070 50-YR Rainfall=9.60"

Area (sf)	CN	Description
710	39	>75% Grass cover, Good, HSG A
1,362	98	Paved parking, HSG A
2,072	78	Weighted Average
710		34.27% Pervious Area
1,362		65.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR20: Parking Lot

Runoff = 1.68 cfs @ 12.09 hrs, Volume= 5,306 cf, Depth> 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2070 50-YR Rainfall=9.60"

Area (sf)	CN	Description
6,386	39	>75% Grass cover, Good, HSG A
5,521	98	Paved parking, HSG A
11,907	66	Weighted Average
6,386		53.63% Pervious Area
5,521		46.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR21: Front Sidewalk and Entrance

Runoff = 1.13 cfs @ 12.09 hrs, Volume= 3,700 cf, Depth> 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2070 50-YR Rainfall=9.60"

Area (sf)	CN	Description
1,778	39	>75% Grass cover, Good, HSG A
4,338	98	Paved parking, HSG A
6,116	81	Weighted Average
1,778		29.07% Pervious Area
4,338		70.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment PR22: Fire Station

Runoff = 1.83 cfs @ 12.09 hrs, Volume= 6,754 cf, Depth> 9.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2070 50-YR Rainfall=9.60"

Area (sf)	CN	Description
8,665	98	Roofs, HSG A
8,665		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Pond 3P: Cultec R-330HLXD

Inflow Area = 11,907 sf, 46.37% Impervious, Inflow Depth > 5.35" for 2070 50-YR event
Inflow = 1.68 cfs @ 12.09 hrs, Volume= 5,306 cf
Outflow = 1.18 cfs @ 12.22 hrs, Volume= 3,676 cf, Atten= 30%, Lag= 7.9 min
Discarded = 0.02 cfs @ 9.65 hrs, Volume= 1,046 cf
Primary = 1.16 cfs @ 12.22 hrs, Volume= 2,631 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 9.37' @ 12.21 hrs Surf.Area= 809 sf Storage= 1,748 cf

Plug-Flow detention time= 149.3 min calculated for 3,669 cf (69% of inflow)
Center-of-Mass det. time= 53.4 min (877.7 - 824.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	6.00'	706 cf	25.67'W x 31.50'L x 3.54'H Field A 2,863 cf Overall - 1,099 cf Embedded = 1,764 cf x 40.0% Voids
#2A	6.50'	1,099 cf	Cultec R-330XLHD x 20 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		1,805 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	6.00'	1.030 in/hr Exfiltration over Surface area
#2	Primary	6.00'	6.0" Round Culvert L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 6.00' / 5.00' S= 0.0100 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#3	Device 2	9.00'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 9.65 hrs HW=6.04' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.07 cfs @ 12.22 hrs HW=9.32' (Free Discharge)

↑ **2=Culvert** (Barrel Controls 1.07 cfs @ 5.46 fps)

↑ **3=Broad-Crested Rectangular Weir** (Passes 1.07 cfs of 2.03 cfs potential flow)

Summary for Link DP-1: Route 1A CDS

Inflow Area = 1,859 sf, 89.13% Impervious, Inflow Depth > 8.62" for 2070 50-YR event
 Inflow = 0.38 cfs @ 12.09 hrs, Volume= 1,336 cf
 Primary = 0.38 cfs @ 12.09 hrs, Volume= 1,336 cf, Atten= 0%, Lag= 0.0 min

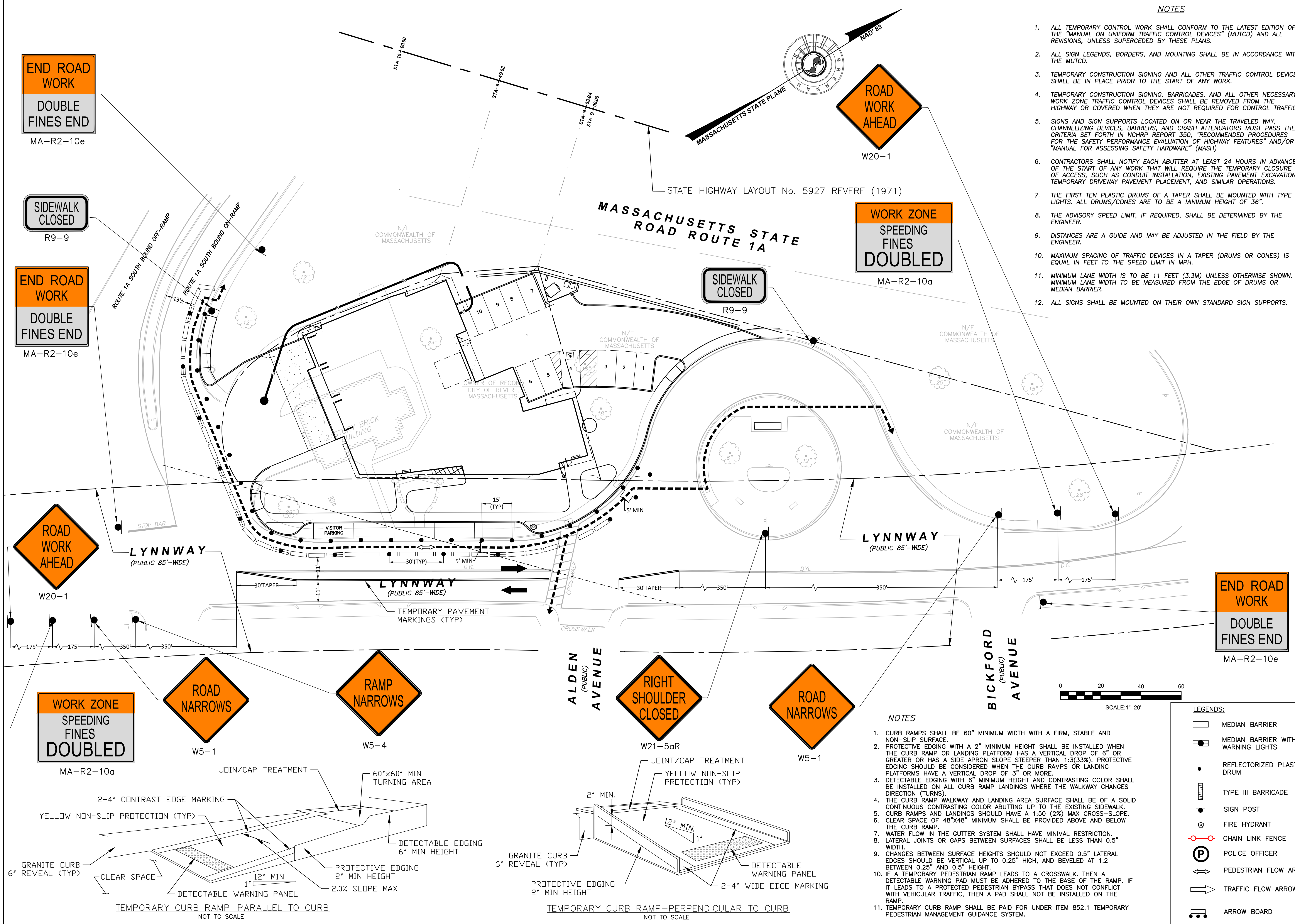
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Lynway CDS

Inflow Area = 28,760 sf, 69.14% Impervious, Inflow Depth > 5.96" for 2070 50-YR event
 Inflow = 3.31 cfs @ 12.10 hrs, Volume= 14,273 cf
 Primary = 3.31 cfs @ 12.10 hrs, Volume= 14,273 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

ATTACHMENT 13
TRAFFIC MANAGEMENT PLAN



- NOTES**
1. ALL TEMPORARY CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
 2. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
 3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
 4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL TRAFFIC.
 5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
 6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT, AND SIMILAR OPERATIONS.
 7. THE FIRST TEN PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH TYPE A LIGHTS. ALL DRUMS/CONES ARE TO BE A MINIMUM HEIGHT OF 36".
 8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
 9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
 10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
 11. MINIMUM LANE WIDTH IS TO BE 11 FEET (3.3M) UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
 12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

TRAFFIC MANAGEMENT PLAN
LOCATED IN
140 LYNNWAY
REVERE, MA
PREPARED FOR
WINTER STREET ARCHITECTS

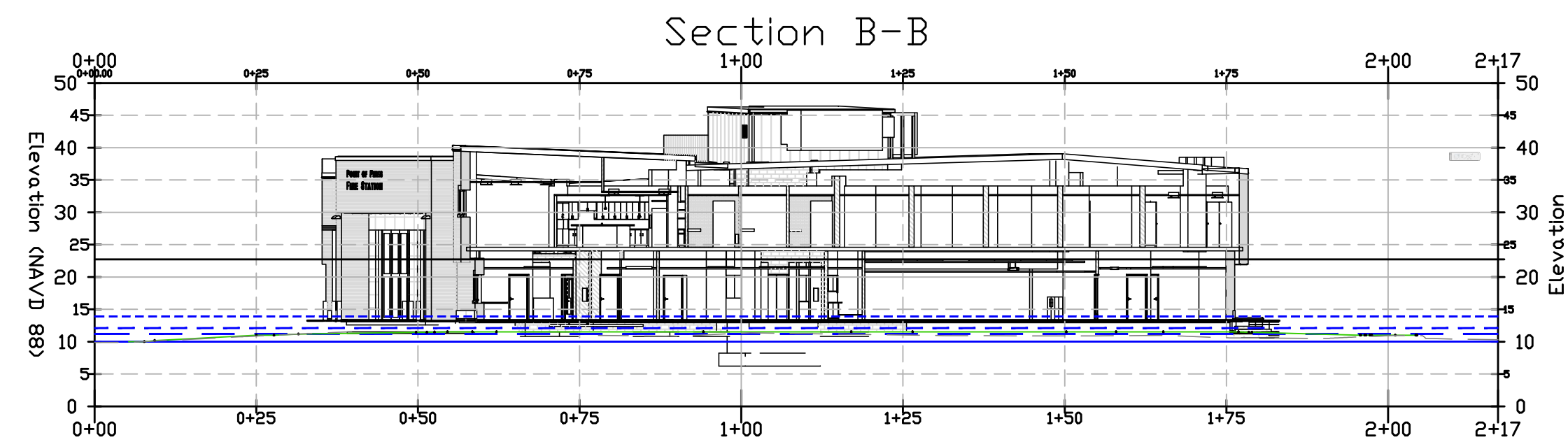
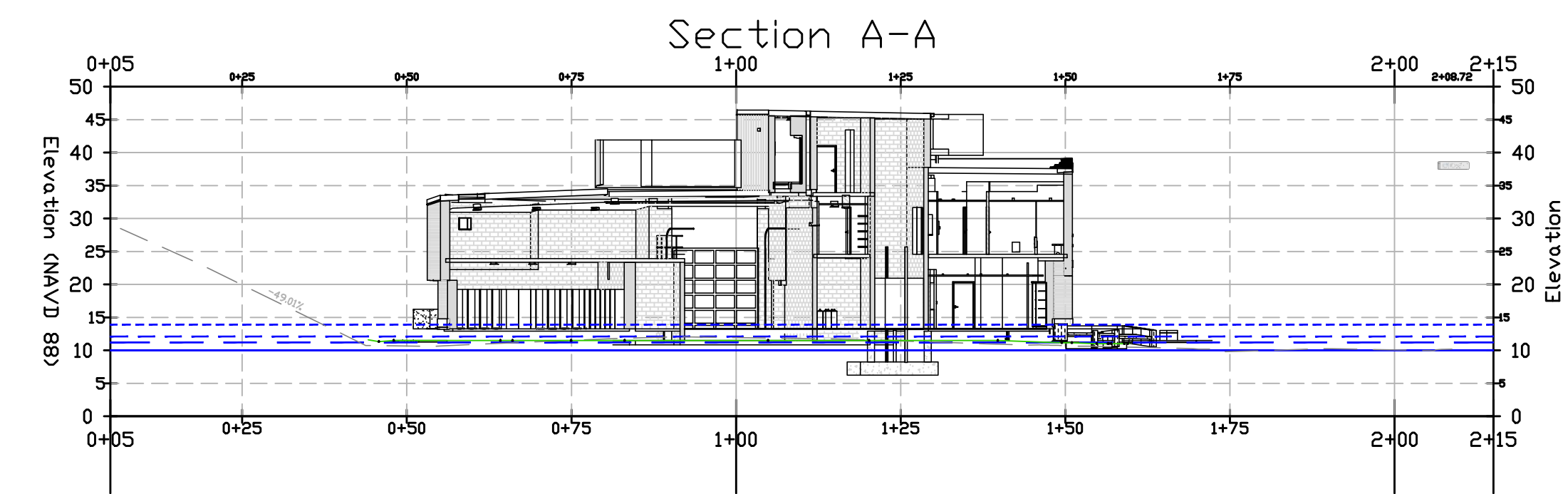
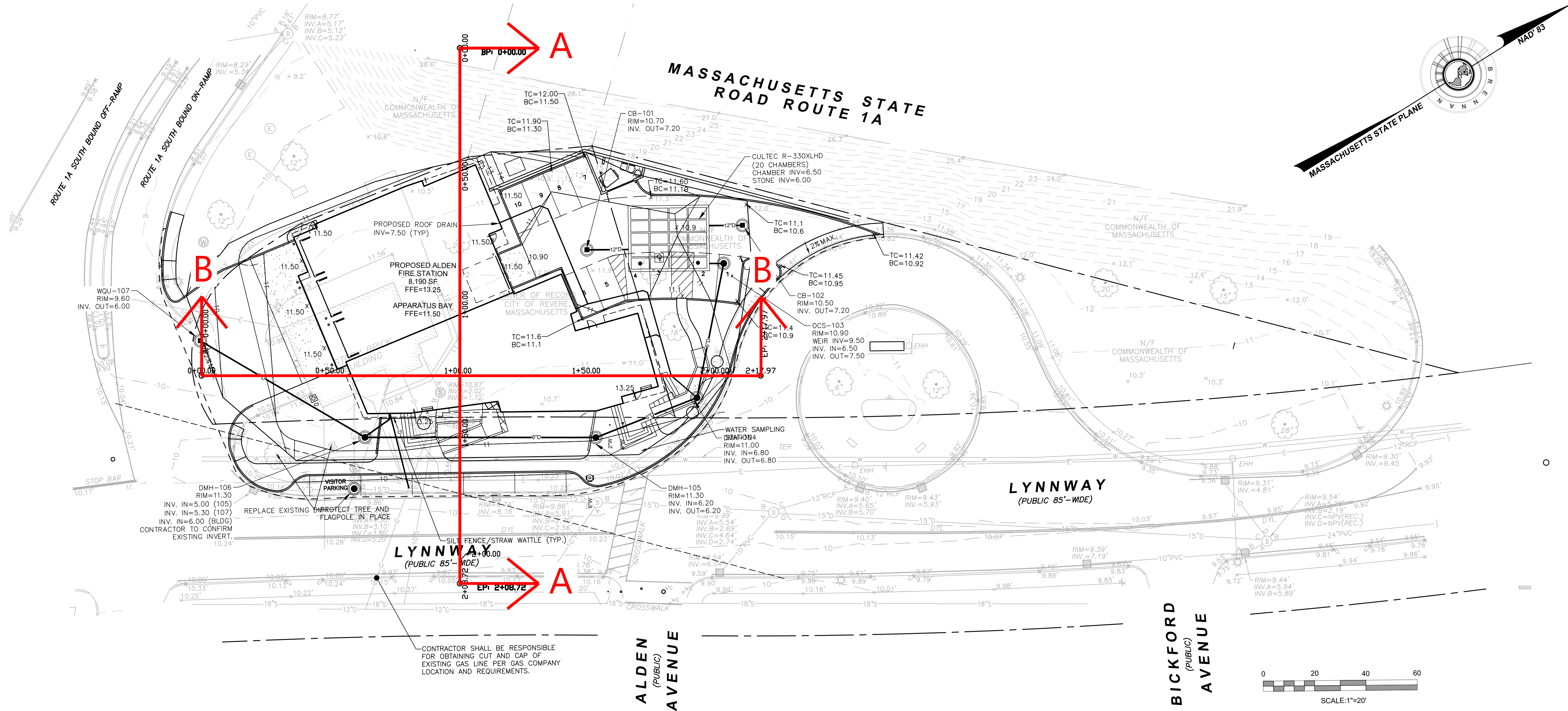
Brennan Consulting
ENGINEERING · TRANSPORTATION · SURVEYING
24 RAY AVENUE, BURLINGTON, MA
PHONE: (781) 273-3434 FAX: (781) 273-3430

REVISIONS		CG	BY
		RESPONSE TO DOT COMMENTS	
</			

SCALE: 1" = 20'
DATE: 7-21-2021 REV: 1-17-22

ATTACHMENT 14

SITE CROSS SECTIONS



- 13.25 = BUILDING FFE
11.5 = APPARATUS BAY FFE
16.5 = FLOOD PROOFING EL
- FEMA 100-YEAR FLOODPLAIN ELEVATION (10.0)
 - FEMA 500-YEAR FLOODPLAIN ELEVATION (11.2)
 - PROJECTED 2050 200-YEAR FLOODPLAIN ELEVATION (12.1)
 - PROJECTED 2070 200-YEAR FLOODPLAIN ELEVATION (13.9)

- PROPOSED GRADES
- EXISTING GRADES

FLOODPLAIN CROSS SECTIONS

LOCATED IN
140 LYNNWAY
REVERE, MA

PREPARED FOR
WINTER STREET ARCHITECTS

DATE: 6-15-2022

SCALE: 1" = 20'

Brennan Consulting

ENGINEERING · TRANSPORTATION · SURVEYING
24 RAY AVENUE, BURLINGTON, MA
PHONE: (781) 273-3434 FAX: (781) 273-3430

REVISIONS

NO.	DATE	DESCRIPTION	BY

CHECKED BY: CE
DRAWN BY: CG

PROJECT 19954B

A-14

**APPENDIX
(SEPARATE)**