PROPOSED ENVIRONMENTAL IMPACT REPORT

Green Line C Branch Station Accessibility Upgrades Project

Brookline, MA

PROPONENT

Massachusetts Bay Transportation Authority
10 Park Plaza
Boston, Massachusetts 02116

SUBMITTED BY

vhb
99 High Street, 13th Floor
Boston, Massachusetts 02110

SUBMITTED TO

Executive Office of Energy & Environmental Affairs MEPA Office
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

December 2024

December 16, 2024

Secretary Rebecca Tepper
Executive Office of Energy and Environmental Affairs
Attn: Tori Kim, MEPA Director
100 Cambridge Street
Boston MA 02110

Re: **Green Line C Branch Accessibility Upgrades Project**
Expanded Environmental Notification Form/Proposed Environmental Impact Report

Dear Secretary Tepper and Director Kim:

The Massachusetts Bay Transportation Authority (MBTA) is pleased to submit the attached dual Expanded Environmental Notification Form/Proposed Environmental Impact Report (EENF/PEIR) for the Green Line C Branch Accessibility Upgrades Project (the "Project") to allow public review under the Commonwealth's Massachusetts Environmental Policy Act (MEPA) process.

In accordance with the American Disability Act, the Project proposes accessibility improvements at several above-ground MBTA Green Line C Branch stations located along Beacon Street in the Town of Brookline, Massachusetts (the "Project Area"). These improvements will provide accessible boarding, increase pedestrian access and egress at the subject stations, along with wayfinding, lighting, and other enhancements to rider experience.

The MBTA will hold a public meeting during the EENF/PEIR public review and comment period.

The MBTA respectfully requests a Rollover Environmental Impact Report, in accordance with 301 CMR 11.06(13) so that the PEIR is reviewed as a Final EIR. If the Secretary finds that this filing does not meet the criteria allowing a Rollover EIR, per 301 CMR 11.13(a-e), the MBTA requests that the Secretary allow a Single EIR, in accordance with 301 CMR 11.06(8).

Please publish notice of availability of the EENF/PEIR for public review in the December 23, 2024, edition of the Environmental Monitor. If adequate, please publish notice of the Rollover EIR in the February 7, 2025, edition of the Environmental Monitor.

Thank you for your consideration of this request. We look forward to continuing to work with EEA through the planning process for this important project.

Respectfully,

Tess Paganelli
Director of Environmental Review and Permitting
Massachusetts Bay Transportation Authority
TPaganelli@MBTA.com
617-549-4357

Cc: Desiree Patrice, Chief of Capital Transformation
Matthew Fuccillo, MBTA Project Manager
Matt Conover, MBTA Deputy Chief of Green Line & Blue Line Transformation
Matt Fuccillo, Mott MacDonald Project Manager
Mark Shamon, Green Line Design Manager
Kristen Bergassi, VHB Director of Environmental Planning

December 16, 2024

Re: **Expanded Environmental Notification Form/Proposed Environmental Impact Report, Green Line C Branch Accessibility Upgrades Project**

Dear Reviewer:

The Massachusetts Bay Transportation Authority (MBTA) is pleased to submit the attached dual Expanded Environmental Notification Form/Proposed Environmental Impact Report (EENF/PEIR) for the Green Line C Branch Accessibility Upgrades Project (the "Project") to allow public review under the Commonwealth's Massachusetts Environmental Policy Act (MEPA) process.

In accordance with the American Disability Act, the Project proposes accessibility improvements at several above-ground Green Line C Branch stations located along Beacon Street in the Town of Brookline, Massachusetts (the "Project Area"). These improvements will provide accessible boarding, increase pedestrian access and egress at the subject stations, along with wayfinding, lighting, and other enhancements to rider experience.

The MBTA will hold a public meeting during the EENF/PEIR public review and comment period.

Written comments should be submitted by January 22, 2025, to:

Secretary Rebecca Tepper
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office, MEPA Analyst
100 Cambridge Street, Suite 900
Boston, MA 02114

Comment letters may be submitted by U.S. mail to the above address, emailed to the MEPA Analyst, or submitted on the MEPA Environmental Monitor located at website here:
https://eeaonline.eea.state.ma.us/EEA/PublicComment/Landing/

The MBTA respectfully requests a Rollover Environmental Impact Report, in accordance with 301 CMR 11.06(13) so that the PEIR is reviewed as a Final EIR. If the Secretary finds that this filing does not meet the criteria allowing a Rollover EIR at 301 CMR 11.13(a-e), the Proponent requests that the Secretary allow a Single EIR, in accordance with 301 CMR 11.06(8). If adequate, the PEIR will be published in the February 7, 2025, edition of the Environmental Monitor for a 30-day comment period. The comment period on the PEIR, if granted, would end on March 10, 2025.

Sincerely,

Tess Paganelli
Director of Environmental Review and Permitting
Massachusetts Bay Transportation Authority
TPaganelli@MBTA.com
617-549-4357

cc: Desiree Patrice, Chief of Capital Transformation
Matthew Fuccillo, MBTA Project Manager
Matt Conover, MBTA Deputy Chief of Green Line & Blue Line Transformation
Matt Fuccillo, Mott MacDonald Project Manager
Mark Shamon, Green Line Design Manager
Kristen Bergassi, VHB Director of Environmental Planning

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

SUBMITTED TO **Executive Office of Energy and Environmental Affairs**
100 Cambridge Street, Suite 900 (9th Floor)
Attn: MEPA Office
Boston, MA 02114

PROPONENT **Massachusetts Bay Transportation Authority**
10 Park Plaza, 6th Fl.
Boston, MA 02116

PREPARED BY **VHB**
99 High Street, 13th Floor
Boston, MA 02110

December 16, 2024

Table of Contents

List of Figures

List of Tables

Appendices

1

Project Description

In accordance with the Massachusetts Environmental Policy Act (MEPA) Massachusetts General Law (MGL) Chapter 30, Section 61-62I and the regulations promulgated thereunder set forth in 301 CMR 11.00, the Massachusetts Bay Transportation Authority (MBTA) (the "Proponent") submits this Expanded Environmental Notification Form (EENF) and Proposed Environmental Impact Report (PEIR) for the Green Line C Branch Station Accessibility Upgrades Project (the "Project"). The Project is located along the Beacon Street corridor in Brookline, MA (the "Project Area").

The Project was initiated through a Federal Transit Administration (FTA) letter dated October 2020 that triggered a compliance requirement with the American with Disabilities Act (ADA) at several Green Line C Branch stations. Specifically, the FTA directed the MBTA to upgrade C Branch Stations to achieve accessible status by raising platform heights, which in combination with extendable ramps built into certain low-floor train cars in the fleet, would make these stations accessible to people with mobility limitations.

The Project will include work on several subject stations of the C Branch to achieve accessibility and includes widening platforms and improving pedestrian access and egress from the stations to the public right-of-way (ROW). The Project aims to bring the subject stations into compliance with the FTA, ADA, National Fire Protection Association (NFPA), standard for emergency egress, Massachusetts Architectural Access Board (MAAB), and all applicable MBTA regulations, guidelines, and design directives.

The Project includes work at the following Green Line C Branch stations:

1. Hawes Street Station (to be upgraded)
2. Kent Street Station (to be decommissioned)
3. Saint Paul Street Station (to be upgraded)
4. Summit Avenue Station (to be upgraded)
5. Fairbanks Street Station (to be consolidated with Brandon Hall Station)
6. Brandon Hall Station (to be consolidated with Fairbanks Street Station)
7. Tappan Street Station (to be upgraded)
8. Dean Road Station (to be upgraded)
9. Englewood Avenue Station (to be upgraded)

1.1 Site Context and Existing Conditions

This section describes the existing site conditions and surrounding context of the Project Area.

1.1.1 Site Context

The entire C Branch corridor includes 13 stations within dedicated reservations along Beacon Street between the portal near Saint Mary's Street Station and its terminus at Cleveland Circle Station. There are 12 stations within Brookline, and one, Cleveland Circle Station, within the City of Boston. All work to be performed as part of the Project is within Brookline. Refer to **Figure 1-1** for the location of the Project Area, which represents a portion of the C Branch corridor.

1.1.2 Existing Conditions

Figure 1-2 shows the location of the existing subject stations along the Green Line C Branch. Each subject station does not currently meet the accessibility criteria of the MBTA, ADA, NFPA 130, or MAAB. Refer to **Appendix E** for the photograph log of existing conditions.

Hawes Street Station

Hawes Street Station is in the median of Beacon Street, to the west of the Hawes Street intersection. The station consists of two surface-level paved platforms providing eastbound and westbound service. The platforms are opposite each other across the tracks on the west side of the intersection between Beacon Street and Hawes Street.

Kent Street Station

Kent Street Station is located in the median of Beacon Street and consists of two surface-level paved platforms providing eastbound and westbound service. The eastbound platform is located to the west of the Kent Street intersection and the westbound platform is located to the east of the Kent Street intersection.

Saint Paul Street Station

Saint Paul Street Station is located in the median of Beacon Street and consists of two surface-level paved platforms providing eastbound and westbound service. The eastbound platform is located to the west of the Saint Paul Street intersection and the westbound platform is located to the east of the Saint Paul Street intersection.

Summit Avenue Station

Summit Avenue Station is located in the median of Beacon Street, at the Summit Avenue intersection. The platforms are slightly offset from one another, with the westbound platform slightly to the east of the inbound platform. A pedestrian track crossing connects the two platforms.

Brandon Hall Station

Brandon Hall Station is located in the median of Beacon Street, at the Mason Path intersection. The station has a pedestrian crossing that connects the eastbound and westbound platforms and allows passengers to access crosswalks to sidewalks on the north and south sides of Beacon Street. There is a stairway that connects the station area to Beacon Street westbound. Both platforms, which are slightly offset extend across the pedestrian crossing.

Brandon Hall Station on Beacon Street. Brookline, Massachusetts

Fairbanks Street Station

Fairbanks Street Station is located in the median of Beacon Street. The station has a pedestrian crossing that connects the eastbound and westbound platforms and allows passengers to access crosswalks to sidewalks on the north and south sides of Beacon Street. There is a stairway that connects the station area to Beacon Street westbound. The eastbound platform is across from the Fairbanks Street intersection and extends across the pedestrian crossing. The westbound platform is across from the Lancaster Terrace intersection and also extends past the pedestrian crossing.

Tappan Street Station

Tappan Street Station is located in the median of Beacon Street, to the east of the Tappan Street and Williston Road intersections. The eastbound and westbound platforms oppose one another.

Dean Road Station

Dean Road Station is located in the median of Beacon Street, less than 800 feet from the MBTA Green Line D Branch Beaconsfield Station. The platforms are staggered across the intersection. The eastbound platform is located to the west of the Dean Road intersection and the westbound platform is located to the east of the Dean Road intersection.

Englewood Avenue Station

Englewood Avenue Station consists of opposing platforms located in the median of Beacon Street, to the west of the Englewood Avenue intersection.

1.2 Project Description

The Project includes the following upgrades to the Green Line C Branch subject stations:

- Raise existing platforms to 8 inches above the top of the adjacent rail elevation for a minimum of a 140-foot length.
- Widen platforms to a minimum 7 feet 6 inches, measured from the platform edge to the back of the accessible surface, including truncated dome panel edges. Wider platforms may be necessary in some cases to achieve accessibility where existing fixed obstructions (e.g., OCS poles) constrain passage.
- Construct at least two means of egress from each platform between stations to the public right-of-way (ROW) to improve safety for passengers in compliance with NFPA 130.
- Construct sloped walkways leading to the proposed raised platform levels and position or reposition pedestrian track crossings to the lower end of the transition walkways.
- Construct a new accessible, covered ramp at the consolidated Fairbanks and Brandon Hall station.
- Restripe crosswalks and repaint pedestrian track crossings.
- Adjust roadway layouts and street parking layouts to widen platforms, which may involve redesign of roadway, traffic, and utility systems.
- Install wayfinding and lighting per MBTA station standards. Pole-mounted lights may be located at the back edge of platforms. Emergency power (i.e., standby generators) would be established in the designs at each station location where feasible.
- Consolidate the existing Fairbanks Street Station and Brandon Hall Station at a new location between the existing stations meeting accessibility standards.
- Decommission the existing Kent Street Station.

Refer to **Figure 1.3a – Figure 1.3f** for the proposed conditions and environmental constraints of the Project Area.

1.3 Regulatory Context

1.3.1 Anticipated Permits and Approvals

Table 1-1 summarizes the anticipated federal, state, and local permits and approvals required for the Project.

Table 1-1 Anticipated Project Permits and Approvals

Agency/Department	Permit/Approval/Action
Federal	
Federal Transit Administration	National Environmental Policy Act (NEPA) Undocumented Categorical Exclusion
	Section 106 Review
U.S. Environmental Protection Agency	National Pollutant Discharge Elimination System (NPDES) Construction General Permit (if applicable)
	National Pollutant Discharge Elimination System Sector Specific Industrial Multi-Sector General Permit (if applicable)
U.S. Fish and Wildlife Service	Endangered Species Act (Section 7) Determination
State	
Massachusetts Department of Environmental Protection	Massachusetts Contingency Plan Review/Preliminary Determination (if required)
	Environmental Results Program Certification for Emergency Generators
	Asbestos, lead, and PCBS Notification (if required)
Massachusetts Department of Labor and Workforce Development and Division of Occupational Safety	Asbestos, lead, and PCBS Notification (if required)
Executive Office of Energy and Environmental Affairs	Massachusetts Environmental Policy Act Filing
Massachusetts Historical Commission	State Register Review
Massachusetts Water Resources Authority	8(m) Permit
Local	
Town of Brookline	Water, Sewer, or Drain Permit (if required)

1.4 Anticipated Project Schedule

Construction is anticipated to begin in late 2025 or early 2026 and be substantially completed in 2026, with finished and punch list work potentially completed in early 2027. It is anticipated that work would be limited to early access (9 PM to 5 AM shifts), extended weekend outages and up to nine-day surges with daytime and nighttime construction shifts as needed. Short term station closures would be required if large construction equipment must be positioned within rail infrastructure foul areas to rebuild the station platforms. Any temporary disruption to C Branch service would be replaced by shuttle bus services with accessible temporary bus stops.

1.5 Summary of Agency and Community Outreach

The MBTA has performed municipal outreach with the Town of Brookline to discuss the major aspects of the Project including, but not limited to, station consolidation options, MBTA station design, alterations to roadway cross sections, and construction sequencing.

Starting in 2020, the MBTA has held monthly meetings with Town of Brookline officials, including the Department of Public Works and the Transportation Board to drive the design of the Project and incorporate goals of the Town of Brookline.

The MBTA has also held the following public meetings to discuss Green Line improvements:

- Transportation Board virtual open meeting on February 14, 2024;
- In-person Open House at Brookline Public Library in Coolidge Corner on February 15, 2024;
- Transportation Board virtual open meeting on July 17, 2024;
- Commission on Disabilities virtual meeting on September 11, 2024; and
- Joint meeting of Shared Mobility Committee/Pedestrian advisory Committee/ Bicycle Advisory Committee on October 30, 2024.

Further coordination with the Town of Brookline, including a dedicated working group for the Project, and additional stakeholder meetings will be employed to finalize the design. The final design and construction entity will coordinate with the Town of Brookline on an ongoing basis and hold a public meeting at each phase of design.

Lastly, the MBTA has developed a robust Public Involvement Plan ("PIP") to serve as a guide during the MEPA process and beyond to ensure meaningful engagement with affected communities. Refer to **Appendix D** for the PIP.

1.6 Request for Rollover or Single EIR

In accordance with 301 CMR 11.06(7)(b), the Project is required to file an Environmental Impact Report (EIR) because the Project Area is located within an Environmental Justice designated population as depicted on the EEA Environmental Justice Maps Viewer. This dual Expanded Environmental Notification Form (EENF) and PEIR, in accordance with 301 CMR 11.05(9), contains a completed ENF Form with additional information and a Proposed EIR in accordance with 301 CMR 11.07(6) which describes and analyzes the Project and its alternatives, assesses its potential environmental and public health impacts and mitigation measures, and contains the analysis required in 301 CMR 11.07(6)(n).

Upon review of this PEIR, the Proponent respectfully requests that the Secretary allow a Rollover EIR, in accordance with 301 CMR 11.06(13), and that this PEIR is reviewed as a Final EIR to be published in the next Environmental Monitor. To assist in the review of this request, the following sections demonstrate how each Rollover EIR criteria is met, pursuant to 301 CMR 11.13(a-e). If the Secretary determines a Rollover EIR is not allowed, the Proponent requests that the Secretary allow a Single EIR in accordance with 301 CMR 11.06(8).

1.6.1 Complete Description and Assessment of Environmental Impacts

This PEIR presents a complete analysis of potential environmental and public health impacts, associated with the Project in **Chapter 3**, *Environmental Impacts*, and **Chapter 4**, *Environmental Justice and Public Health*. The PEIR also provides a detailed description of the proposed mitigation measures in **Chapter 5**, *Mitigation Summary*. An examination of possible Project alternatives in relation to station consolidations and associated impacts on walk time, travel time, and accessibility standards is included in **Chapter 2**, *Alternatives Analysis*.

1.6.2 Unfair/Inequitable Burden on Environmental Justice Populations

Throughout design, it has been a priority of the MBTA and the Town of Brookline to minimize potential adverse impacts from the Project and improve the quality of life of the surrounding neighborhoods through improved accessibility and safety of transit systems.

As demonstrated in **Chapter 4**, *Environmental Justice and Public Health*, the Project, including the specified impact minimization and mitigation measures, is not anticipated to have disproportionate adverse effects on Environmental Justice populations. This finding will be reassessed throughout design and construction.

1.6.3 Meaningful Public Involvement

As described in Section 1.5 above, the MBTA is committed to involving the public on the Project through implementation of a robust PIP (provided in **Appendix D**). The PIP intends to welcome public participation from local communities, C Branch users, and abutters. The public outreach focuses on notification/communication, community meetings, physical signage, and responsiveness.

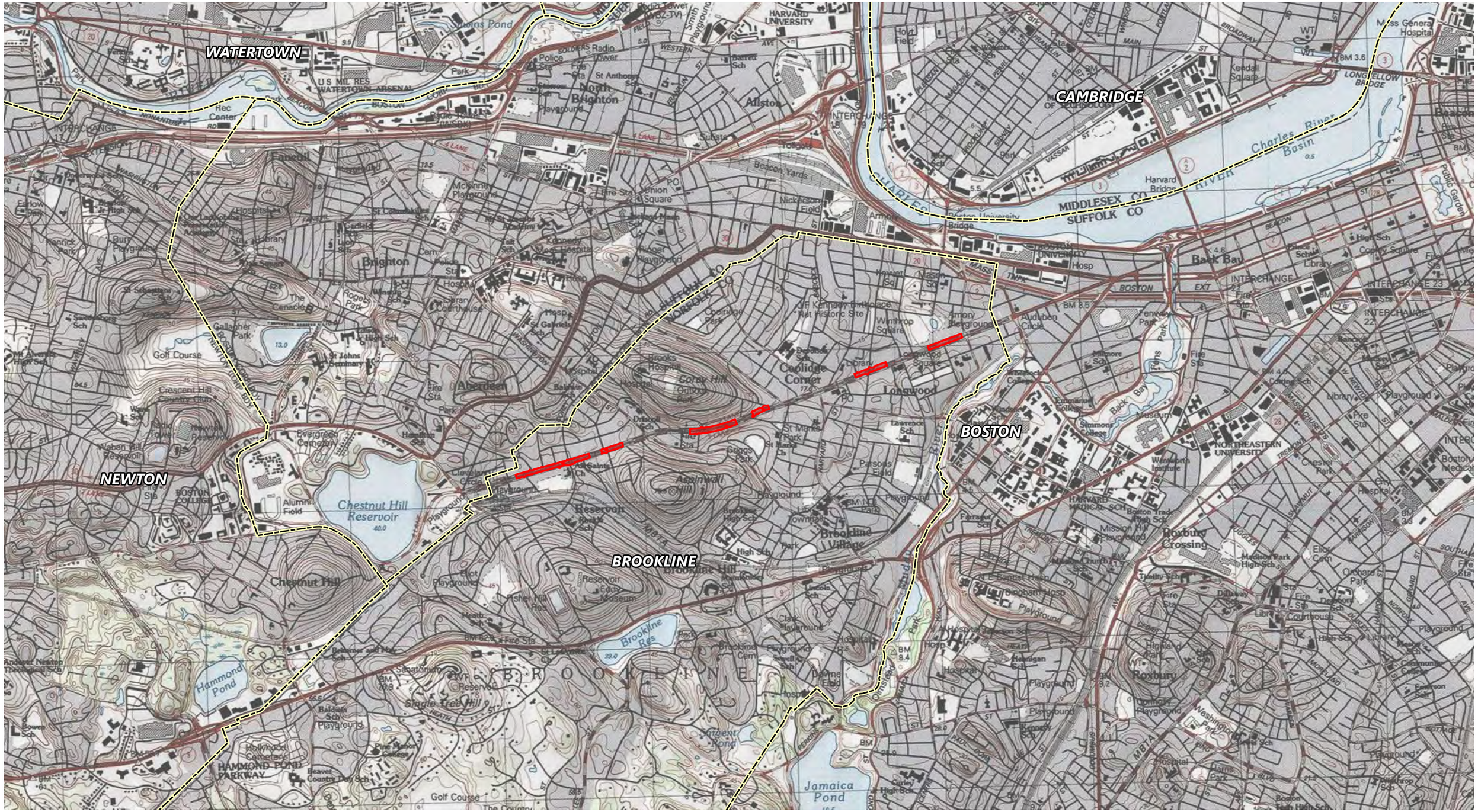
Multiple strategies and tools for communicating information and gathering input will broaden the reach of this Project and offer community members ways to participate at times and in locations that are convenient. The outreach program is designed to meet the particular needs and expectations of the public and stakeholder groups affected by the Project.

Key features of the PIP include:

- Development of clear and targeted materials that provide information on the Project. Materials may include flyers, social media posts, and email notifications.
- Communication with local community and business groups, abutters and stakeholders to publicize community meetings employing the Project database and other outreach strategies. The MBTA will notify the EJ CBO List and other interested groups of all public meetings and open houses.
- Translation services for Spanish, Russian, and Chinese, as identified by the Languages Spoken in Massachusetts tab of the Environmental Justice Populations in Massachusetts map.

1.6.4 Public Review

The PEIR has been prepared to fully address the Project's impacts related to the environment, as well as the surrounding community. Following the submission of the PEIR, the MBTA is committed to working closely with agencies and the public to address and resolve any comments that are received during the public comment period on the PEIR so that no substantive issues remain to be resolved. Following submission of the PEIR, and to ensure a thorough public review, the PEIR, if accepted as a Rollover EIR will be noticed in the subsequent Environmental Monitor resulting in two 30 day review periods.



Massachusetts Bay Transportation Authority

0 1000 2000 4000 Feet

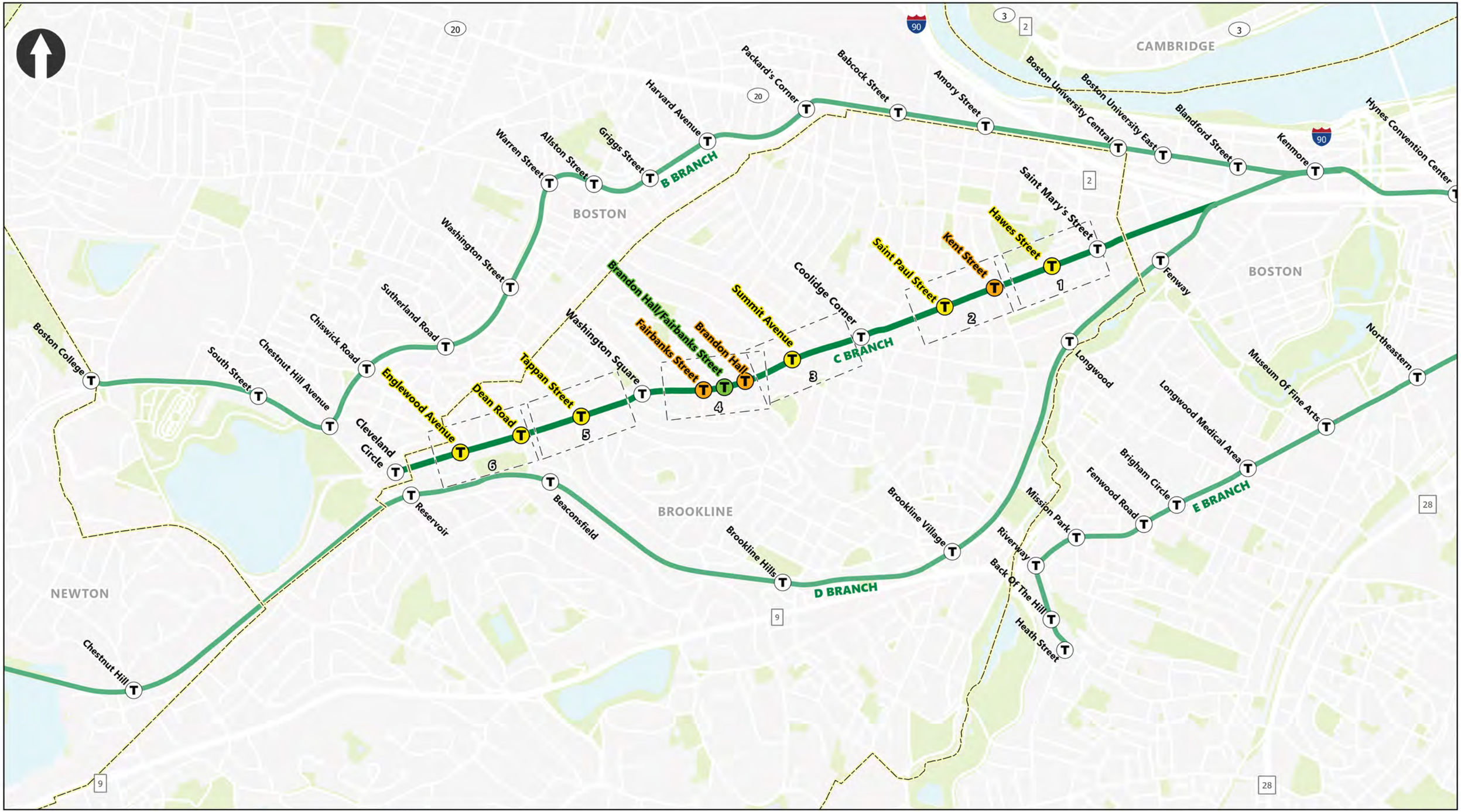
Source: MassGIS, USGS

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 1.1

USGS Location Map



Massachusetts Bay Transportation Authority

0 700 1400 2800 Feet

Source: MassGIS

Accessibility Upgrades
- Proposed New Station
- Station to be Decomissioned
- Station to be Upgraded
- Green Line Station

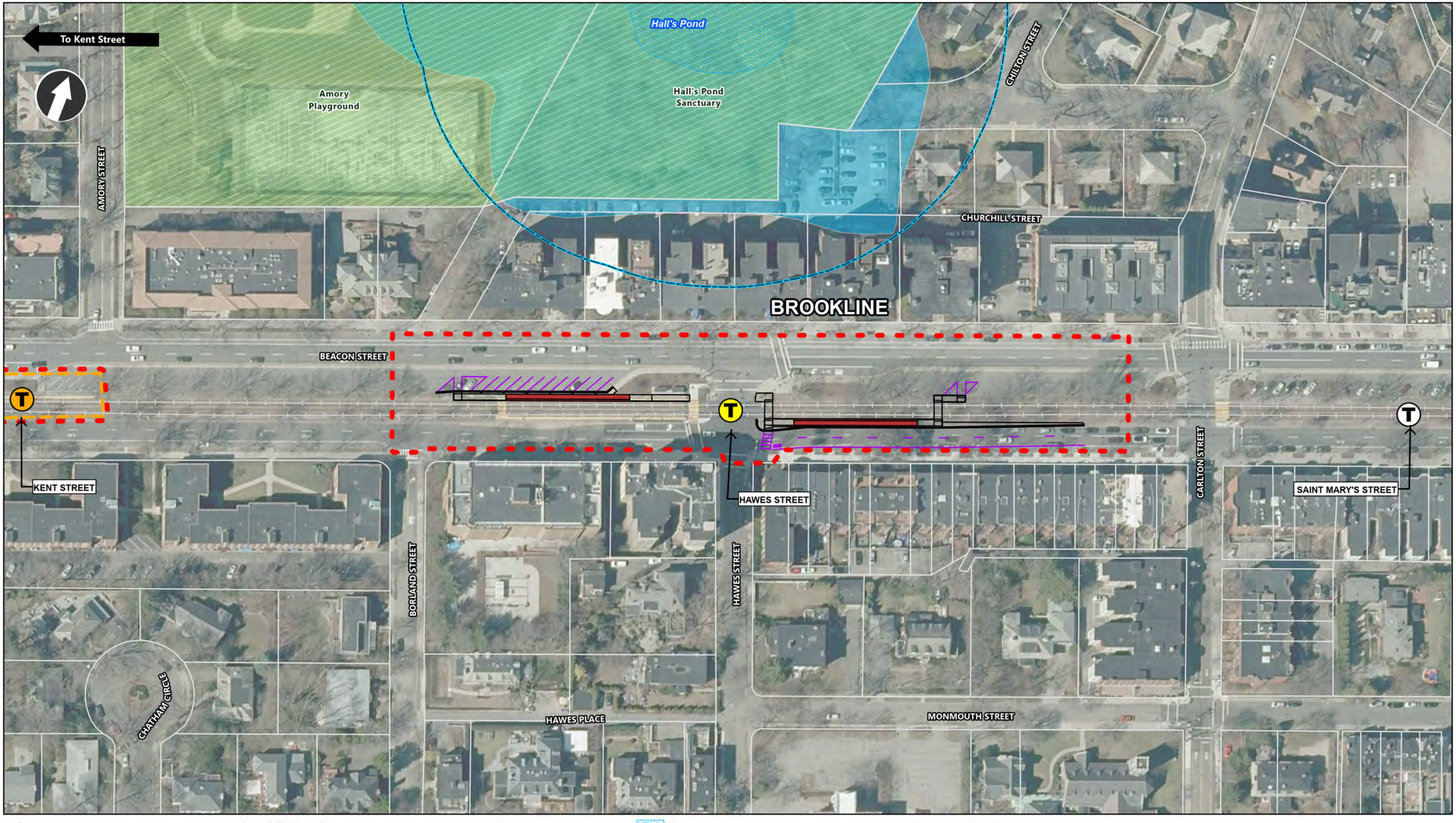
- Page Index
- Municipal Boundary
- MBTA Green Line

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 1.2

Environmental Constaints Index Map



Massachusetts Bay Transportation Authority

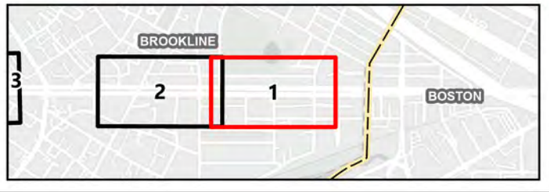
0 50 100 200 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station

- MBTA Green Line
- Limit of Disturbance
- Limits of Station to be Decommissioned
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- Open Water
- 100' Buffer Zone
- Conservation/Recreation Areas Protected Under Article 97
- 1% Annual Chance of Flooding
- Parcel Boundary



Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 1.3a

Environmental Constraints

PLEASANT STREET
To Coolidge Corner
JAMES STREET
SAINT PAUL STREET
PARKMAN STREET
POWELL STREET
Amory Playground
To Hawes Street
AMORY STREET
BROOKLINE
BEACON STREET
SAINT PAUL STREET
KENT STREET
MOSAIC BOSTON CHURCH
MARSHAL STREET
KENT STREET
SEWALL AVENUE
CHAUNCY CIRCLE

Massachusetts Bay Transportation Authority

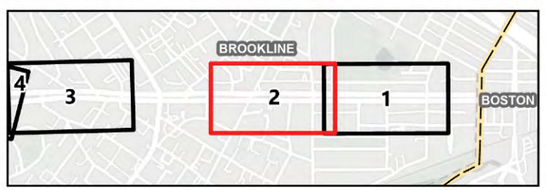
0 50 100 200 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station

- MBTA Green Line
- Limit of Disturbance
- Limits of Station to be Decommissioned
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- Conservation/Recreation Areas Protected Under Article 97
- Places Of Worship
- Parcel Boundary



Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 1.3b

Environmental Constraints

MASON TERRACE
To Brandon Hall
SUMMIT AVENUE
ATHERTON ROAD
WELLMAN STREET
To Coolidge Corner
SHORT STREET
WINCHESTER STREET
CENTRE STREET
BROOKLINE
MARION STREET
SUMMIT AVENUE
BEACON STREET
WEBSTER STREET
PARK STREET
MARION STREET
VERNON STREET
GRIGGS TERRACE
Griggs Park
Crowley Park
MARION TERRACE

Massachusetts Bay Transportation Authority

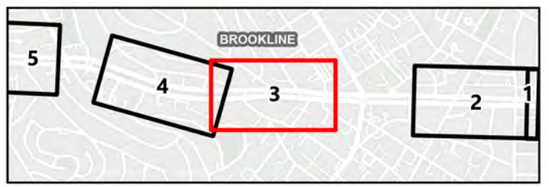
0 50 100 200 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station

- MBTA Green Line
- Limit of Disturbance
- Limits of Station to be Decommissioned
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- 100' Buffer Zone
- Conservation/Recreation Areas Protected Under Article 97
- Parcel Boundary

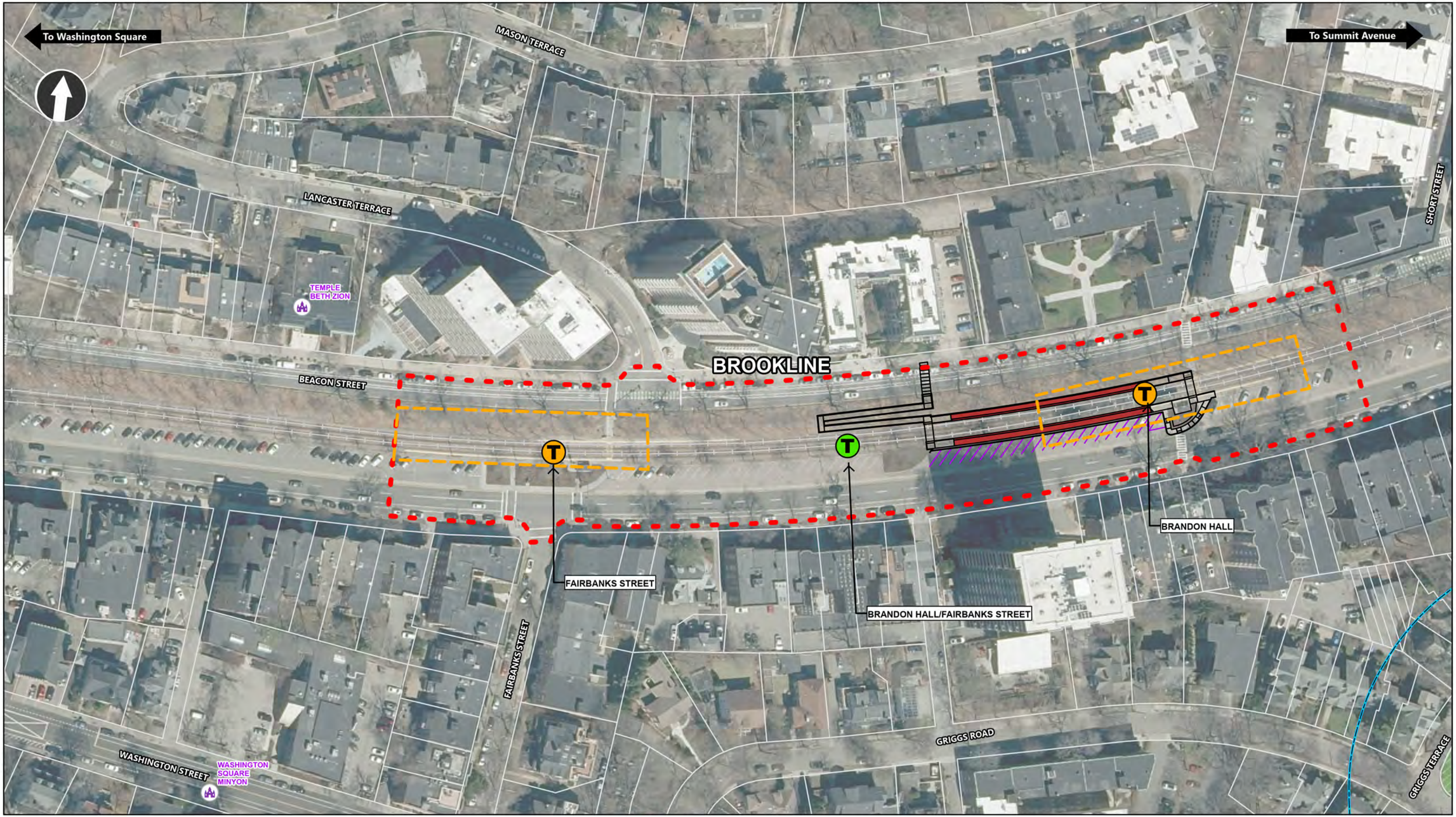


Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 1.3c

Environmental Constraints



Massachusetts Bay Transportation Authority

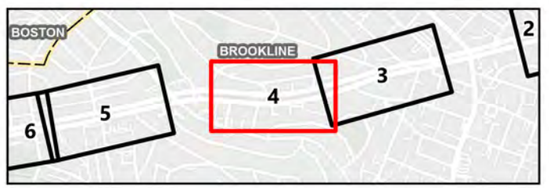
0 50 100 200 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station

- MBTA Green Line
- Limit of Disturbance
- Limits of Station to be Decommissioned
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- 100' Buffer Zone
- Conservation/Recreation Areas Protected Under Article 97
- Places Of Worship
- Parcel Boundary



Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 1.3d

Environmental Constraints

Massachusetts Bay Transportation Authority

0 50 100 200 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station

- MBTA Green Line
- Limit of Disturbance
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- Conservation/Recreation Areas
- School
- Parcel Boundary

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 1.3e

Environmental Constraints

To Cleveland Circle

BOSTON

ENGLEWOOD AVENUE

KILSYTH ROAD

WARWICK ROAD

SALISBURY ROAD

COREY ROAD

To Tappan Street

BEACON STREET

BROOKLINE

ENGLEWOOD AVENUE

CLINTON PATH

STRATHMORE ROAD

DEAN ROAD

THE EVERGREEN CHURCH OF BOSTON INC

DEAN ROAD

Waldstein Playground

Massachusetts Bay Transportation Authority

0 50 100 200 Feet

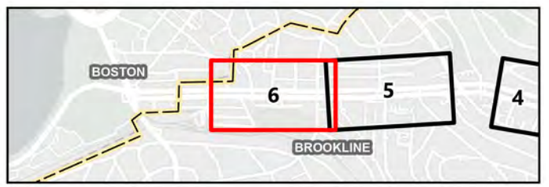
Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades

- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station

- MBTA Green Line
- Limit of Disturbance
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- Conservation/Recreation Areas Protected Under Article 97
- Places Of Worship
- Parcel Boundary



Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 1.3f

Environmental Constraints

2

Alternative Analysis

In accordance with MEPA requirements, this chapter identifies Project alternatives, and their potential impacts related to accessibility, change in walk access and egress time,[1] and net change in travel time.[2] This assessment includes a No Build Alternative as a baseline to compare to the build alternatives.

2.1 Introduction

Due to the complexity of the Project and the public's reliance on the Green Line C Branch, the MBTA undertook a detailed station consolidation analysis to compare three Build Alternatives. This analysis examines the impacts to the stations that are proposed to be consolidated as part of the Project.

2.2 Key Project Goals

Key goals of the Project used to inform the Build Alternatives include:

- Improving accessibility, particularly to allow for accessible boarding;
- Reducing or maintaining existing travel time and improving reliability; and
- Reducing or maintaining existing walk time to stations.

2.3 Preferred Alternative and No Build Alternative

2.3.1 Preferred Alternative

As described in Chapter 1, *Project Description*, the Project will address accessibility issues at Hawes Street Station, Saint Paul Street Station, Summit Avenue Station, Brandon Hall Station, Fairbanks Street Station, Tappan Street Station, Dean Road Station, and Englewood Avenue Station. Refer to Section 2.4.1.3 below for a detailed description of the Preferred Alternative.

2.3.2 No Build Alternative

The No Build Alternative would maintain existing conditions at the Project Area, as described in Section 1.2 of Chapter 1, *Project Description*.

1 Access is defined as trip time from the trip origin to the station. Egress is defined as the trip time from the station to the trip destination.

2 Travel time incorporates walk access/egress time and vehicle trip time.

The No Build Alternative would not modify the locations of any of the existing C Branch stations. The No Build Alternative would maintain several C Branch stations as inaccessible, due to the low station platform heights, and fail to meet the FTA mandate requiring that all C Branch stations be made accessible to continue train operations at all C Branch stations. The findings from the existing conditions analysis also apply to the No Build Alternative since the No Build does not modify the locations of any of the existing stations.

2.4 Alternatives Evaluation Criteria and Screening

The station consolidation analysis considered physical characteristics, demographics, walk access and egress time, and in-vehicle travel time to identify potential impacts. Based on the station consolidation analysis, the proposed C Branch station locations would be physically feasible and improve accessibility in the Build Alternatives. The proposed station locations in the Build Alternatives would:

- Improve the accessibility of the MBTA stations;
- Improve reliability for the line as a whole, while reducing in-vehicle travel time; and
- Result in slightly faster average passenger trip times.

2.4.1 Build Alternatives

2.4.1.1 Build Alternative 1

The Build Alternative 1 as illustrated in **Figure 2-1** would consist of the following:

- Decommissioning of the Englewood Avenue Station;
- Decommissioning of the Brandon Hall Station;
- Decommissioning of the existing Kent Street Station
- Maintaining the Hawes Street Station location, with a staggering of the platforms by keeping the location of the existing westbound platform and shifting the eastbound platform to be east of Hawes Street.

Accessibility

Under Build Alternative 1, the modified locations would provide the following physical benefits:

- The Dean Road Station would provide accessible boarding, access, and egress.
- The consolidated Fairbanks Street Station would provide accessible boarding, access, and egress.
- The Saint Paul Street Station would provide accessible boarding, access, and egress.

Change in Walk Access and Egress

While users of Dean Road Station, Fairbanks Station, and Saint Paul Street Station would have an increase in walk access and egress time under Build Alternative 1, the average increase in walk access and egress time is approximately ten seconds per passenger across all C Branch surface stations.

Net Change in Travel Time

Build Alternative 1 would result in increased passenger travel time by an average of approximately five seconds per passenger in the AM Peak eastbound and decrease passenger travel time by an average of approximately 78 seconds per passenger in the PM Peak westbound.

2.4.1.2 Build Alternative 2

Build Alternative 2 as illustrated in **Figure 2-2** would consist of the following:

- Decommissioning of the Dean Road Station;
- Decommissioning of the existing Kent Street Station;
- Decommissioning of the Brandon Hall Station;
- Maintaining the existing location of the Englewood Avenue Station, but shifts the eastbound platform to the east of Englewood Avenue;
- Maintaining of the Hawes Street Station location, with a staggering of the platforms by keeping the location of the existing westbound platform and shifting the eastbound platform to be east of Hawes Street (as proposed under Build Alternative 1).

Accessibility

Under Build Alternative 2, the modified locations would provide the following physical benefits:

- The upgraded Tappan Street Station would provide accessible boarding, access, and egress;
- The Fairbanks Street Station would provide accessible boarding, access, and egress. T
- The Saint Paul Street Station would provide accessible boarding, access, and egress.

Change in Walk Access and Egress

While users of Tappan Street Station, Fairbanks Street Station, and Saint Paul Street Station would have an increase in walk access and egress time under Build Alternative 2, the average increase in walk access and egress time is approximately five seconds per passenger across all C Branch surface stations.

Net Change in Travel Time

Build Alternative 2 would reduce passenger travel time by an average of approximately one second per passenger in the AM Peak eastbound and decrease passenger travel time by an average of approximately 44 seconds per passenger in the PM Peak westbound.

2.4.1.3 Build Alternative 3

Build Alternative 3 as illustrated in **Figure 2-3** consists of the following:

- Decommissioning of the existing Kent Street Station;
- Consolidation of the Fairbanks Street Station and Brandon Hall Station to a single station, which differs from Build Alternatives 1 and 2, spanning the area between the existing stations, shifting the eastbound platform to the west of the existing pedestrian crossing at Mason Path and the westbound platform fully to the east of the existing pedestrian crossing at Fairbanks Street;

- Maintaining of the Hawes Street Station location, with a staggering of the platforms by keeping the location of the existing westbound platform and shifting the eastbound platform to be east of Hawes Street (as proposed under Build Alternatives 1 and 2);
- Maintaining of the existing location of the Englewood Avenue Station, but shifts the eastbound platform to the east of Englewood Avenue (as proposed under Build Alternative 2);
- Maintaining of the existing location of the Dean Road Station, but shifts the eastbound platform to the east of Dean Road and the westbound platform to the west of Dean Road; and
- Maintaining of the existing location of the Summit Avenue Station, but shifts both platforms further west, immediately to the east of the Marion Street intersection.

Accessibility

Under Build Alternative 3, the modified locations would provide the following physical benefits:

- The consolidated Fairbanks Street/Brandon Hall Station would provide accessible boarding, access, and egress. The station would maintain access from the existing pedestrian crossings at Fairbanks Street and Brandon Hall; and
- The Saint Paul Street would provide accessible boarding, access, and egress.

Change in Walk Access and Egress

While users of Fairbanks Street/Brandon Hall Station and Saint Paul Street Station would have an increase in walk access and egress time under Build Alternative 3, the average increase in walk access and egress time is approximately five seconds per passenger across all C Branch surface stations.

Net Change in Travel Time

Build Alternative 3 would reduce passenger travel time by an average of approximately 31 seconds per passenger in the AM Peak eastbound and decrease passenger travel time by an average of approximately 54 seconds per passenger in the PM Peak westbound.

2.4.1.4 Build Alternative 3A

As a result of ongoing discussions with the Town of Brookline, the design of the Build Alternative 3 was advanced to redesign the consolidated Fairbanks Street/Brandon Hall Station to reduce Project impacts related to tree removal and the loss of parking spaces (referred to as Build Alternative 3A). The revised design aligns the eastbound and westbound platforms so that they are situated across from each other and shifts the consolidated station to the west side of the existing Brandon Hall Station pedestrian track crossing. The updated configuration also provides a single sloped walkway on the western portion of the westbound platform with a pedestrian crossing at each end of the platforms and removal of the existing stairway at Brandon Hall Station.

2.4.2 Summary of Build Alternatives

Based on the evaluation above, the proposed Green Line C Branch station consolidations would provide the following improvements:

- Improved accessibility of the MBTA stations;
- Improved in-vehicle travel time;

- Maintained access for Environmental Justice communities;
- Maintained access to sensitive land uses;
- Reduced average passenger trip time;
- Avoidance of excessive tree and parking impacts by consolidating stations; and
- Opportunity to further decrease in-vehicle travel time by staggering certain platforms to the far side of corridor intersections, allowing implementation of a Transit Signal Prioritization, reducing train stoppage at these intersections.

Table 2-1 below outlines how each Build Alternative meets or fails to meet the criteria of the Project goals of accessibility, change in walk access and egress time, and net change in travel time. The numbers (1,2,3) are used to rank the ability of the Build Alternatives to meet the station consolidation criteria. The higher the number indicates the greater ability of the Build Alternative to meet the overall Project goals.

Table 2-1 Summary of Green Line C Branch Build Alternatives

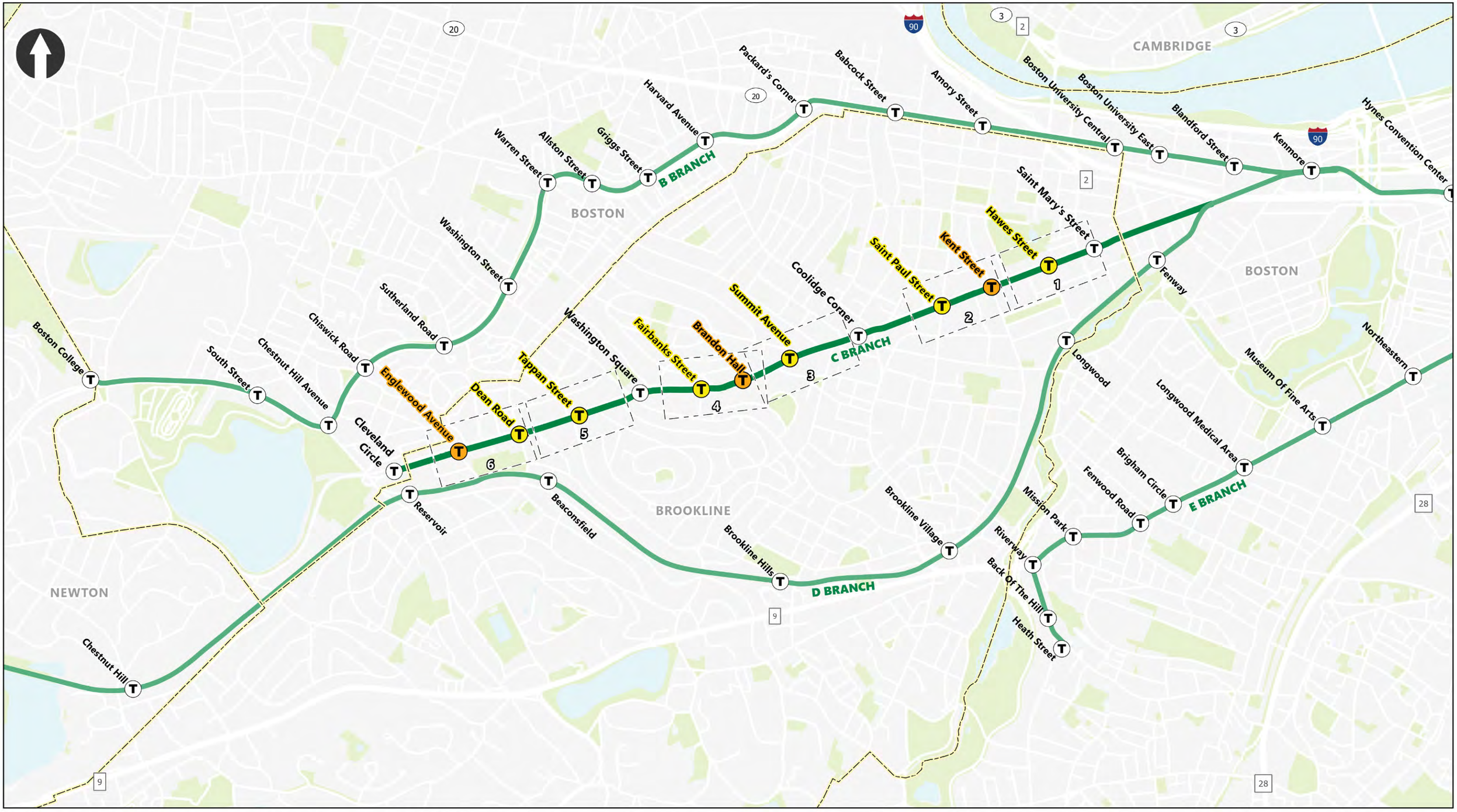
Station Consolidation Criteria	No-Build Alternative	Build Alternative 1	Build Alternative 2	Build Alternative 3A (Preferred Alternative)
Accessibility	**1**	3	3	3
Change in Walk Access and Egress	2	2	2	2
Net Change in Travel Time	2	2	2	3
Total	**5**	**7**	**7**	**8**

(1) = Fails to meet criteria
(2) = Below criteria
(3) = Meets criteria

Following the proposed station consolidation analysis, the MBTA continued to conduct public outreach and solicit feedback from the Town of Brookline on the proposed station locations in order to meet the needs of local residents and stakeholders. As design advanced, the MBTA reached concurrence that Build Alternative 3A is the Preferred Alternative as it meets the goals of the Project.

2.4.3 Platform Configuration Options

During the concept design phase of the Project, multiple options were developed for each station and platform location with the primary consideration being the configuration of the platforms. At each station, both staggered and parallel platform options were developed to understand impacts as a result of each concept, except for Tappan Street Station, which only included a parallel station concept due to its location relative to the nearest intersection. Each concept assumed a minimum platform length of 140 feet set eight inches above the nearest top of rail, a minimum platform width of seven-feet six-inches, two accessible means of egress, and a maximum grade along the path of travel of 5.7 percent. The staggered platform concepts were developed with the platforms on the far side of the intersection to help facilitate Transit Signal Priority, which is being implemented along Beacon Street in the Town of Brookline, while the parallel platform concepts maintained the existing footprint for the most part. In addition to the configuration of the platforms, each concept identified impacts to roadway, parking, traffic operations (specifically related to elimination of dedicated left turn lanes), and drainage, location of platform amenities, improvements to pedestrian paths of travel, identification of points of safety to comply with NFPA 130, upgrades to non-compliant pedestrian curb ramps, and the location of emergency generators and supporting electrical equipment.



Massachusetts Bay Transportation Authority

0 700 1400 2800 Feet

Source: MassGIS

Accessibility Upgrades
- Proposed New Station
- Station to be Decomissioned
- Station to be Upgraded
- Green Line Station

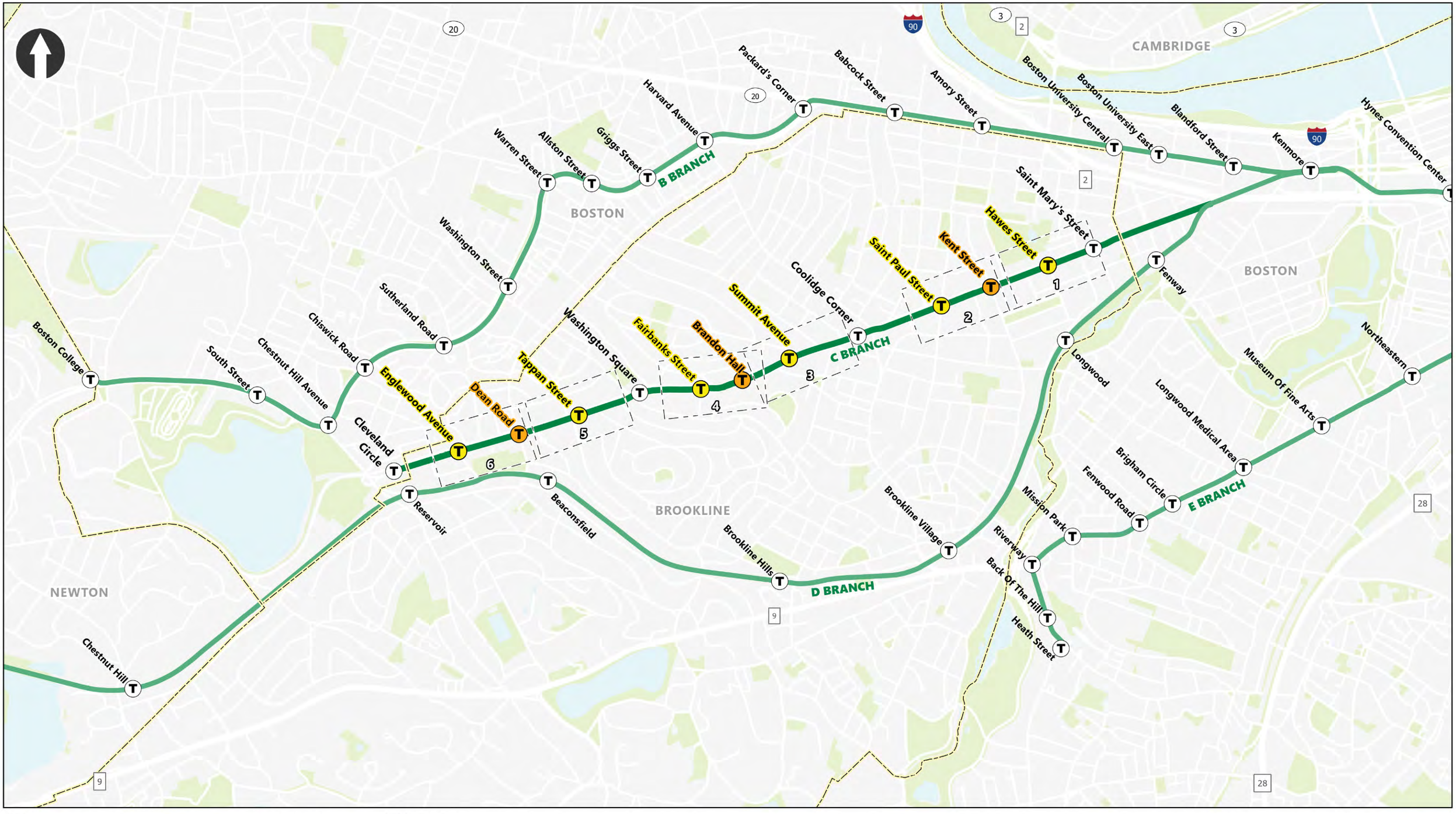
- Page Index
- Municipal Boundary
- MBTA Green Line

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 2.1

Build Alternative 1 Station Locations



Massachusetts Bay Transportation Authority

0 700 1400 2800 Feet

Source: MassGIS

Accessibility Upgrades
- Proposed New Station
- Station to be Decomissioned
- Station to be Upgraded
- Green Line Station

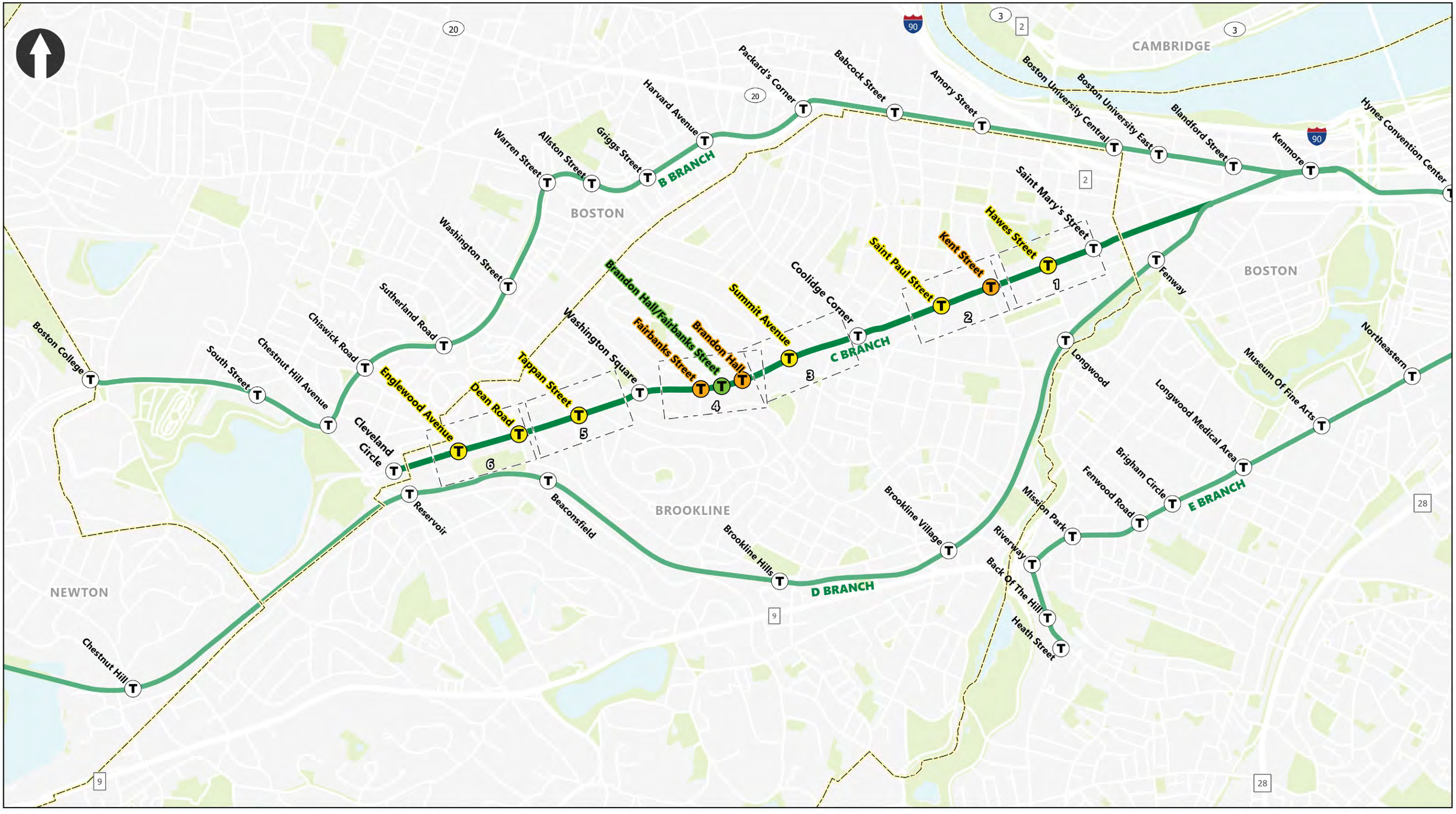
- Page Index
- Municipal Boundary
- MBTA Green Line

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 2.2

Build Alternative 2 Station Locations



Massachusetts Bay Transportation Authority

0 700 1400 2800 Feet

Source: MassGIS

Accessibility Upgrades
- Proposed New Station
- Station to be Decomissioned
- Station to be Upgraded
- Green Line Station

- Page Index
- Municipal Boundary
- MBTA Green Line

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 2.3

Build Alternative 3 Station Locations

3

Environmental Impacts

This chapter analyzes potential impacts on environmental resources as a result of the Project. Environmental resources evaluated include:

- Land Use
- Transportation
- Air Quality
- Noise and Vibration
- Climate Change Resiliency
- Stormwater Management/ Water Quality
- Natural Resources
- Hazardous Materials
- Historic and Archaeological Resources

3.1 Existing Conditions

This section describes the existing conditions of environmental resources throughout the Project Area to establish a baseline for assessing impacts that are presented in Section 3.2 and Section 3.3. **Figures 1-3a – Figure 1-3f** show the existing conditions of the Project.

3.1.1 Land Use

The Project Area is located along a transit corridor that is bordered by densely populated residential and developed commercial land uses. All proposed work along the C Branch is transportation-related and would occur entirely within the existing shared road (Beacon Street) and rail right-of-way (ROW).

3.1.2 Transportation

The following sections describe the existing conditions in the Project Area as it relates to transit, vehicles, pedestrians, bicyclists, and parking.

3.1.2.1 Transit

The Project Area is served by the MBTA Green Line C Branch Light-Rail Transit service. The C Branch travels from Cleveland Circle Station in the west to Government Center Station in the east and operates at surface level in the median of Beacon Street between Cleveland Circle Station and the portal east of Saint Mary's Street Station. Service is provided seven days a week, operating from 5:00 AM to 12:52 AM on weekdays, from 4:50 AM to 12:54 AM on Saturday, and from 5:30 AM to 12:52 AM on Sunday.[1] Trains on the C Branch run every 6 to 8 minutes during peak periods on weekdays, every 7 to 12

1 Based on MBTA Rapid Transit Schedule, effective August 25, 2024. Retrieved from https://cdn.mbta.com/sites/default/files/media/route_pdfs/batch_7116/SUB-S4-P4.pdf

minutes during off-peak periods on weekdays, every 8 to 12 minutes on Saturday, and every 9 to 13 minutes on Sunday.

The C Branch serves 13 surface-level stops between Cleveland Circle and the portal east of Saint Mary's Street. All stations are in the median of Beacon Street and riders access the platforms by using crosswalks across the eastbound and westbound roadways of Beacon Street. Nine of the stations, which are the subject stations located within the Project Area, do not currently meet the accessibility criteria of the MBTA, ADA, NFPA, or MAAB.

Within the Town of Brookline, the Project Area is also served by two MBTA bus routes:

- Bus Route 65 travels between Brighton Center and Kenmore Station and travels on Washington Street in the Town of Brookline. C Branch riders can transfer between the C Branch and Bus Route 65 at the Washington Square Station. Bus Route 65 operates six days a week, Monday through Saturday, with service provided every 8-to-12 minutes during peak periods on weekdays, every 70 minutes during off-peak periods on weekdays, and every 60 minutes on Saturday.[2]
- Bus Route 66 travels between Harvard Square and Nubian Station and travels on Harvard Street in the Town of Brookline. C Branch riders can transfer between the C Branch and Bus Route 66 at the Coolidge Corner Station. Bus Route 66 operates seven days a week with service provided every 10 to 11 minutes during peak periods on weekdays, every 12 to 15 minutes during off-peak periods on weekdays, every 12 minutes on Saturday, and every 15 minutes on Sunday.

3.1.2.2 Vehicles

The Beacon Street corridor serves as a major east-west roadway in Brookline connecting Washington Square and Coolidge Corner with the Cleveland Circle area of Boston in the west and the Fenway area of Boston in the east. Beacon Street is classified as an urban principal arterial under local control. The roadway contains two travel lanes in the eastbound direction and one-to-two travel lanes in the westbound direction; two westbound travel lanes are provided between Saint Mary's Street and Marion Street and between Westbourne Terrace and Ayr Road and one westbound travel lane is provided between Marion Street and Westbourne Terrace. Signalized intersections are provided at the following locations: Saint Mary's Street, Carlton Street, Hawes Street, Kent Street/Powell Street, Saint Paul Street, Charles Street, Pleasant Street, Harvard Street, Centre Street, Winchester Street, Summit Avenue, Marion Street, Lancaster Terrace, Fairbanks Street, Washington Street, Williston Road/Tappan Street, Corey Road/Dean Road, and Englewood Avenue. Dedicated left turn lanes are provided at most signalized intersections. At locations where dedicated left turn lanes are not provided, left turns and U-turns are prohibited from crossing the C Branch tracks that are in the Beacon Street median.

3.1.2.3 Pedestrians

Within the Project Area, sidewalks are provided on both sides of all roadways. Signalized crosswalks are provided across Beacon Street at all signalized intersections. Unsignalized crosswalks across Beacon Street are provided west of Strathmore Road, west of Winthrop Road, east of Westbourne Terrace, and

2 Based on MBTA 2024 System Map, Retrieved from https://cdn.mbta.com/sites/default/files/2024-08/2024-08-25-system-map-brochure.pdf

west of Short Street. Crosswalks across Beacon Street connect to all C Branch station platforms, providing access points for pedestrians to access the C Branch stations.

3.1.2.4 Bicycles

The following bicycle accommodations are provided on Beacon Street in the Town of Brookline:

- Beacon Street Eastbound:
  - Between Ayr Road and Washington Street, shared lane markings are provided.
  - Between Washington Street and Centre Street, an on-road bicycle lane without a buffer is provided.
  - Between Centre Street and Saint Mary's Street, shared lane markings are provided.
- Beacon Street Westbound:
  - Between Saint Mary's Street and Carlton Street, a parking-protected on-road bicycle lane is provided.
  - Between Carlton Street and Pleasant Street, an on-road bicycle lane without a buffer is provided.
  - Between Pleasant Street and Marion Street, shared lane markings are provided.
  - Between Marion Street and Westbourne Terrace, an on-road buffered bicycle lane is provided.
  - Between Westbourne Terrace and Washington Street, shared lane markings are provided.
  - Between Washington Street and Ayr Road, an on-road bicycle lane without a buffer is provided.

Bicycle left-turn boxes are provided at the signalized intersections of Beacon Street at Webster Street, Beacon Street at Harvard Street, and Beacon Street at Saint Paul Street.

Bikeshare in the Town of Brookline is provided by the Bluebikes system. Bluebikes allows riders to pick up a bicycle at any Bluebikes station within Brookline and 12 additional surrounding communities and then return the bicycle at any other station. Bicycles are unlocked via a mobile app and can be picked up or returned at over 400 stations. Bluebikes stations along the Beacon Street corridor are provided at Tappan Street, Washington Square, Centre Street, Kent Street/Powell Street, and Saint Mary's Street. All five Bluebikes stations are located within 500 feet of a C Branch station.

3.1.2.5 Parking

Along the Beacon Street corridor within the Town of Brookline, there are approximately 1,349 on-street parking spaces. Metered, and unmetered, parallel parking spaces are provided on the north and south sides of Beacon Street and metered angled parking spaces are provided in the median of Beacon Street next to the C Branch tracks. Of the 1,349 on-street parking spaces, 47 spaces are designated as accessible parking spaces.

3.1.3 Air Quality

Brookline is located in Norfolk County and is in attainment of all current National Ambient Air Quality Standards (NAAQS). This county has previously had nonattainment for the 8-hour (1997 Revoked) and 1-hour (1979 Revoked) ozone standards. Because of this former nonattainment status, federally funded

projects in this county must demonstrate Air Quality Conformity in order to be compliant with the State Implementation Plan (SIP).

The MassDEP maintains a network of air quality monitors to measure background concentrations for criteria pollutants regulated by the NAAQS. Background concentrations represent pollution levels from all sources, i.e., stationary and mobile, in the area surrounding the monitoring location. MassDEP and the EPA determine appropriate monitoring locations to capture regional data; therefore, the most applicable monitoring location may not be proximal to the actual Project Area. **Table 3-1** below displays representative background concentrations for NAAQS criteria pollutants.

Table 3-1 Representative Pollutant Background Concentrations

Pollutant		Averaging Time	Monitoring Location	Background Concentration	NAAQS Value	% of NAAQS
Carbon Monoxide		1-hour	Harrison Avenue, Boston	1.6 ppm	35 ppm	5%
		8-hour	Harrison Avenue, Boston	1.0 ppm	9 ppm	11%
Nitrogen Dioxide		1-hour	Kenmore Square, Boston	44 ppb	100 ppb	44%
		Annual	Kenmore Square, Boston	11 ppb	53 ppb	21%
Ozone		8-Hour	Harrison Avenue, Boston	0.064 ppm	0.070 ppm	91%
Particulate Matter[1]	PM_{10}	24-hour	Harrison Avenue, Boston	34 µg/m^3	150 µg/m^3	23%
	$PM_{2.5}$	24-hour	Kenmore Square, Boston	16 µg/m^3	35 µg/m^3	46%
		Annual	Kenmore Square, Boston	6.7 µg/m^3	9.0 µg/m^3	74%
Sulfur Dioxide		1-hour	Kenmore Square, Boston	2 ppb	75 ppb	3%

Source: 2023 EPA Design Values (https://www.epa.gov/air-trends/air-quality-design-values)
1 2023 PM Design Values were not available at the time of this report. 2022 values are presented.

3.1.4 Noise and Vibration

While the MBTA is exempt from local noise ordinances, the MBTA and construction contractor will follow the ordinances to the extent practicable for both temporary construction activities and operations. An assessment for noise and vibration impacts was conducted as part of the FTA's NEPA categorical exclusion (CE) filing, which followed the methodologies and criteria of the 2018 FTA Noise and Vibration Impact Assessment Manual.[3] Maximum noise level restrictions will be placed on vehicular sources and specific construction equipment as shown in **Table 3-2** below.

3 Federal Transit Administration. (2018). Transit noise and vibration impact assessment manual (FTA Report No. 0123). U.S. Department of Transportation. Retrieved from https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Table 3-2 Construction and Maintenance Equipment Maximum Noise Levels (dBA)

Equipment	Maximum Noise Level
Backhoe, Bulldozer, Concrete Mixer, Dump Truck, Loader, Roller, Scraper, Pneumatic Tools, Paver	90
Air Compressor	85
Generator	80
Electric Drills, Power Tools, Sanders, Saws, etc.	75
Woodchipper, Running Concrete Mixer, Leaf Vacuum	90
Chainsaw, Solid Waste Compactor, Tractor (Full-Size)	85
Home Tractor, Snow Blower	80
Lawn Mower, Trimmer	75
Leaf Blowers	67
All Vehicles over 10,000 lbs. GVWR or GCWR	85
Automobiles and Light Trucks	75

Source: Noise Control By-law of the Town of Brookline, Section 8.15.6c.
Note: Maximum noise level measurements are to be made 50 feet from the noise source.

3.1.5 Climate Change Adaptation and Resiliency

The EEA released the *MEPA Interim Protocol on Climate Change Adaptation and Resiliency*,[4] effective on October 1, 2021, to "strengthen the resilience of communities, prepare for the impacts of climate change, and proactively plan for and mitigate damage from extreme weather events." This interim protocol describes how projects should address existing and anticipated vulnerabilities as a result of Project components and activities.

This Project will follow the design principles and guidelines that advance sustainability and enhance the Green Line's resiliency in this changing climate including the Design for the Environment Guidance MBTA Green Line Projects[5] (DFE) which is intended to help both designers and construction contractors comply with applicable environmental regulations and incorporate appropriate sustainability and resiliency measures to enhance the design and construction of Green Line Projects. The Project will also adhere to the August 30, 2019, MBTA's *Green Line Transformation Design Criteria*[6] document which outlines the design principles and guidelines for resiliency and adaptation aspects of the Project. These design criteria are aimed at reducing the impacts of future flooding, extreme heat, and extreme storms.

All projects filing with the MEPA Office are required to run the state's Resilient Massachusetts Action Team (RMAT) Climate Resilience Design Standards Tool (RMAT Tool) and submit the output report generated from it as an attachment to ENF/EENF submittals. The RMAT Tool is an interactive web-based tool that compiles the state's available climate change data, outputs a preliminary climate risk and exposure screening, and provides recommendations for climate adaptation and resiliency

4 Massachusetts Executive Office of Energy and Environmental Affairs. (2021). *MEPA interim protocol on climate change adaptation and resiliency*. Retrieved from https://www.mass.gov/doc/mepa-interim-protocol-on-climate-change-adaptation-and-resiliency-effective-oct-1-2021/download

5 *MBTA Design for the Environment Guidance Green Line Projects*. August 2024

6 *Green Line Transformation Design Criteria*. August 2019

improvements. RMAT reports (**Appendix B**) were generated for the Project Area of each C Branch subject station. **Table 3-3** below presents climate related exposures according to the RMAT Tool.

For the C Branch subject stations, none are projected to be exposed to sea level rise/storm surge. Additionally, with the exception of Hawes Street Station (which received moderate exposure), no subject stations are exposed to riverine flooding. All subject stations have high exposure rating for urban flooding and extreme heat. Sections 3.1.5.1 and 3.1.5.2 below address extreme precipitation and extreme heat, respectively.

Table 3-3 RMAT Report Results

	Sea Level Rise/ Storm Surge		Extreme Precipitation/ Riverine Flooding		Extreme Precipitation/ Urban Flooding		Extreme Heat	
C Branch Stations	Risk	Exposure	Risk	Exposure	Risk	Exposure	Risk	Exposure
Hawes Street	Low Risk	Not Exposed	Moderate Risk	Moderate Exposure	High Risk	High Exposure	High Risk	High Exposure
St. Paul Street/ Kent Street	Low Risk	Not Exposed	High Risk	Not Exposed	Low Risk	High Exposure	High Risk	High Exposure
Summit Avenue/ Fairbanks Street/ Brandon Hall	Low Risk	Not Exposed	High Risk	Not Exposed	Low Risk	High Exposure	High Risk	High Exposure
Tappan Street/ Englewood Avenue/ Dean Road	Low Risk	Not Exposed	High Risk	Not Exposed	Low Risk	High Exposure	High Risk	High Exposure

3.1.5.1 Floodplain Impacts

As shown in **Figure 1-3a** through **Figure 1-3f**, the Project Area is not located within a floodplain. Therefore, no impacts on floodplain capacity or flooding of the Project Area are anticipated.

3.1.5.2 Extreme Precipitation

All C Branch stations studied using the RMAT Tool received a high exposure rating for extreme precipitation from urban flooding because the maximum annual daily rainfall exceeds ten inches within the Project's useful life and the existing impervious area of the Project Area is greater than 50 percent. However, the Project Area does not have a history of flooding or propose an increase in impervious area.

The Hawes Street Station received a moderate exposure for riverine flooding associated with future extreme precipitation events. As described in the RMAT report, this rating is based on the Project Area's proximity to a waterbody (within 500 feet) and its elevation relative to the waterbody (less than 20 feet above). The waterbody that meets these criteria is Hall's Pond. Hall's Pond does not receive inflow from any streams, its only water source is stormwater runoff from the surrounding watershed. As a result, Hall's Pond does not experience riverine flooding. Therefore, the Project Area around the Hawes Street Station is not likely to be exposed to riverine flooding in the future within the recommended planning horizon.

3.1.5.3 Extreme Heat

Due to its densely developed urban setting, the Project Area received a high exposure rating for extreme heat because an increase of 10 to 30 days over 90-degrees Fahrenheit is anticipated within the Project's useful life and the existing impervious area of the Project Area is greater than 50 percent.

3.1.5.4 MBTA Climate Change Vulnerability Assessment

A MBTA Climate Change Vulnerability Assessment (CCVA) was completed in 2022 to examine the existing and future climate vulnerabilities of the Green Line from Science Park Station to the terminus of the B, C, D, and E branches and provide recommendations on planning resilient infrastructure.

The CCVA considers extreme heat, precipitation, storm surge, wind, and winter weather in its evaluation of climate hazards on the planning horizons of 2030 and 2070. To calculate the risk and vulnerability of MBTA assets, the MBTA examined exposure, sensitivity, and adaptive capacity, as shown in the graphic below.

The variables of exposure, sensitivity, and adaptive capacity are scored from 1 to 4, and then weighted equally resulting in an overall vulnerability score from 1 to 4, where 1 is the least vulnerable and 4 is the most vulnerable. An overall vulnerability score is assigned to each station based on the average of the 2030 vulnerability scores across all climate stressors. Green Line C Branch stations did not meet the "Increased Vulnerability" designations with the exception of Saint Mary's Street Station, which received a vulnerability score of 2.57 in terms of the 2030 projection and a vulnerability score of 2.63 for the 2070 projection. The nine subject stations of the Project all received a score of 2.37.

3.1.5.5 RMAT Climate Resilience Design Standards Tool vs. MBTA Climate Change Vulnerability Assessment

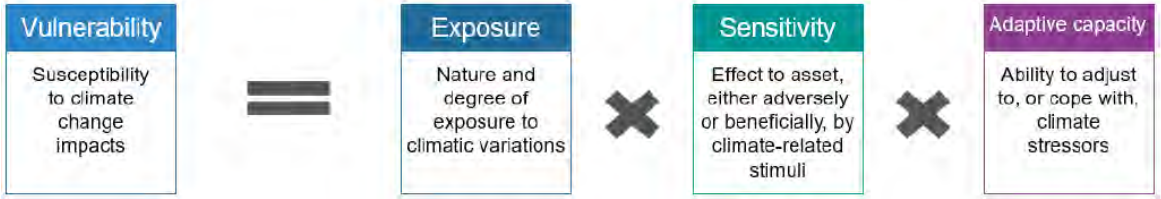
The MBTA CCVA and the RMAT Tool both provide risk ratings associated with sea level rise/storm surge, precipitation, and extreme heat. The CCVA also examines the risk of wind and winter weather on the MBTA assets. The RMAT Tool and CCVA both utilize the 2070 planning horizon, while the CCVA also analyzes the 2030 planning horizon for assets that have a shorter useful life.

3.1.6 Stormwater Management and Water Resources

The existing stormwater management system in the Project Area is owned and maintained by the Town of Brookline. This system includes stormwater manhole, inlets, and conveyance drainage lines. The Project Area is not located near wellhead protection areas, surface drinking water supplies, or outstanding resource waters. The nearest water body is the Chestnut Hill Reservoir (MA72023). The Project Area is not within 100 feet of any Wetland Protection Act jurisdiction.

3.1.7 Natural Resources

According to a July 18, 2024, desktop review of MassWildlife's Natural Heritage and Endangered Species Program data on MassMapper, the Project Area is within a densely developed, urban setting and does not include critical habitat areas, Priority Habitat of Rare Species or Estimated Habitat of Rare Wildlife, or vernal pools.



The July 17, 2024 Official Species List from the U.S. Fish and Wildlife Service (USFWS) identified the endangered northern long-eared bat, the candidate species monarch butterfly, and the endangered (proposed) tricolored bat.[7]

The Project is not within any wetland resource areas or associated buffers protected under the jurisdiction of the Massachusetts Wetlands Protection Act (WPA).

3.1.8 Hazardous Materials

An August 2024 desktop review of the MassDEP Bureau of Waste Site Cleanup online database identified 31 state-listed disposal sites within a 500-foot radius of the Project. Of the 31 disposal sites, 26 disposal sites were identified within the vicinity of the Project Areas with the potential to impact the Project, based on the severity of the release, type of contaminants, and current regulatory status. If a reportable condition is identified during Project excavations per the MCP, construction activities would need to be conducted under a Utility Related Abatement Measure (URAM) and impacted soil and/or groundwater would require handling under appropriate documentation such as a Material Shipping Record, Bill of Lading, or manifest. Contract documents would necessitate the Contractor comply with requirements of the MCP. The Contractor would be responsible for contracting an LSP during construction, with MBTA oversight.

3.1.9 Historic and Archaeological Resources

The Massachusetts Historical Commission (MHC) Inventory of the Historic and Archaeological Assets of the Commonwealth (the Inventory) was reviewed to determine resources which fell wholly or partially within the Project site and within 150 feet of the limits of work (Area of Potential Effect). Summarized in **Table 3-4** below, there are 23 resources recorded in the Inventory. Of these resources, nine are listed in and one is considered eligible for listing in the State/National Register of Historic Places. Refer to **Figure 3-1a** through **Figure 3-1f** for locational information of these resources.

7 The status of the monarch butterfly and tricolor bat do not provide protection under the Endangered Species Act, and no further coordination with the USFWS is required at this time.

Table 3-4 Inventoried Properties Located within the Project Area and APE

MHC Inv. No.	Resource Name	Location	Designation
BKL.A	Cottage Farm Historic District	Centered around the intersection of Essex and Ivy streets, Brookline	NRDIS
BKL.K	Beacon Street Historic District	Beacon Street, Brookline	NRDIS
BKL.R	Strathmore Road Historic District	Strathmore Road, Brookline	NRDIS
BKL.S	Beaconsfield Terraces Historic District	Tappan Street and Garrison Road, Brookline	NRDIS
BKL.T	Longwood Historic District	Roughly bounded by Chapel, Saint Mary's, Monmouth, and Kent Streets, Brookline	NRDIS
BKL.1446	Richmond Court Apartments	1209-1217 Beacon St Brookline	NRIND
BKL.1747	Arthur - Shaw House	12-16 Corey Rd Brookline	NRIND
BKL.1748	Kilsyth Terrace	15-27 Kilsyth Rd Brookline	NRIND
BKL.1717	Austin W. Benton House	105 Marion Street, Brookline	NRIND
BKL.3865	Gorfinkle and Barkin Rowhouse	89-99 Marion Street, Brookline	CE
BOS.AEC	Aberdeen Architectural Conservation District	Roughly bounded by Chestnut Hill and Commonwealth Avenues; South, Washington, Beacon, and Colburn Streets; Chiswick, Corey, and Leamington Roads, Boston	LHD
BKL.B	Cottage Farm Local Historic District	Centered around the intersection of Essex and Ivy streets, Brookline	LHD
BKL.AL	Griggs Park	Griggs Terrace and Griggs Road, Brookline	INV
BKL.I	Aspinwall Hill	Bounded by Washington Street, Gardner Road, Blake Road, Tappan Street, Garrison Road, Winthrop Road, and Beacon Street, Brookline	INV
BKL.J	Corey Hill	Bounded by Winchester Street, Beacon Street, Washington Street, and Corey Road, Brookline	INV
BKL.327	Elbridge Watson House	26 Winchester Street, Brookline	INV
BKL.387	Alexander J. MacDonald - Augustus Dole House	17 Williston Road, Brookline	INV
BKL.393	C.H. Watson Stable	18 Willison Road, Brookline	INV
BKL.393	C.H. Watson Stable	18 Willison Road, Brookline	INV
BKL.405	Charles J, Johnston Building	11-17 Warwick Road, Brookline	INV
BKL.409	Morris Rudnick Building	12-16 Warwick Road, Brookline	INV
BKL.411	Benjamin Snider Building	8-12 Kilsyth Road, Brookline	INV
BKL.412	Joseph Newman Apartment House	11-17 Englewood Avenue, Brookline	INV
BKL.3395	The Public Library of Brookline – Coolidge Corner Library	31 Pleasant Street, Brookline	INV
BKL.3395	The Public Library of Brookline – Coolidge Corner Library	31 Pleasant Street, Brookline	INV

BKL Town of Brookline
BOS City of Boston
NRDIS National Register of Historic Places, District Listing
NRIND National Register of Historic Places, Individual Listing
LHD Local Historic District
INV Inventoried resource, no designation
CE Resource considered eligible for listing to the National Register

3.2 Environmental Considerations

This section identifies the potential environmental impacts from the Project construction activities and operations. Refer to **Figure 1-3a – Figure 1-3f** for the proposed conditions.

3.2.1 Land Use

The Project will not impact land uses within the Project Area because it is proposed within the existing shared ROW and transit-developed area. The Project does not propose any increase in intensity or change of use to the established transit use within the corridor. The Project will improve the physical characteristics of the Green Line C Branch corridor through station and roadway enhancements. The Project would not reconstruct the existing track, nor would it affect train operations outside of the construction period, but adjustments will be made to meet accessibility requirements for the new station platforms. No property acquisitions or relocations are proposed.

3.2.1.1 Public Shade Trees

The Project includes removal of public shade trees in order to make the subject stations accessible. Approximately 32 living public shade trees that exceed the MEPA threshold of 14 or more inches diameter at breast height will be removed.

To reduce impacts associated with tree removal, such as urban heat island effect and flooding, the Project will adhere to the MBTA's vegetation management plan[8] during site construction and operation which includes the following BMPs:

- Minimize removal of mature vegetation.
- If mature trees are in the work zone, identify tree protection measures and require the construction contractor to erect barriers prior to the start of work.
- Include in specifications and provisions for the construction contractor to replant temporarily impacted vegetated areas.
- Plant native plant species.
- Use plants that minimize the need for pesticides, irrigation, and added nutrients.

During conceptual design, the MBTA and Town of Brookline have conducted a tree survey to minimize tree and vegetation removal to the extent practicable. As part of the tree survey the MBTA hired a certified arborist to identify native species and the health of trees within the anticipated Project limits.

The MBTA and the Town will develop a tree planting and maintenance plan to compensate tree loss as a result of the Project.

3.2.2 Transportation

The following sections describe the environmental considerations for public transit, vehicles, pedestrians, bicycles, and parking.

8 2024-2028 MBTA Vegetation Management Plan

3.2.2.1 Public Transit

The Project includes the following upgrades to the Green Line C Branch subject stations:

- Raise existing platforms to 8 inches above the top of the adjacent rail elevation for 140 feet.
- Widen platforms to a minimum 7 feet 6 inches, measured from the platform edge to the back of the accessible surface, including truncated dome panel edges. Wider platforms may be necessary in some cases to achieve accessibility where existing fixed obstructions (e.g., OCS poles) constrain passage.
- Construct at least two means of egress from each platform between stations to public ROW to improve safety for passengers in compliance with NFPA 130.
- Consolidate the existing Fairbanks Street Station and Brandon Hall Station at a new location between the two existing stations that will meet accessibility standards.
- Decommission the existing Kent Street Station.

3.2.2.2 Vehicles

At several station locations, roadway travel lanes would be adjusted to make space for wider platforms. While some lane widths and alignments may shift slightly, the Project will not result in a change in the number of travel lanes.

3.2.2.3 Pedestrians

The Project will result in the following changes to the pedestrian network:

- The crosswalk across the Beacon Street eastbound roadway at Englewood Avenue will shift from the west side of the intersection to the east side of the intersection to align with the relocated Englewood Avenue Station platform.
- A new crosswalk will be installed across the Beacon Street westbound roadway east of Lancaster Terrace to align with the relocated Brandon Hall/Fairbanks Street Station platform.
- The crosswalk across the Beacon Street eastbound roadway at Hawes Street will shift from the west side of the intersection to the east side of the intersection to align with the relocated Hawes Street Station platform.

Crosswalks at several additional locations will be restriped and pedestrian track crossings will be repainted to align with the reconstructed station platforms and to meet accessibility requirements.

3.2.2.4 Bicycles

The Project will not impact the existing bicycle accommodations as lanes will remain open during construction.

3.2.2.5 Parking

At many station locations, parking spaces would be relocated or eliminated to make space for wider platforms. All existing angled parking in the Project Area is public parking for the Town of Brookline with parking meters. Parking areas adjacent to station platforms would be restriped to match existing to the greatest extent feasible. Approximately 69 parking spaces, owned by the Town of Brookline, are proposed to be eliminated due to platform widening, the inclusion of points of safety or curb island

reconstruction. Where an existing accessible space is impacted, a new accessible space will be installed at the closest space to the existing.

3.2.3 Air Quality

The Project is not specifically identified in the current adopted Metropolitan Planning Organization (MPO) plan, nor is it included in the Transportation Improvement Plan (TIP). Despite not being specifically identified in the MPO or TIP, the Project may be accounted for in currently programmed TIP projects, including the various "Stations and Facilities Programs" listed in the 2024-28 TIP under the MBTA section of the investment tables. These TIP projects are noted as "No assumed impact/negligible impact on emissions" under the Transit Greenhouse Gas Analysis section of the TIP.

As documented under the Demonstration of Conformity section in the Federal Fiscal Year's (FFYs) 2024–28 TIP, the FFYs 2024–28 TIP meets the Clean Air Act and Transportation Conformity Rule requirements for the 1997 ozone National Ambient Air Quality Standards and was prepared following all the guidelines and requirements of the applicable rules. Therefore, the implementation of the FFYs 2024–28 TIP is consistent with the air quality goals of, and in conformity with, the Massachusetts State Implementation Plan.

The Project is not expected to be a substantial source of emissions during operations. Minor emissions would occur from the use of standby generators during emergencies. Since the Green Line is electrified, direct emissions are not expected from the train movements. As emissions from the operation of the Project would be minor, the Project is not expected to cause substantial air quality impacts or conflict with the SIP.

3.2.4 Noise and Vibration

This Project does not introduce any increase in MBTA train operations, nor adjustments of the existing track alignment or special track work. Per the noise impact criteria established by the FTA, the Project would result in negligible noise increases that are not anticipated to impact nearby sensitive receptors. Therefore, no mitigation measures related to operations are required. Section 3.3.2 describes temporary noise impacts expected during construction.

3.2.5 Climate Change Adaptation and Resiliency

This section provides requirements and BMPs related to sustainability and climate resiliency. The sustainability and resiliency principles applicable to the Green Line Projects include the following:

› Maximize the resiliency of systems and minimize risk to MBTA assets from climate hazards expected to worsen due to climate change (e.g., flooding, extreme storm events, and extreme heat).

The Project's design flood elevation will align with the MBTA climate guidelines and final design will continue to evaluate climate vulnerabilities.

Designing for flood protection is critical to the functionality and longevity of MBTA systems, including station platforms, parking areas, tracks, maintenance facilities, utilities, and all other supporting infrastructure. When avoidance of flood risk is not feasible, the preferred design approach is to elevate assets above the potential flood elevation. The Project will be designed to elevate both critical and non-critical assets according to the coastal and inland flood design elevations. Critical assets will be designed for greater freeboard to further protect from flood risk.

For assets that cannot be elevated, design options include:

› Dry floodproofing, including permanent and temporary barrier deployment.
› Wet floodproofing, including material selection that is resilient to flooding and wet conditions.

Determination of which of the above approaches, or combination of approaches, to pursue should be made based on the criticality of the asset and feasibility of the design approach, as well as ability to recover from operational downtime.

3.2.5.1 Dry Floodproofing

Dry floodproofing uses design techniques that fully seal off a structure or equipment to any water intrusion. Such methods may include:

› Use of waterproof membranes.
› Permanent sealants or coatings.
› Use of flood-resistant doors or hatches.
› Sealing electrical conduits and other utilities.
› Flood protection measures on underground structures, such as vent grates (especially on street level), egresses, and air louvers.

Dry floodproofing may also utilize temporary or permanent barrier deployment, or watertight shields. If temporary barrier deployment is pursued, the Project will need to consider maintenance requirements as well as the ability to put in place operational procedures for sufficient warning time for deployment.

3.2.5.2 Wet Floodproofing

Wet floodproofing refers to design actions that reduce or eliminate flood damage to structures or equipment. More specifically, wet floodproofing uses design strategies, including selection of flood damage-resistant materials, that will allow for flooding to occur, but with minimal or no operational downtime and without short- or long-term damage to the asset. Such methods may include:

› Using flood damage-resistant materials, including materials resistant to saltwater intrusion/corrosion.
› Elevating critical components of an asset while allowing non-critical or non-vulnerable components to flood temporarily.
› Installing redundant electrical, mechanical, or telecommunications systems so that exposed systems can be shut down temporarily.
› Installing permanent or temporary pumps to remove excess water.
› Securing components and equipment to avoid buoyant movement during flooding.

3.2.5.3 Increased Temperatures and Duration

As noted above in Section 3.2.1.1, a tree survey was conducted in collaboration with Town of Brookline to determine the health of existing trees and extent of tree removal impacts. The MBTA will work closely with the Town to reduce and mitigate the impacts of tree removal through the following measures:

› Replacement trees to be planted along the C Branch corridor where feasible and elsewhere in the Town to compensate tree loss; and

› A tree planting and maintenance plan to ensure future protection of all trees along the shared road and rail ROW.

Urban heat island effect is associated with urban areas experiencing increased temperatures due to the retention of heat on impervious surfaces, such as paved roads and building rooftops. Urban heat island effect is often measured at a larger scale beyond the limits of a project. To reduce the potential risk of urban heat island effect due to the removal of public shade trees, the Project will implement the mitigation measures above.

The DFE guidelines present strategies (such as improved building ventilation and shading features) to reduce impacts on MBTA facilities and assets from future potential extreme heat and storms, and urban heat island effect. As design continues, the MBTA and its contractors will specify the building design features that will be included in the Project.

3.2.6 Stormwater Management and Water Resources

No significant changes in impervious cover or peak flow rates are anticipated. Due to the MBTA's need to install hose bib or ground hydrant connections for station washdowns, coordination with the Town of Brookline Department of Public Works Water and Sewer is required before construction. Minor changes to the storm drain system, such as catch basin relocations, are anticipated, specifically at Dean Road Station, Saint Paul Street Station, and Tappan Street Station due to curb realignments (refer to the proposed drainage plans provided in **Appendix C**).

The Project does not require compliance with the Massachusetts Stormwater Standards as the work does not require the issuance of an Order of Conditions per the Massachusetts Wetlands Protection Act for work within wetland resource area. As the Project operations would involve stormwater discharge associated with station janitorial actions, an EPA NPDES 2021 MSGP is required. Although the Project's impacts on stormwater are minimal, stormwater BMPs, such as good housekeeping practices, spill control procedures, and deep sump catch basins, will be implemented or installed to minimize stormwater pollution as required.

Appropriate measures that meet TMDL pollutant removal requirements will be taken to control the stormwater discharge from the Project to protect water quality. Further, an Operations and Maintenance (O&M) Plan for stormwater collection, conveyance, and treatment systems will be prepared and implemented during operation of the Project.

Since the Project will require work near MWRA water lines, an MWRA 8(m) permit will be required. The Project Area will be designed to minimize impacts to the MWRA system. Proposed work will comply with MWRA standard and special permit terms and conditions upon issuance of an 8(m) permit or permits. These conditions are anticipated to include:

› Coordination with the MWRA to avoid interference with the agency's activities or operations at the Project Area.

› Opportunity for MWRA review and approval of proposed work as MWRA deems necessary.

› Written approval by MWRA for changes in work scope.

› No blasting, drilling, or other activity that could affect the integrity or operability of MWRA's property without prior written approval.

› Conducting design, construction, and excavation in accordance with all federal, state, and local safety regulations including, but not limited, to federal OSHA regulations (29 CFR 1926) and Massachusetts Department of Public Safety regulations (520 CMR 14.00).

- Implementation of monitoring and incorporation of appropriate sheeting and shoring measures during construction to protect the integrity of MWRA's water main, with the associated design, stamped by a Massachusetts licensed Professional Engineer, submitted to MWRA prior to the start of construction.
- Adjusting MWRA frames and covers to grade within limits of work.

3.2.7 Natural Resources

The U.S. Fish and Wildlife Service (USFWS) is anticipated to determine that the Project will have *no effect* on the northern long-eared bat. For these reasons, no additional consultation with USFWS is anticipated to be required.

The Project is not within any wetland resource areas or associated buffers protected under the jurisdiction of the WPA. Therefore, no impact to WPA jurisdictional areas is anticipated.

3.2.8 Hazardous Materials

The MBTA will consult with the MassDEP regarding the planning and implementation of demolition and management of contaminated materials to confirm consistency with applicable regulations and provide adequate protection to workers and sensitive receptors.

Applicable regulations for hazardous waste handling and ACM include the MassDEP Hazardous Waste Regulations (310 CMR 30.000), the MassDEP Asbestos Regulations (310 CMR 7.15), National Emission Standards for Hazardous Air Pollutants (NESHAP), and the Massachusetts Air Pollution Control Regulations.

The Project will maximize diversion opportunities for discarded materials, prioritizing waste reduction and reuse opportunities and recycling and/or composting where applicable. Proper containers for waste and garbage collection will be provided on-site and stormwater will be protected by properly storing hazardous materials and chemicals.

Due to the developed nature of the Project Area, undocumented releases and non-native urban fill may be present, which may require special handling and management during construction. Due to the industrial nature of the shared road and rail ROW, and the potential for disposal sites to impact environmental conditions within the Project Area, LSP services would be required during construction.

3.2.9 Historic and Archaeological Resources

The Project is located within the boundaries of the Beacon Street Historic District (BKL.K). The Project limit of disturbance is bounded to the north by Cottage Farm Historic District (BKL.A / BKL.B), the Arthur - Shaw House, and Kilsyth Terrace (BKL.1748) and to the south by Longwood Historic District (BKL.T), Beaconsfield Terraces Historic District (BKL.S), Strathmore Road Historic District (BKL.R), Richmond Court Apartments (BKL.1446), the Austin W. Benton House (BKL.1717), and the Gorfinkle and Barkin Rowhouse (BKL.3865).

The Project-wide improvements will not physically impact existing buildings or other character defining features of the Beacon Street Historic District. Beacon Street which was originally designed to accommodate a streetcar line in the center of boulevard and therefore upgrades in-keeping with the existing scale and design of the rail improvements will not introduce a new, incompatible element to the setting, character, or association of the Beacon Street Historic District. The nine historic resources that are outside of the Project limit of disturbance, but in the vicinity of the Project, have views toward the railroad corridor but the improvements to the road surface and utilities along with track adjustment beyond the rail ROW will not introduce new elements, therefore allowing any resulting changes to be

subtle when viewed from within historic properties' boundaries. The proposed Project activities will not detract from the setting, character, or association of the Cottage Farm Historic District, the Arthur - Shaw House, Kilsyth Terrace, Longwood Historic District, Beaconsfield Terraces Historic District, Strathmore Road Historic District, Richmond Court Apartments, the Austin W. Benton House, and the Gorfinkle and Barkin Rowhouse. Therefore, FTA has determined there will be no adverse effect to historic properties.

3.3 Construction Period Impacts

This chapter includes a discussion of the anticipated temporary construction activities for the Project and presents the projected construction schedule and phasing. It describes the associated temporary impacts relative to noise, utilities, air quality, water quality, construction waste, site access, and traffic, and the mitigation measures proposed to reduce such impacts and disruption to the community.

3.3.1 Construction Schedule and Phasing

Construction is anticipated to begin in late 2025 or early 2026 and be substantially completed in 2026. It is anticipated that work would be limited to extended weekend outages and surges of construction crossing multiple days with daytime and nighttime construction shifts as needed. Short term station closures would be required when large construction equipment must be positioned within rail infrastructure foul areas to rebuild the station platforms. Any temporary disruption to C Branch service would be replaced by shuttle bus services.

3.3.2 Temporary Construction Period Impacts

3.3.2.1 Noise

While not subject to local noise ordinances, the MBTA would minimize construction noise to the extent practicable and implement measures to assure that construction equipment is functioning properly and is equipped with mufflers and other noise reducing features.

The proposed temporary construction noise abatement measures include:

- Restricting working hours, where possible;
- Scheduling of noisy work to less sensitive working hours;
- Adopting quiet working methods, using equipment with lower noise emission levels;
- Using electrically powered equipment in preference to internal combustion powered equipment;
- Installing of site hoardings or perimeter noise barriers; and
- Using temporary acoustic enclosures or screens around specific noisy stationary equipment.

3.3.2.2 Utility Disruption

While stations are not currently served by underground water, drainage, electrical, telecommunications, or gas utilities, they are in proximity to subsurface utility lines. No new direct connections to MWRA utility lines are required. Since the Project will require work in the vicinity of MWRA water lines, an MWRA 8(m) permit will be required. Due to the Project involving the installation of hose connections for station washdowns, coordination with Brookline Department of Public Works Water and Sewer and MWRA is required as design advances.

3.3.2.3 Debris and Soil Disposal

Appropriate handing, transportation, and disposal requirements for construction debris would be detailed in the contract documents. No structures will be demolished and therefore a pre-demolition hazardous building material survey has not been conducted. However, buried utility conduits and other unanticipated waste materials may have the potential to contain hazardous building materials (e.g., lead-based paint, asbestos, etc.). Therefore, the contract documents will include provisions for testing of suspect hazardous building materials as they are encountered, as well as requirements for abatement and/or disposal in accordance with state and federal regulations, if required.

Minimal excavations associated with traffic barriers, light pole foundations, and surface asphalt would be conducted during the Project. Nearby MassDEP disposal sites have the potential to impact soil and/or groundwater conditions within these Project excavations; however, encountering groundwater during the Project excavations is unlikely. If a reportable condition is identified during Project excavations per the MCP, construction activities would need to be conducted under a Utility Related Abatement Measure (URAM) and impacted soil and/or groundwater would require handling under appropriate documentation such as a Material Shipping Record, Bill of Lading, or manifest. Contract documents would necessitate the Contractor comply with requirements of the MCP. The Contractor would be responsible for contracting an LSP during construction, with MBTA oversight.

3.3.2.4 Air Quality

Temporary emissions from construction activities are expected from diesel powered construction equipment and fugitive dust from earthwork. Emissions may temporarily increase from motor vehicles on local streets due to traffic disruptions. The MBTA contractor would develop and implement a Construction Management Plan to address impacts from fugitive dust, construction equipment exhaust, and any additional dust control considerations.

In an effort to reduce Greenhouse Gas (GHG) emissions from temporary construction activities, the MBTA will contractually require the construction contractors to adhere to all applicable regulations regarding control of construction vehicles emissions. This will include, but not be limited to, maintenance of all motor vehicles, machinery, and equipment associated with construction activities and proper fitting of equipment with mufflers or other regulatory-required emissions control devices. Also, the prohibition of excessive idling of construction equipment engines will be implemented, as required by MassDEP regulations in 310 CMR 7.11.

Additionally, construction specifications will require that all diesel construction equipment used on-site will be fitted with after-engine emission controls such as diesel oxidation catalysts or diesel particulate filters. Additionally, the MBTA and the Town will contractually require the construction contractors to utilize ultra-low sulfur diesel fuel for all off-road construction vehicles as an additional measure to reduce air emissions from construction activities. The MBTA and the Town will put idling restriction signs on the premises to remind drivers and construction personnel of the state's idling regulation.

The contractor will also be responsible for protective measures around the construction work to protect pedestrians and prevent dust and debris from leaving the Project Area or entering the surrounding community. Dust generated from earthwork and other construction activities like stockpiled soils will be controlled by spraying with water to mitigate wind erosion on open soil areas. Other dust suppression methods will be implemented to ensure minimization of the off-site transport of dust. There will be regular sweeping of the pavement of adjacent roadway surfaces during the construction period to minimize the potential for vehicular traffic to create airborne dust and particulate matter.

3.3.2.5 Water Quality

As the total land disturbance may exceed one acre, the Project requires a U.S. EPA NPDES Construction General Permit (CGP). In accordance with the NPDES CGP, appropriate construction-period controls would be implemented to prevent potential off-site impacts, including development of and adherence to a Stormwater Pollution Prevention Plan, implementation of erosion and sediment controls, and inspection and maintenance of controls throughout construction. As subsurface work is to occur, dewatering may be required. Any dewatering would follow MBTA's dewatering specifications, which require a dewatering system of sufficient scope, size, and capacity to control groundwater flow into excavations and permit construction to proceed on dry, stable sub-grades.

3.3.2.6 Disruptions of Traffic

During construction along Beacon Street, temporary parking loss and station closures are expected. A temporary traffic control and detour plan has been developed to facilitate station construction. The contractor will notify abutters at least 24 hours in advance of work that requires temporary closure of access. 11-foot lane widths will be maintained, and a flagger or police detail will be required when control measures are in place.

Due to temporary closure of stations during construction, plans would be developed to maintain transit service throughout construction. This may involve temporary station bypasses or diversions. Bus diversion concepts and preliminary roadway traffic management plans meeting accessibility requirements would be created and implemented to mitigate impacts on transit services. Construction work and operations would occur within the shared ROW, including parking spaces owned by the Town of Brookline, and no substantial increase of vehicular traffic from the proposed work is anticipated. Bicycle lanes along Beacon Street will remain open during construction.

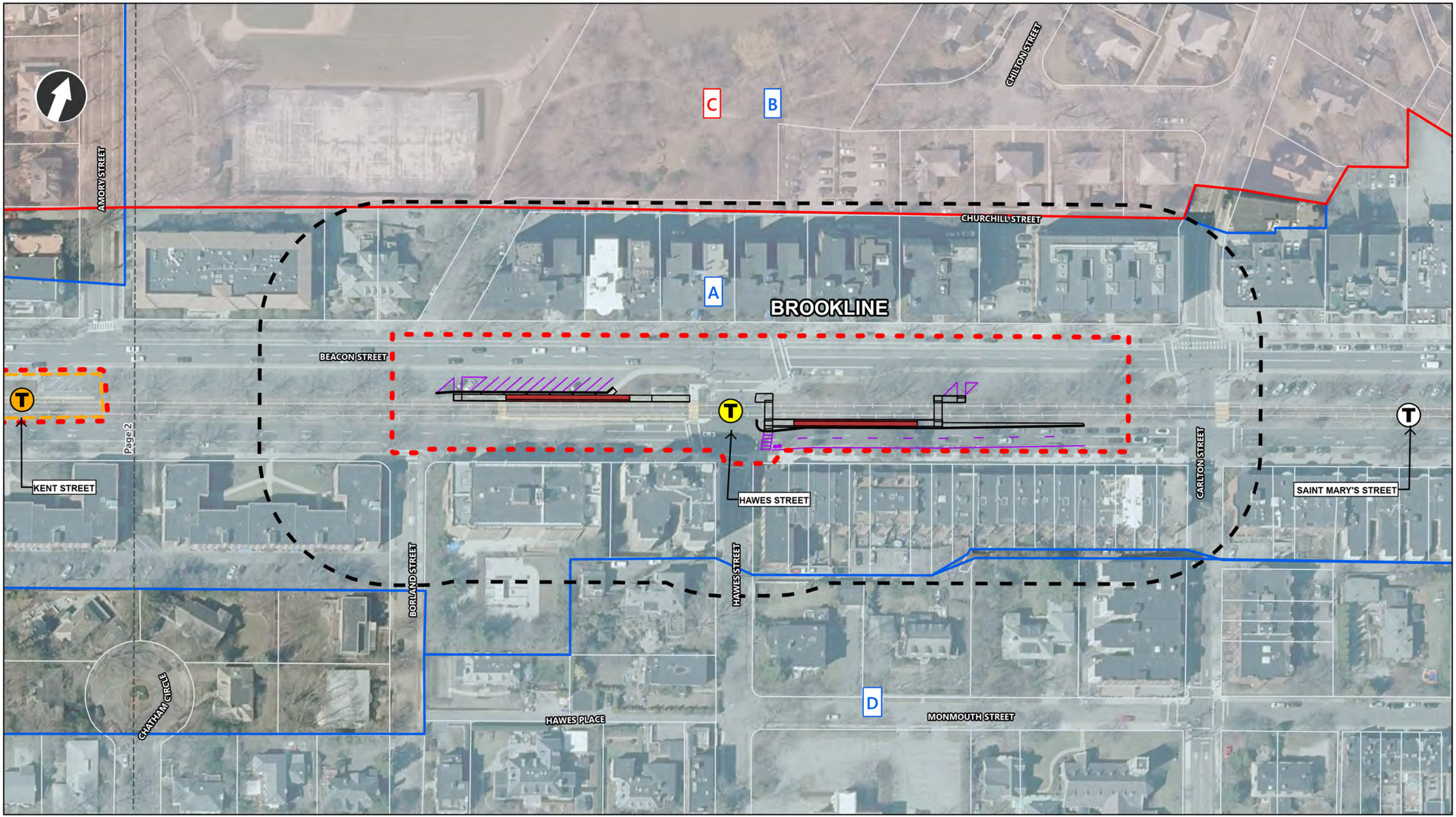
3.3.2.7 Safety and Security

A Safety and Security Program Plan would be prepared by the Contractor in coordination with MBTA and the Town outlining the safety and security resources, policies, practices, and procedures for the Project's construction period. The MBTA would coordinate proposed safety and security programs/measures with law enforcement agencies, emergency responders, and the Town. During the construction period, those stations actively under construction would not be open or publicly accessible. Access to businesses and residences will be maintained during construction.

3.3.2.8 Invasive Plant Species

The proposed work is within previously disturbed and developed urban areas with limited natural resources. The MBTA and its Contractor would follow the MBTA's established vegetation management plan during construction and operation.[9]

9 MBTA (Massachusetts Bay Transportation Authority). (2023). *MBTA 2024-2028 Vegetation Management Plan*.



Massachusetts Bay Transportation Authority

0 50 100 200 Feet

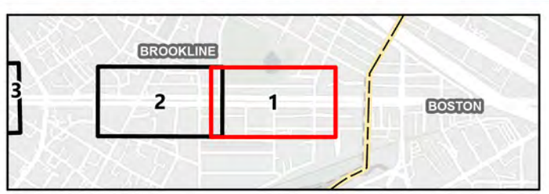
Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station
- Page Match Lines

- MBTA Green Line
- Limit of Disturbance
- Limits of Station to be Decommissioned
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- 150-Ft APE
- Properties Recommended Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing

- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Parcel Boundary

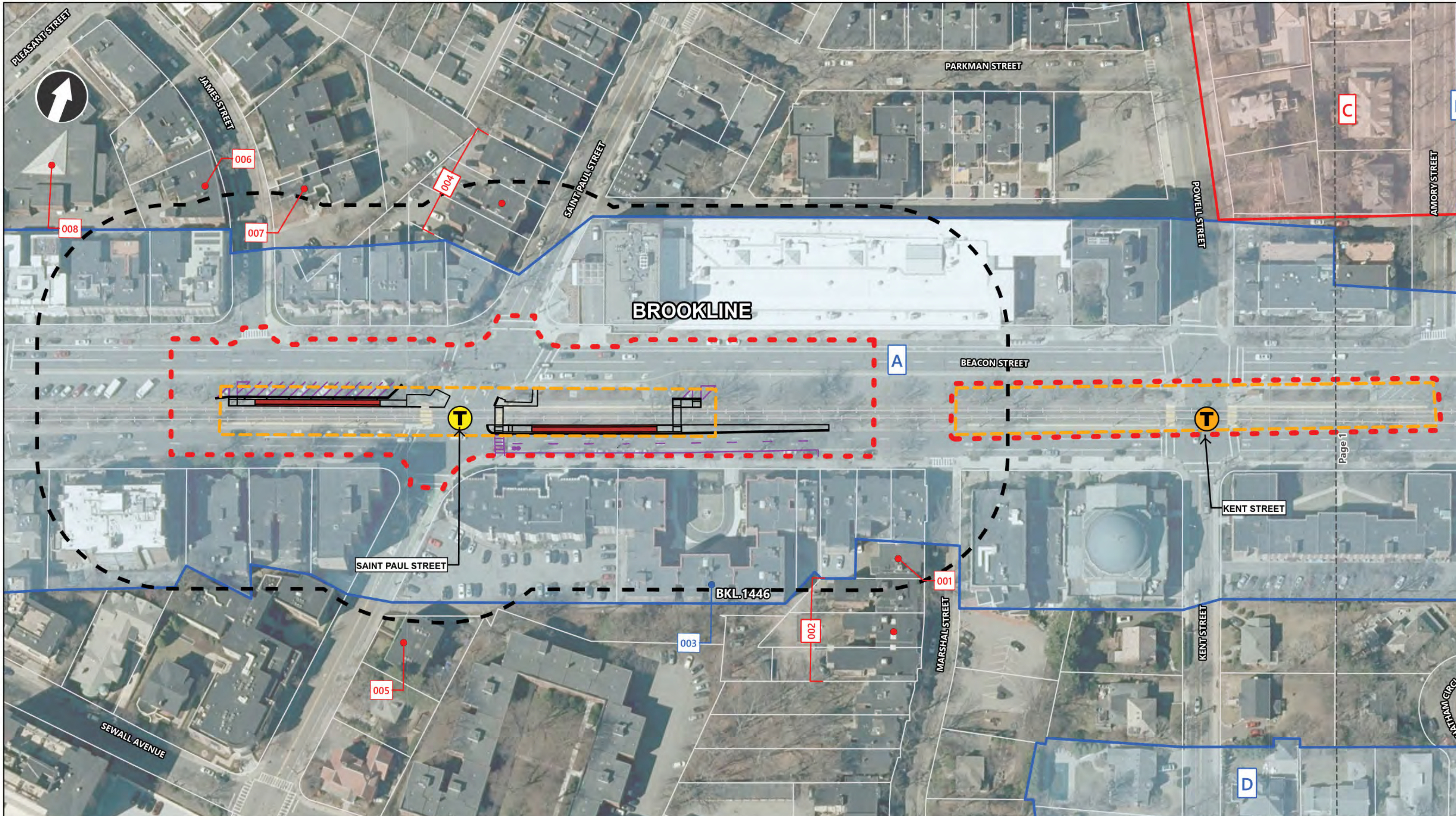


Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 3.1a

Cultural Resources - Englewood Avenue/Dean Road

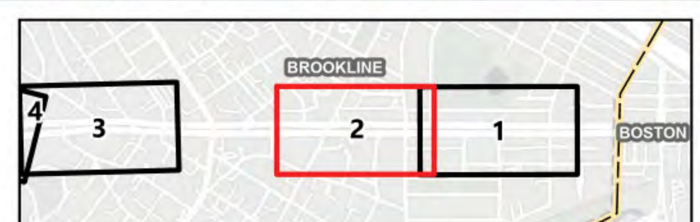


Massachusetts Bay Transportation Authority

0 50 100 200 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station
- Page Match Lines
- MBTA Green Line
- Limit of Disturbance
- Limits of Station to be Decommissioned
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location
- 150-Ft APE
- Properties Recommended Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Parcel Boundary

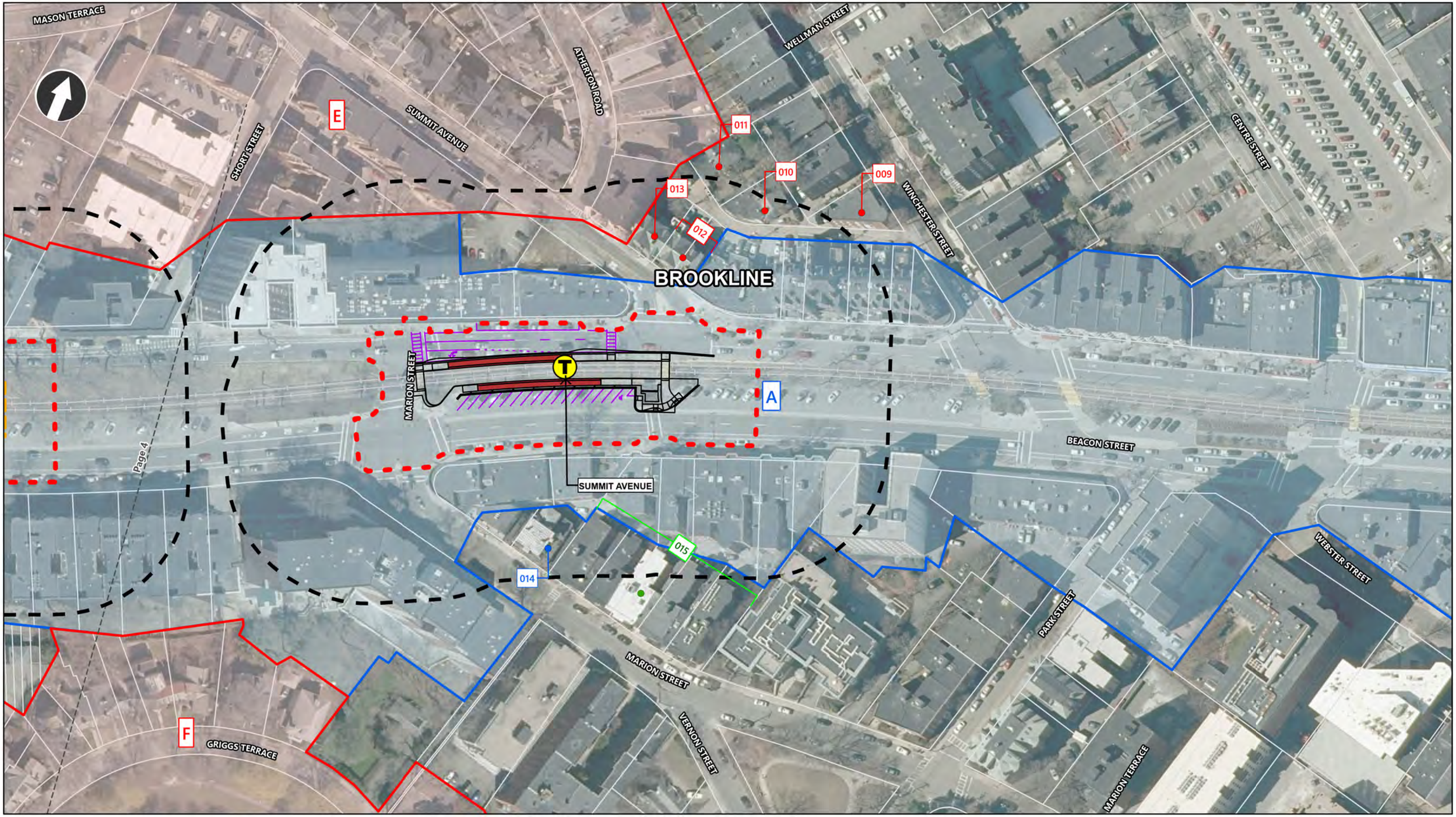


Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 3.1b

Cultural Resources - Englewood Avenue/Dean Road



Massachusetts Bay Transportation Authority

0 50 100 200 Feet

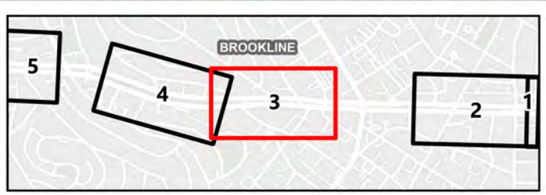
Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station
- Page Match Lines

- MBTA Green Line
- Limit of Disturbance
- Limits of Station to be Decommissioned
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- 150-Ft APE
- Properties Recommended Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing

- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Parcel Boundary



Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 3.1c

Cultural Resources - Englewood Avenue/Dean Road

MASON TERRACE

LANCASTER TERRACE

SHORT STREET

E

A

BROOKLINE

BEACON STREET

Page 3

BRANDON HALL

FAIRBANKS STREET

BRANDON HALL/FAIRBANKS STREET

FAIRBANKS STREET

016

017

F

GRIGGS ROAD

WASHINGTON STREET

GRIGGS TERRACE

Massachusetts Bay Transportation Authority

0 50 100 200 Feet

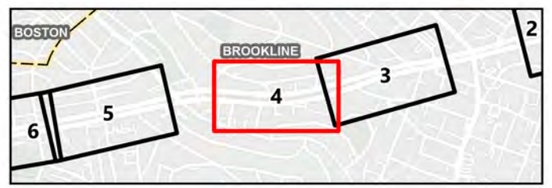
Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station
- Page Match Lines

- MBTA Green Line
- Limit of Disturbance
- Limits of Station to be Decommissioned
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location

- 150-Ft APE
- Properties Recommended Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing

- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Parcel Boundary



Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 3.1d

Cultural Resources - Englewood Avenue/Dean Road

Massachusetts Bay Transportation Authority

0 50 100 200 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station
- Page Match Lines
- MBTA Green Line
- Limit of Disturbance
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location
- 150-Ft APE
- Properties Recommended Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Parcel Boundary

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 3.1e

Cultural Resources - Englewood Avenue/Dean Road

BOSTON

BROOKLINE

SALISBURY ROAD

KILSYTH ROAD

ENGLEWOOD AVENUE

WARWICK ROAD

COREY ROAD

BEACON STREET

CLINTON PATH

STRATHMORE ROAD

DEAN ROAD

BKL.411

I

A

J

027

026

025

024

023

021

022

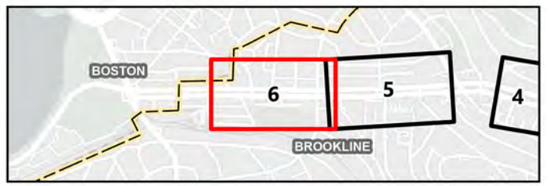
Page 5

Massachusetts Bay Transportation Authority

0 50 100 200 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Accessibility Upgrades
- Proposed New Station
- Station to be Decommissioned
- Station to be Upgraded
- MBTA Station
- Page Match Lines
- MBTA Green Line
- Limit of Disturbance
- Proposed Station Details
- Proposed Pavement Marking
- Platform Location
- 150-Ft APE
- Properties Recommended Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Properties Listed or Determined Eligible for Listing in the National Register
- Properties Recommended Not Eligible for National Register Listing
- Parcel Boundary



Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Figure 3.1f

Cultural Resources - Englewood Avenue/Dean Road

4

Environmental Justice and Public Health

This chapter provides a summary of Environmental Justice (EJ) populations within the Designated Geographic Area (DGA) of one mile around the Project Area, an assessment of existing unfair or inequitable environmental burdens and related public health consequences, an analysis of anticipated project impacts on EJ populations, and a summary of previous and planned public outreach. In addition to discussing the potential impacts of the Project on the identified EJ populations, this assessment considers whether Project activities may exacerbate existing human health and environmental burdens.

4.1 Regulatory Context and Compliance

In compliance with the *Environmental Justice Policy Of The Executive Office Of Energy And Environmental Affairs*[1] (2021 EJ Policy), and the *MEPA Interim Protocol for Analysis of Project Impacts on Environmental Justice Populations*[2] and *MEPA Public Involvement Protocol for Environmental Justice Populations*[3] (the 2022 EJ Protocols), this chapter identifies and describes the characteristics of the EJ populations surrounding the Project Area, assesses unfair or inequitable environmental burden and related public health consequences within the DGA, analyzes Project impacts for disproportionate adverse effects on EJ populations, and describes measures taken by the MBTA to provide meaningful engagement with surrounding EJ populations.

Following the direction of the 2022 EJ Protocols, this assessment utilized the Massachusetts Executive Office of Energy and Environmental Affairs' (EEA's) EJ Maps Viewer, the Massachusetts Department of Public Health (DPH) to identify the Vulnerable Health EJ Criteria and potential sources of pollution data within the DGA of a 1-mile radius around the Project Area, and the U.S. Environmental Protection Agency's (EPA's) EJScreen for EJ Indexes percentile data. These tools allow for the characterization of EJ populations, existing environmental burdens and related public health consequences on EJ and non-EJ populations.

1 Executive Office of Energy and Environmental Affairs. *Environmental Justice Policy Of The Executive Office Of Energy And Environmental Affairs*, 2021. https://www.mass.gov/doc/environmental-justice-policy6242021-update/download.

2 Executive Office of Energy and Environmental Affairs. *MEPA Interim Protocol for Analysis of Project Impacts on Environmental Justice Populations*, 2022. https://www.mass.gov/doc/final-mepa-interim-protocol-for-analysis-of-project-impacts-on-environmental-justice-populations-effective-date-of-january-1-2022/download.

3 Executive Office of Energy and Environmental Affairs. *MEPA Public Involvement Protocol for Environmental Justice Populations*, 2022. https://www.mass.gov/doc/final-mepa-public-involvement-protocol-for-environmental-justice-populations-effective-date-of-january-1-2022/download.

4.1.1.1 EJ Populations Definitions

EEA defines EJ as "the equal protection and meaningful involvement of all people and communities" regarding environmental issues, including the equitable allocation of benefits and burdens. The EJ Policy builds upon Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*,[4] which "directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law."

EJ Populations are defined by the EEA as a block group that meets one or more of the following criteria:

- The annual median household income is not more than 65 percent of the statewide annual median household income;
- Minorities comprise 40 percent or more of the population;
- 25 percent or more of households lack English language proficiency; or
- Minorities comprise 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income; or
- A geographic portion of a neighborhood designated by the Secretary as an EJ population in accordance with law.

4.2 Identification of Environmental Justice Populations

This section identifies the EJ block groups within one and five miles of the Project Area, per EJ Map Viewer data. Within the 1-mile DGA, which includes the municipalities of Boston; Brookline; Cambridge; and Newton, 127 block groups meet one or more EJ criteria (see **Figure 4-1**). No EJ block groups within the DGA are located within the City of Newton.

There are 13 census tracts where at least 5 percent of the population speak a language other than English within the DGA and do not speak English well or at all. These languages include Chinese, Russian, and Spanish/Creole.

Table 4-1 below presents the demographic information on the EJ block groups within the DGA, per EEA definitions. Cells that are **bolded** and highlighted exceed that column's EJ criterion threshold.

4 U.S. Executive Office of the President. *Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*; February 16, 1994. 59 FR 7629. https://www.federalregister.gov/documents/1994/02/16/94-3685/federal-actions-to-address-environmental-justice-in-minority-populations-and-low-income-populations.

Table 4-1 Environmental Justice Block Groups within 1 Mile of the Project Area

Block Group	Census Tract	Total Minority Percent	Median Household Income	English Isolation Percent	Language
1	2.02	**29.5%**	$97,105	7.6%	Chinese (8.6%)
3	2.02	**50.5%**	$74,375	14.1%	Chinese (8.6%)
1	4.01	**32.7%**	$74,679	0.0%	Russian (9.9%), Chinese (8.7%)
2	4.01	**35.9%**	$82,232	8.8%	Russian (9.9%), Chinese (8.7%)
3	4.01	**32.3%**	$90,536	6.0%	Russian (9.9%), Chinese (8.7%)
4	4.01	**41.7%**	**$11,799**	**64.5%**	-
1	4.02	**31.4%**	$74,565	1.1%	Chinese (5.0%)
2	4.02	**34.4%**	$113,015	0.0%	Chinese (5.0%)
3	4.02	**26.8%**	$139,071	0.5%	Chinese (5.0%)
1	5.02	**29.3%**	$87,941	4.3%	—
2	5.02	**25.4%**	$73,889	0.9%	—
3	5.02	**33.4%**	**$46,818**	15.9%	—
1	5.03	**33.5%**	$107,639	5.9%	—
2	5.03	**32.7%**	$74,869	10.4%	—
-	5.04[1]	-	-	-	Russian (8.4%)
1	5.05	**37.2%**	$100,451	0.0%	—
2	5.05	**39.4%**	**$40,758**	9.7%	—
3	5.05	**32.5%**	$73,333	10.7%	—
1	5.06	**31.3%**	$55,577	23.6%	—
2	5.06	**30.6%**	$99,038	6.3%	—
1	6.01	**41.5%**	$133,750	16.3%	Chinese (5.1%)
2	6.01	**34.1%**	$89,276	3.9%	Chinese (5.1%)
3	6.01	**33.9%**	$112,031	10.0%	Chinese (5.1%)
-	6.02[1]	-	-	-	Russian (6.6%), Spanish (5.5%), Chinese (5.0%)
1	6.03	**77.2%**	**$25,039**	**28.5%**	—
1	6.04	**49.7%**	**$50,869**	22.5%	—
2	6.04	**42.8%**	$57,237	**28.3%**	—
1	7.01	**34.1%**	$89,044	9.6%	Chinese (6.3%)
2	7.01	**37.7%**	$66,518	19.1%	Chinese (6.3%)
3	7.01	**39.9%**	$88,625	2.3%	Chinese (6.3%)
4	7.01	**48.2%**	$68,333	21.7%	Chinese (6.3%)
1	7.03	**54.4%**	**$34,871**	4.0%	—
2	7.03	**44.6%**	**$52,738**	7.2%	—
1	7.04	**46.8%**	$65,078	6.1%	—
2	7.04	**49.3%**	$97,167	1.3%	—

Table 4-1 Environmental Justice Block Groups within 1 Mile of the Project Area

Block Group	Census Tract	Total Minority Percent	Median Household Income	English Isolation Percent	Language
3	7.04	**43.9%**	$71,464	5.3%	—
4	7.04	**61.5%**	**$44,941**	22.5%	—
-	8.02[1]	-	-	-	Spanish (9.2%)
1	8.04	**59.9%**	**$50,909**	13.3%	—
1	8.05	**48.9%**	$59,792	18.4%	—
2	8.05	**57.4%**	**$44,643**	20.6%	—
3	8.05	**53.0%**	**$27,314**	23.6%	—
1	8.07	**46.3%**	-	0.0%	—
1	101.03	**44.7%**	**$32,572**	**34.3%**	—
2	101.03	**47.8%**	-	0.0%	—
3	101.03	**37.4%**	-	9.4%	—
1	101.04	**29.1%**	$90,917	0.0%	—
2	101.04	**39.9%**	$95,139	2.3%	—
3	101.04	**44.9%**	**$26,463**	22.3%	—
1	102.04	**61.5%**	**$33,657**	13.4%	—
2	102.04	**46.4%**	$82,000	2.5%	—
3	102.04	**44.7%**	**$34,167**	11.5%	—
1	102.05	**51.0%**	$68,750	15.3%	—
2	102.05	**52.1%**	$81,020	0.0%	—
3	102.05	**54.6%**	**$37,719**	2.1%	—
4	102.05	**50.4%**	**$37,719**	33.2%	—
1	102.06	**39.8%**	$110,994	6.6%	—
2	102.06	**59.9%**	**$13,500**	11.0%	—
1	103	**33.0%**	**$14,271**	17.9%	—
2	103	**29.9%**	$73,611	8.9%	—
1	104.03	**57.7%**	**$25,000**	19.2%	—
1	104.04	**41.3%**	$58,393	12.8%	—
2	104.04	**41.7%**	**$28,250**	22.7%	—
3	104.04	**51.1%**	**$19,583**	12.5%	—
4	104.04	**32.7%**	**$39,250**	7.9%	—
1	104.05	**38.6%**	-	0.0%	—
2	104.05	**49.3%**	**$26,023**	16.1%	—
1	104.08	**42.9%**	$64,714	4.9%	—
1	808.01	**51.2%**	**$13,325**	17.8%	—
2	808.01	**96.1%**	**$33,629**	14.4	—
-	808.01[1]	—	—	—	Spanish (8.6%)
1	809	**67.7%**	$58,542	4.0%	—
2	809	**40.4%**	$66,552	0.0%	—
3	809	**44.5%**	$91,250	0.0%	—

Table 4-1 Environmental Justice Block Groups within 1 Mile of the Project Area

Block Group	Census Tract	Total Minority Percent	Median Household Income	English Isolation Percent	Language
1	810.01	**32.9%**	$72,609	0.0%	Chinese (10.1%)
2	810.01	**55.0%**	**$45,395**	6.7%	Chinese (10.1%)
3	810.01	**84.3%**	**$22,730**	**52.1%**	Chinese (10.1%)
4	810.01	**79.5%**	**$16,648**	**32.1%**	Chinese (10.1%)
5	810.01	**84.3%**	-	15.9%	Chinese (10.1%)
-	811[1]	-	-	-	Spanish (8.2%)
1	811.01	**46.2%**	$77,702	17.2%	—
2	811.01	**45.5%**	$83,472	9.3%	—
1	811.02	**57.2%**	**$41,591**	21.0%	—
2	811.02	**63.9%**	$74,295	**37.2%**	—
2	3531.02	**65.1%**	$90,833	0.0%	—
3	3531.02	**68.1%**	-	**50.0%**	—
1	3532	**35.6%**	$75,357	9.9%	—
2	3532	**47.5%**	$96,071	0.0%	—
3	3532	**36.5%**	$181,944	1.6%	—
4	3532	**68.7%**	$131,563	5.8%	—
2	3533	**35.4%**	$104,875	4.2%	—
3	3533	**28.4%**	$141,933	1.5%	—
2	3594	**56.5%**	$103,026	6.8%	—
1	4001	**32.3%**	$64,545	7.9%	—
2	4001	**38.8%**	$92,050	4.8%	—
3	4001	**35.1%**	$147,353	0.0%	—
4	4001	**44.7%**	$123,359	0.0%	—
2	4001	**33.3%**	$123,359	0.0%	—
-	4002[1]	—	—	—	Chinese (7.1%)
1	4002.01	**33.0%**	$80,909	19.8%	—
1	4002.02	**55.5%**	**$31,074**	**44.3%**	—
2	4002.02	**40.6%**	$144,167	6.2%	—
1	4003	**29.4%**	$153,438	0.0%	—
2	4003	**33.6%**	$113,929	5.9%	—
3	4003	**31.6%**	$109,018	10.4%	—
1	4004.01	**28.6%**	$102,604	8.3%	—
2	4004.01	**29.3%**	$73,625	5.4%	—
1	4004.02	**33.1%**	$128,750	0.0%	—
1	4005	**26.4%**	$160,509	0.0%	—
2	4005	**28.6%**	$87,181	0.0%	—
3	4005	**30.6%**	$149,132	0.0%	—
4	4005	**25.3%**	$104,712	6.9%	—
1	4006	**32.0%**	$98,603	1.6%	—

Table 4-1 Environmental Justice Block Groups within 1 Mile of the Project Area

Block Group	Census Tract	Total Minority Percent	Median Household Income	English Isolation Percent	Language
2	4006	**33.9%**	$250,000	4.9%	—
3	4006	**28.2%**	$132,941	0.0%	—
4	4006	**28.2%**	$146,042	0.0%	—
1	4007	**35.1%**	$140,192	9.6%	—
2	4007	**32.9%**	$153,529	4.1%	—
3	4007	**29.5%**	$130,729	0.0%	—
1	4008	**37.1%**	$112,011	3.4%	—
2	4008	**39.8%**	$110,385	3.3%	—
3	4008	**39.4%**	$85,625	7.5%	—
4	4008	**33.2%**	$66,250	21.1%	—
1	4009	**57.0%**	$89,375	10.1%	Chinese (6.6%)
2	4009	**47.9%**	**$14,038**	24.4%	Chinese (6.6%)
3	4009	**35.4%**	$140,278	1.2%	Chinese (6.6%)
1	4010	**34.3%**	$157,188	0.0%	—
2	4010	**27.4%**	$198,125	0.0%	—
3	4010	**44.1%**	$81,591	9.9%	—
1	4011	**30.4%**	$141,136	4.0%	—
2	4011	**30.2%**	$203,542	0.0%	—
3	4011	**35.1%**	$250,000	1.9%	—
1	4012.02	**29.9%**	$107,167	11.9%	—

Source: EEA's EJ Maps Viewer. https://www.mass.gov/info-details/massgis-data-2020-environmental-justice-populations.

1 Census tracts denoted do not contain EJ block groups defined by EEA's EJ criteria definitions, but they do exceed the language outreach threshold and therefore are included in this table for comprehensiveness.

4.2.1.1 Characteristics of EJ Populations within 5 Miles of the Project Area

The following EJ populations fall within a 5-mile radius of the Project Area, by EJ criteria met:[5]

Minority EJ Criterion

- BG 1, CT 1.01, Boston
- BG 2, CT 1.01, Boston
- BG 1, CT 1.02, Boston
- BG 2, CT 1.02, Boston
- BG 1, CT 2.01, Boston
- BG 2, CT 2.01, Boston
- BG 3, CT 2.01, Boston
- BG 4, CT 2.01, Boston
- BG 2, CT 2.02, Boston
- BG 1, CT 3.01, Boston
- BG 4, CT 3.01, Boston
- BG 1, CT 3.02, Boston
- BG 2, CT 3.02, Boston
- BG 4, CT 6.01, Boston
- BG 2, CT 8.04, Boston
- BG 3, CT 104.03, Boston
- BG 3, CT 105, Boston
- BG 1, CT 106, Boston
- BG 2, CT 106, Boston
- BG 3, CT 106, Boston
- BG 1, CT 107.01, Boston
- BG 1, CT 108.01, Boston
- BG 1, CT 202, Boston
- BG 2, CT 202, Boston
- BG 1, CT 203.01, Boston
- BG 1, CT 203.04, Boston
- BG 2, CT 203.04, Boston
- BG 1, CT 203.05, Boston
- BG 2, CT 203.05, Boston
- BG 1, CT 303.02, Boston
- BG 2, CT 402, Boston
- BG 1, CT 403, Boston
- BG 1, CT 404.01, Boston
- BG 1, CT 406, Boston
- BG 1, CT 501.01, Boston
- BG 1, CT 915, Boston
- BG 1, CT 916, Boston
- BG 2, CT 916, Boston
- BG 1, CT 917, Boston
- BG 1, CT 918, Boston
- BG 3, CT 918, Boston
- BG 2, CT 920, Boston
- BG 3, CT 920, Boston
- BG 3, CT 921.01, Boston
- BG 5, CT 921.01, Boston
- BG 1, CT 922, Boston
- BG 2, CT 922, Boston
- BG 3, CT 922, Boston
- BG 1, CT 923, Boston
- BG 2, CT 923, Boston
- BG 3, CT 923, Boston
- BG 1, CT 924, Boston
- BG 1, CT 1001, Boston
- BG 7, CT 1001, Boston
- BG 1, CT 1002, Boston
- BG 3, CT 1002, Boston
- BG 1, CT 1003, Boston
- BG 3, CT 1003, Boston
- BG 1, CT 1004, Boston
- BG 2, CT 1004, Boston
- BG 3, CT 1004, Boston
- BG 4, CT 1004, Boston
- BG 1, CT 1005, Boston
- BG 2, CT 1005, Boston
- BG 4, CT 1005, Boston
- BG 1, CT 1006.01, Boston
- BG 2, CT 1006.01, Boston
- BG 3, CT 1006.01, Boston
- BG 4, CT 1006.01, Boston
- BG 1, CT 1006.03, Boston
- BG 1, CT 1603, Chelsea
- BG 3, CT 1604, Chelsea
- BG 1, CT 3391.01, Medford
- BG 2, CT 3393, Medford
- BG 1, CT 3394, Medford
- BG 2, CT 3394, Medford
- BG 1, CT 3395, Medford
- BG 3, CT 3395, Medford
- BG 4, CT 3395, Medford
- BG 1, CT 3396, Medford
- BG 2, CT 3396, Medford
- BG 3, CT 3396, Medford
- BG 5, CT 3396, Medford
- BG 6, CT 3396, Medford
- BG 1, CT 3397, Medford
- BG 2, CT 3397, Medford
- BG 3, CT 3397, Medford
- BG 4, CT 3397, Medford
- BG 1, CT 3398.02, Medford
- BG 2, CT 3398.02, Medford
- BG 3, CT 3398.02, Medford
- BG 4, CT 3398.02, Medford
- BG 1, CT 3398.03, Medford
- BG 2, CT 3398.03, Medford
- BG 1, CT 3398.04, Medford
- BG 2, CT 3398.04, Medford
- BG 3, CT 3398.04, Medford
- BG 1, CT 3399, Medford
- BG 2, CT 3399, Medford
- BG 4, CT 3399, Medford
- BG 1, CT 3423.02, Everett
- BG 2, CT 3423.02, Everett
- BG 3, CT 3423.02, Everett
- BG 1, CT 3424.01, Everett
- BG 1, CT 3424.02, Everett
- BG 1, CT 3530, Cambridge
- BG 2, CT 3530, Cambridge
- BG 1, CT 3531.01, Cambridge
- BG 2, CT 3531.01, Cambridge
- BG 1, CT 3531.02, Cambridge
- BG 1, CT 3533, Cambridge
- BG 1, CT 3536, Cambridge
- BG 3, CT 3536, Cambridge
- BG 2, CT 3537, Cambridge
- BG 3, CT 3537, Cambridge
- BG 1, CT 3538, Cambridge
- BG 3, CT 3538, Cambridge
- BG 4, CT 3538, Cambridge
- BG 1, CT 3539, Cambridge
- BG 2, CT 3539, Cambridge
- BG 3, CT 3539, Cambridge
- BG 1, CT 3540, Cambridge
- BG 2, CT 3540, Cambridge
- BG 3, CT 3540, Cambridge
- BG 1, CT 3541, Cambridge
- BG 2, CT 3541, Cambridge
- BG 1, CT 3543, Cambridge
- BG 2, CT 3543, Cambridge
- BG 2, CT 3544, Cambridge
- BG 1, CT 3545, Cambridge
- BG 2, CT 3545, Cambridge
- BG 2, CT 3546.01, Cambridge
- BG 1, CT 3546.02, Cambridge
- BG 2, CT 3546.02, Cambridge
- BG 3, CT 3546.02, Cambridge
- BG 1, CT 3547, Cambridge
- BG 2, CT 3547, Cambridge
- BG 1, CT 3548, Cambridge
- BG 2, CT 3548, Cambridge
- BG 1, CT 3549.01, Cambridge

5 Does not include EJ populations already listed within the 1-mile DGA. These block groups are not included in the EJ analysis and are provided for consistency with the 2022 EJ Protocols and comprehensiveness.

Minority EJ Criterion

- BG 3, CT 501.01, Boston
- BG 1, CT 502, Boston
- BG 2, CT 502, Boston
- BG 1, CT 503, Boston
- BG 1, CT 504, Boston
- BG 2, CT 504, Boston
- BG 1, CT 505, Boston
- BG 2, CT 506, Boston
- BG 2, CT 509.01, Boston
- BG 2, CT 512, Boston
- BG 3, CT 512, Boston
- BG 1, CT 606.04, Boston
- BG 2, CT 606.04, Boston
- BG 1, CT 612.03, Boston
- BG 2, CT 701.02, Boston
- BG 3, CT 701.02, Boston
- BG 1, CT 701.03, Boston
- BG 1, CT 701.04, Boston
- BG 2, CT 701.04, Boston
- BG 2, CT 702.01, Boston
- BG 2, CT 703.01, Boston
- BG 1, CT 703.02, Boston
- BG 3, CT 703.02, Boston
- BG 1, CT 704.02, Boston
- BG 2, CT 705.01, Boston
- BG 1, CT 705.02, Boston
- BG 2, CT 707, Boston
- BG 1, CT 708.01, Boston
- BG 1, CT 708.02, Boston
- BG 2, CT 708.02, Boston
- BG 1, CT 709.02, Boston
- BG 2, CT 709.02, Boston
- BG 1, CT 711.01, Boston
- BG 2, CT 711.01, Boston
- BG 4, CT 711.01, Boston
- BG 1, CT 712.01, Boston
- BG 3, CT 712.01, Boston
- BG 1, CT 805, Boston
- BG 1, CT 812, Boston
- BG 2, CT 813.02, Boston
- BG 2, CT 814, Boston
- BG 2, CT 815, Boston
- BG 2, CT 1006.03, Boston
- BG 1, CT 1008, Boston
- BG 2, CT 1008, Boston
- BG 3, CT 1008, Boston
- BG 3, CT 1009, Boston
- BG 1, CT 1010.01, Boston
- BG 2, CT 1010.01, Boston
- BG 5, CT 1010.01, Boston
- BG 6, CT 1010.01, Boston
- BG 3, CT 1010.02, Boston
- BG 2, CT 1011.02, Boston
- BG 1, CT 1101.05, Boston
- BG 1, CT 1101.06, Boston
- BG 2, CT 1101.06, Boston
- BG 1, CT 1103.01, Boston
- BG 2, CT 1103.01, Boston
- BG 2, CT 1104.01, Boston
- BG 2, CT 1104.03, Boston
- BG 3, CT 1104.03, Boston
- BG 4, CT 1104.03, Boston
- BG 5, CT 1104.03, Boston
- BG 1, CT 1105.01, Boston
- BG 2, CT 1105.01, Boston
- BG 3, CT 1105.01, Boston
- BG 1, CT 1105.02, Boston
- BG 2, CT 1105.02, Boston
- BG 3, CT 1105.02, Boston
- BG 2, CT 1106.07, Boston
- BG 3, CT 1106.07, Boston
- BG 1, CT 1201.04, Boston
- BG 2, CT 1201.04, Boston
- BG 2, CT 1201.05, Boston
- BG 1, CT 1202.01, Boston
- BG 2, CT 1202.01, Boston
- BG 3, CT 1202.01, Boston
- BG 1, CT 1203.01, Boston
- BG 2, CT 1203.01, Boston
- BG 3, CT 1203.01, Boston
- BG 4, CT 1203.01, Boston
- BG 1, CT 1204, Boston
- BG 4, CT 1204, Boston
- BG 5, CT 1204, Boston
- BG 2, CT 3424.02, Everett
- BG 1, CT 3501.05, Somerville
- BG 1, CT 3501.06, Somerville
- BG 1, CT 3501.07, Somerville
- BG 2, CT 3501.08, Somerville
- BG 1, CT 3501.09, Somerville
- BG 1, CT 3502.01, Somerville
- BG 2, CT 3502.01, Somerville
- BG 3, CT 3502.01, Somerville
- BG 1, CT 3502.02, Somerville
- BG 2, CT 3502.02, Somerville
- BG 3, CT 3502.02, Somerville
- BG 1, CT 3503, Somerville
- BG 2, CT 3503, Somerville
- BG 3, CT 3503, Somerville
- BG 1, CT 3506, Somerville
- BG 2, CT 3506, Somerville
- BG 3, CT 3506, Somerville
- BG 1, CT 3507.02, Somerville
- BG 1, CT 3508, Somerville
- BG 2, CT 3508, Somerville
- BG 1, CT 3510.01, Somerville
- BG 2, CT 3510.01, Somerville
- BG 3, CT 3510.01, Somerville
- BG 1, CT 3511.01, Somerville
- BG 3, CT 3511.01, Somerville
- BG 1, CT 3511.02, Somerville
- BG 1, CT 3512.03, Somerville
- BG 2, CT 3512.03, Somerville
- BG 4, CT 3512.03, Somerville
- BG 1, CT 3512.04, Somerville
- BG 2, CT 3512.04, Somerville
- BG 3, CT 3512.04, Somerville
- BG 1, CT 3513, Somerville
- BG 2, CT 3513, Somerville
- BG 3, CT 3513, Somerville
- BG 2, CT 3514.03, Somerville
- BG 3, CT 3514.03, Somerville
- BG 4, CT 3514.03, Somerville
- BG 1, CT 3514.04, Somerville
- BG 3, CT 3514.04, Somerville
- BG 4, CT 3514.04, Somerville
- BG 2, CT 3549.01, Cambridge
- BG 3, CT 3549.01, Cambridge
- BG 1, CT 3549.02, Cambridge
- BG 2, CT 3549.02, Cambridge
- BG 1, CT 3550, Cambridge
- BG 2, CT 3550, Cambridge
- BG 3, CT 3550, Cambridge
- BG 3, CT 3561, Arlington
- BG 1, CT 3563, Arlington
- BG 2, CT 3563, Arlington
- BG 5, CT 3563, Arlington
- BG 3, CT 3567.01, Arlington
- BG 4, CT 3567.01, Arlington
- BG 2, CT 3571, Belmont
- BG 3, CT 3577, Belmont
- BG 4, CT 3578, Belmont
- BG 1, CT 3594, Cambridge
- BG 3, CT 3594, Cambridge
- BG 4, CT 3594, Cambridge
- BG 5, CT 3594, Cambridge
- BG 2, CT 3685, Waltham
- BG 1, CT 3686, Waltham
- BG 2, CT 3686, Waltham
- BG 5, CT 3686, Waltham
- BG 1, CT 3687, Waltham
- BG 2, CT 3688, Waltham
- BG 3, CT 3688, Waltham
- BG 4, CT 3688, Waltham
- BG 5, CT 3688, Waltham
- BG 1, CT 3689.02, Waltham
- BG 1, CT 3691, Waltham
- BG 2, CT 3701.01, Watertown
- BG 3, CT 3701.01, Watertown
- BG 4, CT 3701.01, Watertown
- BG 5, CT 3701.01, Watertown
- BG 1, CT 3701.03, Watertown
- BG 2, CT 3701.03, Watertown
- BG 3, CT 3701.03, Watertown
- BG 1, CT 3701.04, Watertown
- BG 2, CT 3701.04, Watertown
- BG 1, CT 3703.01, Watertown
- BG 3, CT 3703.01, Watertown

Minority EJ Criterion

- BG 2, CT 818, Boston
- BG 3, CT 819, Boston
- BG 1, CT 820, Boston
- BG 2, CT 821, Boston
- BG 3, CT 901, Boston
- BG 1, CT 904, Boston
- BG 2, CT 904, Boston
- BG 4, CT 904, Boston
- BG 1, CT 907, Boston
- BG 2, CT 907, Boston
- BG 3, CT 907, Boston
- BG 4, CT 907, Boston
- BG 2, CT 910.01, Boston
- BG 4, CT 910.01, Boston
- BG 1, CT 911, Boston
- BG 2, CT 911, Boston
- BG 4, CT 911, Boston
- BG 5, CT 911, Boston
- BG 1, CT 912, Boston
- BG 2, CT 912, Boston
- BG 3, CT 912, Boston
- BG 1, CT 1205, Boston
- BG 3, CT 1205, Boston
- BG 1, CT 1206, Boston
- BG 2, CT 1206, Boston
- BG 3, CT 1206, Boston
- BG 1, CT 1207, Boston
- BG 2, CT 1207, Boston
- BG 1, CT 1301.01, Boston
- BG 4, CT 1303, Boston
- BG 1, CT 1304.02, Boston
- BG 2, CT 1304.02, Boston
- BG 3, CT 1304.02, Boston
- BG 1, CT 1304.04, Boston
- BG 2, CT 1304.04, Boston
- BG 2, CT 1304.06, Boston
- BG 1, CT 1401.05, Boston
- BG 2, CT 1401.05, Boston
- BG 4, CT 1403, Boston
- BG 5, CT 1404, Boston
- BG 6, CT 1404, Boston
- BG 7, CT 1404, Boston
- BG 1, CT 3515, Somerville
- BG 2, CT 3515, Somerville
- BG 3, CT 3515, Somerville
- BG 1, CT 3521.01, Cambridge
- BG 2, CT 3521.01, Cambridge
- BG 3, CT 3521.01, Cambridge
- BG 1, CT 3521.02, Cambridge
- BG 2, CT 3521.02, Cambridge
- BG 1, CT 3522, Cambridge
- BG 1, CT 3523, Cambridge
- BG 2, CT 3523, Cambridge
- BG 3, CT 3523, Cambridge
- BG 1, CT 3524, Cambridge
- BG 1, CT 3525, Cambridge
- BG 2, CT 3525, Cambridge
- BG 1, CT 3526, Cambridge
- BG 2, CT 3526, Cambridge
- BG 1, CT 3527, Cambridge
- BG 1, CT 3528, Cambridge
- BG 1, CT 3529, Cambridge
- BG 2, CT 3529, Cambridge
- BG 4, CT 3703.01, Watertown
- BG 2, CT 3703.02, Watertown
- BG 2, CT 3704.01, Watertown
- BG 1, CT 3704.02, Watertown
- BG 2, CT 3704.02, Watertown
- BG 1, CT 3704.03, Watertown
- BG 2, CT 3704.03, Watertown
- BG 1, CT 3739.02, Newton
- BG 1, CT 3741, Newton
- BG 2, CT 3741, Newton
- BG 3, CT 3741, Newton
- BG 2, CT 3745, Newton
- BG 1, CT 4012.01, Brookline
- BG 2, CT 4012.01, Brookline
- BG 3, CT 4012.01, Brookline
- BG 4, CT 4012.01, Brookline
- BG 1, CT 4173, Quincy
- BG 1, CT 9803, Boston
- BG 1, CT 9809, Newton
- BG 1, CT 9813, Boston

Low-Income EJ Criterion

- BG 1, CT 3732, Newton

English Isolation EJ Criterion

- BG 3, CT 304, Boston

Minority and Low-Income EJ Criteria

- BG 1, CT 8.06, Boston
- BG 2, CT 8.06, Boston
- BG 2, CT 104.03, Boston
- BG 1, CT 105, Boston
- BG 1, CT 402, Boston
- BG 1, CT 408.01, Boston
- BG 2, CT 408.01, Boston
- BG 2, CT 503, Boston
- BG 1, CT 607, Boston
- BG 2, CT 610, Boston
- BG 3, CT 610, Boston
- BG 1, CT 611.01, Boston
- BG 1, CT 815, Boston
- BG 1, CT 817, Boston
- BG 2, CT 817, Boston
- BG 3, CT 817, Boston
- BG 4, CT 817, Boston
- BG 5, CT 817, Boston
- BG 1, CT 818, Boston
- BG 3, CT 818, Boston
- BG 1, CT 819, Boston
- BG 2, CT 819, Boston
- BG 2, CT 820, Boston
- BG 3, CT 820, Boston
- BG 2, CT 917, Boston
- BG 2, CT 918, Boston
- BG 1, CT 919, Boston
- BG 2, CT 919, Boston
- BG 3, CT 919, Boston
- BG 4, CT 920, Boston
- BG 4, CT 922, Boston
- BG 2, CT 924, Boston
- BG 3, CT 924, Boston
- BG 4, CT 924, Boston
- BG 2, CT 1001, Boston
- BG 3, CT 1001, Boston
- BG 1, CT 1101.04, Boston
- BG 1, CT 1102.01, Boston
- BG 1, CT 1104.03, Boston
- BG 4, CT 1304.02, Boston
- BG 1, CT 1401.06, Boston
- BG 2, CT 1401.06, Boston
- BG 4, CT 1602, Chelsea
- BG 2, CT 1603, Chelsea
- BG 4, CT 1604, Chelsea
- BG 3, CT 3391.01, Medford
- BG 1, CT 3393, Medford
- BG 4, CT 3394, Medford

Minority and Low-Income EJ Criteria

- BG 1, CT 707, Boston
- BG 2, CT 712.01, Boston
- BG 1, CT 801, Boston
- BG 2, CT 801, Boston
- BG 1, CT 803, Boston
- BG 2, CT 803, Boston
- BG 1, CT 804.01, Boston
- BG 1, CT 806.01, Boston
- BG 2, CT 806.01, Boston
- BG 2, CT 812, Boston
- BG 3, CT 812, Boston
- BG 1, CT 813.02, Boston
- BG 1, CT 814, Boston
- BG 3, CT 814, Boston
- BG 4, CT 814, Boston
- BG 3, CT 821, Boston
- BG 1, CT 901, Boston
- BG 2, CT 901, Boston
- BG 4, CT 901, Boston
- BG 5, CT 901, Boston
- BG 3, CT 902, Boston
- BG 3, CT 903, Boston
- BG 3, CT 904, Boston
- BG 2, CT 909.01, Boston
- BG 3, CT 911, Boston
- BG 1, CT 913, Boston
- BG 2, CT 913, Boston
- BG 1, CT 914, Boston
- BG 2, CT 914, Boston
- BG 3, CT 915, Boston
- BG 4, CT 1001, Boston
- BG 5, CT 1001, Boston
- BG 6, CT 1001, Boston
- BG 2, CT 1002, Boston
- BG 2, CT 1003, Boston
- BG 4, CT 1003, Boston
- BG 5, CT 1005, Boston
- BG 4, CT 1010.01, Boston
- BG 1, CT 1010.02, Boston
- BG 2, CT 1010.02, Boston
- BG 1, CT 1011.01, Boston
- BG 2, CT 1011.01, Boston
- BG 3, CT 1011.01, Boston
- BG 3, CT 1011.02, Boston
- BG 4, CT 1011.02, Boston
- BG 2, CT 3395, Medford
- BG 2, CT 3425.01, Everett
- BG 1, CT 3501.08, Somerville
- BG 2, CT 3507.02, Somerville
- BG 2, CT 3514.04, Somerville
- BG 2, CT 3536, Cambridge
- BG 5, CT 3537, Cambridge
- BG 2, CT 3538, Cambridge
- BG 1, CT 3685, Waltham
- BG 3, CT 3686, Waltham
- BG 2, CT 3687, Waltham
- BG 5, CT 3703.01, Watertown
- BG 3, CT 9811, Boston

Minority and English Isolation EJ Criterion

- BG 4, CT 502, Boston
- BG 1, CT 506, Boston
- BG 1, CT 507, Boston
- BG 3, CT 507, Boston
- BG 1, CT 509.01, Boston
- BG 1, CT 512, Boston
- BG 3, CT 701.04, Boston
- BG 3, CT 711.01, Boston
- BG 1, CT 910.01, Boston
- BG 2, CT 915, Boston
- BG 4, CT 919, Boston
- BG 1, CT 921.01, Boston
- BG 2, CT 921.01, Boston
- BG 4, CT 923, Boston
- BG 5, CT 924, Boston
- BG 3, CT 1005, Boston
- BG 6, CT 1008, Boston
- BG 2, CT 1101.04, Boston
- BG 1, CT 1104.01, Boston
- BG 2, CT 1205, Boston
- BG 1, CT 1601.03, Chelsea
- BG 2, CT 1601.03, Chelsea
- BG 4, CT 1601.03, Chelsea
- BG 1, CT 1602, Chelsea
- BG 3, CT 1602, Chelsea
- BG 2, CT 3412, Malden
- BG 3, CT 3424.02, Everett
- BG 3, CT 3507.02, Somerville
- BG 1, CT 3514.03, Somerville
- BG 5, CT 3514.03, Somerville
- BG 2, CT 3527, Cambridge

Low-Income and English Isolation EJ Criterion

- BG 1, CT 3703.02, Watertown

Minority, Low-Income, and English Isolation EJ Criteria

- BG 3, CT 104.05, Boston
- BG 2, CT 105, Boston
- BG 2, CT 501.01, Boston
- BG 3, CT 502, Boston
- BG 3, CT 503, Boston
- BG 2, CT 507, Boston
- BG 3, CT 509.01, Boston
- BG 2, CT 607, Boston
- BG 2, CT 611.01, Boston
- BG 1, CT 701.02, Boston
- BG 1, CT 702.01, Boston
- BG 2, CT 702.02, Boston
- BG 2, CT 704.02, Boston
- BG 2, CT 705.02, Boston
- BG 1, CT 709.01, Boston
- BG 4, CT 712.01, Boston
- BG 2, CT 804.01, Boston
- BG 2, CT 805, Boston
- BG 3, CT 806.01, Boston
- BG 1, CT 813.01, Boston
- BG 2, CT 813.01, Boston
- BG 4, CT 819, Boston
- BG 1, CT 821, Boston
- BG 1, CT 902, Boston
- BG 2, CT 902, Boston
- BG 1, CT 903, Boston
- BG 2, CT 903, Boston
- BG 1, CT 906, Boston
- BG 2, CT 906, Boston
- BG 1, CT 909.01, Boston
- BG 3, CT 916, Boston
- BG 3, CT 917, Boston
- BG 1, CT 920, Boston
- BG 4, CT 921.01, Boston
- BG 1, CT 1011.02, Boston
- BG 2, CT 1602, Chelsea
- BG 1, CT 1604, Chelsea
- BG 2, CT 1604, Chelsea
- BG 1, CT 3413.01, Malden
- BG 2, CT 3424.01, Everett
- BG 4, CT 3515, Somerville
- BG 4, CT 3537, Cambridge
- BG 3, CT 3549.02, Cambridge
- BG 4, CT 3549.02, Cambridge

4.3 Socioeconomic Conditions

Socioeconomic conditions, which consider a variety of social and economic factors such as unemployment rate, provide further context toward analyzing potential Project impacts on EJ populations. EEA's EJ criteria definitions provide quantifiable data on a block group scale.[6] The municipality-scale socioeconomic data provides broader trends to supplement block group data, allowing for a more comprehensive existing conditions assessment that not only addresses the EEA's 2021 EJ Policy and 2022 EJ Protocols, but also Title VI of the Civil Rights Act of 1964.

According to the MBTA's 2023 Title VI Program, 37.8 percent of the population in the core service area[7] is comprised of members of minority groups, as reported in the US Census 2017–21 ACS five-year estimates. The MBTA uses this average population concentration percentage to identify "minority census tracts" in the service area as those with minority population concentrations that meet or exceed 37.8 percent.[8] In this instance, there are 97 block groups partially or fully within the Study Area. Of the 127 block groups, 67 have a minority population percentage greater than 37.8 percent (see above for the breakdown of EJ minority criterion met under the Massachusetts Environmental Policy Act [MEPA]). Similarly, when looking at income, the MBTA's 2023 Title VI Program notes that the median household income in the core service area is $99,071. A low-income census tract is defined as one in which the median household income is less than 80 percent of the area median income, or $79,257. Of the 127 block groups partially or fully within the Study Area, 61 fall below 80 percent of the median household income (see above for the breakdown of EJ low-income criterion met under MEPA).

Table 4-2 below includes the socioeconomic indicator data for the municipalities within the DGA.

Table 4-2 Municipal Social and Economic Conditions

Municipality	Population	Housing Units	Median Household Income	Per Capita Income	Unemployment Rate	Poverty Rate
Boston	689,326	300,437	$76,298	$46,845	6.9%	18%
Brookline	59,223	28,274	$113,642	$74,549	3.1%	10.8%
Cambridge	117,822	51,966	$107,490	$61,036	4.0%	12.0%
Newton	88,322	32,693	$154,398	$73,398	3.3%	4.3%

Sources: U.S. Census Bureau. 2020 ACS 5-Year Estimates, Total Population; U.S. Census Bureau. 2020 ACS 5-Year Estimates, Housing Units; U.S. Census Bureau. 2020 ACS 5-Year Estimates, Per Capita Income in the Last 12 Months; U.S. Census Bureau. 2020 ACS 5-Year Estimates, Employment Status; U.S. Census Bureau. 2020 ACS 5-Year Estimates, Poverty Status.

4.4 Assessment of Existing Unfair or Inequitable Environmental Burden

Under Section 58 of Chapter 8 of the Acts of 2021: An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy ("the Act"), and consistent with 301 CMR 11.06(7)(b) and 11.07(6)(n), each project to which the new EIR requirement applies under Part I must submit an EIR that contains

6 A block group is a geographically-defined area that usually has in the range of 600-3,000 people living in it, per the U.S. Census Bureau.
7 The core service area comprises the 59 municipalities that have access to the MBTA's bus and rapid transit services.
8 For the purposes of this analysis, and to remain consistent with the EJ analysis, the average population concentration percentage to identify "minority census tracts" is applied to block groups instead of census tracts.

"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."

This section addresses vulnerable health criteria, potential sources of pollution, and climate change vulnerability to help assess whether an existing unfair or inequitable environmental burden related to public health consequences has been placed upon the EJ populations, as compared to the general population, within one mile of the Project Area.

4.4.1 Vulnerable Health EJ Criteria

Within the DGA for the Project, six census tracts containing four EJ block groups exhibit existing blood lead levels greater than 110 percent of the statewide rate. Additionally, the data shows 11 census tracts, including seven EJ block groups, currently experience greater rates of low birth weight than 110 percent of the statewide rate. Thus, a portion of populations within the DGA experience a health consequence related to elevated blood lead and low birth weight. **Table 4-3** below provides a breakdown of these occurrences by census tract and denotes if an EJ block group is present within the census tract.

Table 4-3 Vulnerable Health EJ Criteria by Census Tract within the DGA

		Elevated Blood Lead Prevalence		Low Birth Weight	
Census Tract	EJ Block Group Present	Rate per 1,000	Existing Burden (Greater than 110% of the Statewide Rate)?	Rate per 1,000	Existing Burden (Greater than 110% of the Statewide Rate)?
2.02	Y	18.7	**Yes**	-	No
4.01	Y	24.0	**Yes**	-	No
5.03	Y	-	No	0	No
5.04	N	-	No	413.2	**Yes**
6.01	Y	26.3	**Yes**	285.7	**Yes**
8.02	N	52.9	**Yes**	288.5	**Yes**
8.03	N	0	No	0	No
101.03	Y	0	No	-	No
101.04	Y	-	No	0	No
102.03	N	0	No	211.9	No
102.04	Y	0	No	0	No
103	Y	0	No	0	No
104.04	Y	0	No	-	No
104.08	Y	0	No	0	No
810.01	Y	0	No	517.2	**Yes**
811.00	N	0	No	-	No
811.03	N	0	No	-	No
815.01	N	0	No	0	No
818	N	0	No	0	No
3531.02	Y	-	No	303	**Yes**

Table 4-3 Vulnerable Health EJ Criteria by Census Tract within the DGA

Census Tract	EJ Block Group Present	Elevated Blood Lead Prevalence		Low Birth Weight	
		Rate per 1,000	Existing Burden (Greater than 110% of the Statewide Rate)?	Rate per 1,000	Existing Burden (Greater than 110% of the Statewide Rate)?
3533	Y	17.1	No	240.4	**Yes**
3736	N	24.2	**Yes**	-	No
4001	Y	0	No	292.9	**Yes**
4002	N	-	No	180.2	No
4003	Y	24.5	**Yes**	-	No
4004	N	-	No	363.6	**Yes**
4008	Y	0	No	252.8	**Yes**
4009	Y	-	No	269.1	**Yes**
4012	N	-	No	409.8	**Yes**
9815.01	N	0	No	0	No
9818.00	N	0	No	0	No

Source: DPH EJ Tool.

Table 4-4 below depicts whether the four municipalities within the DGA meet one or more vulnerable health EJ criteria. Three municipalities within the DGA: Boston, Brookline, and Cambridge, have EJ populations. While only available at the municipality level, communities within Boston currently experience greater rates of heart attack and pediatric asthma conditions than 110 percent of the statewide rate.

Table 4-4 Vulnerable Health EJ Criteria in Municipalities within the DGA

Vulnerable Health EJ Criteria	Meets Criteria			
	Boston	Brookline	Cambridge	Newton
Heart Attack	No	No	No	No
Childhood Blood Lead	No	No	No	No
Low Birth Weight	**Yes**	No	No	No
Pediatric Asthma	**Yes**	No	No	No

Source: DPH EJ Tool

4.4.2 Potential Sources of Pollution

Table 4-5 below identifies sites within the DGA with routine activities or incidents that have been correlated with the potential for contributing to existing environmental burdens and related health consequences. This assessment cannot determine which of these facilities may or may not be specific contributors to the existing health or environmental burdens experienced by populations within the DGA.

Table 4-5 Potential Sources of Pollution within the DGA

DPH Classification Category	Site Count	Site Uses
Major Air and Waste Facilities (large quantity generators, air operating permits)	1	Energy
MassDEP Tier Classified 21E Sites	11	Commercial entertainment, Transportation and parking, Consumer goods/services, Residential, Municipal services, Education
Tier II Facilities	46	Energy, Pharmaceutical/Research, Education, Healthcare, Banking, Consumer goods and services, Fueling and automotive services, Telecommunications, Arts/Cultural Entertainment, Municipal/Government Services
MassDEP Sites with Activity and Use Limitations (AULs)	68	Education, automotive services, Consumer goods/services, Residential, Banking, Energy, Arts/Cultural, Municipal services, Transportation and parking, Parks and recreation
MassDEP Groundwater Discharge Permits	0	N/A
Wastewater Treatment Plants	1	Transportation
Underground Storage Tanks (USTs)	43	Healthcare, automotive services, municipal services, Consumer goods/services, Education, Telecommunications
U.S. EPA facilities (Toxic Release Inventory)	1	Energy
Power Plants	2	Healthcare, Education

Source: DPH EJ Tool.

4.4.3 U.S. EPA EJScreen Environmental Justice Indexes

The U.S. EPA's EJScreen tool was referenced for percentile ranking comparisons by census block group to statewide and national averages, respectively, for 13 EJ Indexes. The Community Report generated by EJScreen (see **Appendix C**) provided percentiles of EJ Indexes within the DGA. **Table 4-6** below presents the U.S. EPA EJScreen tool results for the Project. The following EJ Indexes are above the 80th percentile of the statewide and/or national average for the Project Buffer Area, signifying a potential existing environmental burden for the area's EJ populations:

- Particulate Matter (PM)
- Diesel PM
- Toxic Releases to Air
- Traffic Proximity
- Hazardous Waste Proximity
- Underground Storage Tanks (USTs)

These values greater than the 80th percentile compared to the state or national values are **bolded** for ease of reference.

Table 4-6 EJ Screen Community Report Results

Environmental Justice Indexes	DGA Value	Percentile Compared to State	Percentile Compared to U.S.	Existing Community Burden Compared to State and U.S. (DGA ≥80th Percentile)
Particulate Matter 2.5 (µg/m^3)	6.63	59	12	None
Ozone (ppb)	55.7	36	26	None
Nitrogen Dioxide (NO_2) (ppbv)	16	**94**	**97**	**Both**
Diesel Particulate Matter (µg/m^3)	0.341	**91**	**88**	**Both**
Toxic Releases to Air (toxicity-weighted concentration)	4,500	**88**	**85**	**Both**
Traffic Proximity (daily traffic count/distance to road)	16,000,000	**94**	**99**	**Both**
Lead Paint Indicator (% of pre-1960 housing)	0.58	56	79	None
Superfund Proximity (site count/km)	0.052	40	56	None
Risk Management Plan (RMP) Proximity (facility count/km)	0.35	65	55	None
Hazardous Waste Proximity (facility count/km)	47	**96**	**99**	**Both**
Underground Storage Tanks (count/km^2)	9.5	**91**	**89**	**Both**
Wastewater Discharge (toxicity-weighted concentration/m)	110	73	56	None
Drinking Water Non-Compliance (points)	6.7	79	**91**	**U.S.**

The following environmental indicators are above the 80th percentile of the statewide average for the DGA,[9] signifying a potential existing environmental burden for the area's EJ populations:

- ***Nitrogen Dioxide (NO_2)*** – This indicator assesses average annual nitrogen dioxide (NO_2) levels, expressed in parts per billion (by volume), from NASA's Health and Air Quality Applied Sciences Team (2020). NO_2, primarily emitted from vehicles, power plants, and industrial activities, can aggravate respiratory conditions like asthma and contribute to the formation of acid rain and haze. The NO_2 indicator in EJScreen measures concentrations using a percentile rank from 0 to 100, with higher scores indicating higher concentrations. The value for this indicator in the DGA is 16, which is greater than the state average of 8.8 and the national average of 7.8.
- ***Diesel PM[10]*** – The Diesel Particulate Matter (PM) indicator in EJScreen measures concentrations rather than cancer risk, although the EPA's Health Assessment Document for Diesel Engine Exhaust (Final 2002) concludes that "long-term (i.e., chronic) inhalation exposure is likely to pose a lung cancer hazard to humans, as well as damage the lung in other ways depending on exposure. Short-term (i.e., acute) exposures can cause irritation and inflammatory symptoms of a transient nature, these being highly variable across the population…. Evidence for exacerbation of existing allergies and asthma symptoms is emerging."[11] It is important to remember that the air toxics data presented in the EJScreen report provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations.

The Diesel PM concentration in the DGA (0.341 µg/m^3) is higher than both the average concentrations in the state and in the U.S. (0.176 µg/m^3 and 0.191 µg/m^3 respectively).

- ***Toxic Releases to Air*** – This indicator provides toxicity-weighted concentration of listed Toxic Release Inventory (TRI) chemicals in the air, as determined by the U.S. EPA's Risk-Screening Environmental Indicators (RSEI) Model. The values are linearly related, meaning risk is proportional to the difference in values. The TRI listed chemicals cause at

9 According to the EJ Screen Technical Documentation (September 2019, p. 27), a relatively high percentile means the value is relatively uncommon. However, a high percentile is not necessarily a real concern from a health or legal perspective. To understand the actual health or other implications of any screening results requires looking at the actual data and the indicator represents, and also looking at other relevant data if available. Besides the percentile, other important considerations in interpreting any screening results include the following: whether and to what extent the environmental data shows values above any relevant health-based or legal threshold; the significance of any such thresholds, or the magnitude and severity of the health or other impacts of the given environmental concern, nationally or locally; and the degree of any disparity between various groups, in exposures to the relevant environmental pollutants.

10 The National Air Toxics Assessment (NATA) has been replaced with AirToxScreen. AirToxScreen calculates concentration and risk estimates from a single year's emissions data using meteorological data for that same year. The risk estimates assume a person breathes these emissions each year over a lifetime (or approximately 70 years). The EPA cautions that AirToxScreen results are best applied to larger areas – counties, states and the nation. Results for smaller areas, such as a census tract, are best used to guide follow-up local studies. AirToxScreen assessments should not be used: to pinpoint specific risk values in small areas such a census tract; to characterize or compare risks at local levels (such as between neighborhoods); to characterize or compare risks between states; to examine trends from one assessment year to another; as the sole basis for risk reduction plans or regulations; to control specific sources or pollutants; or to quantify benefits of reduced air toxics emissions. https://www.epa.gov/AirToxScreen/airtoxscreen-overview.

11 Health Assessment Document For Diesel Engine Exhaust (Final 2002) https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=29060.

least one of the following: cancer or other chronic human health effects; significant adverse acute human health effects; and/or significant adverse environmental effects.

The value for this indicator in the DGA is 4500, which is greater than the state average (2,800) and less than the national average (4,600).

- ***Traffic Proximity*** – This indicator consists of a count of vehicles (average annual daily traffic [AADT]) at major roads within 500 meters, divided by distance in meters as calculated from U.S. Department of Transportation traffic data. Proximity to roads can provide access to jobs, health care, food, recreational opportunities, and other benefits. However, proximity to motor vehicle traffic is associated with increased exposure to ambient noise, toxic gases, and PM, including diesel PM. Any indicator of residential proximity addresses exposures relevant to the residences within a block group and would not capture most exposures that occur away from the home, such as at work, at school or during a commute. As with all proximity-based indicators, proximity alone may not represent any actual risk or even exposure. High values are expected for highly urbanized environments.

The value for this indicator in the DGA is 16,000,000, which is greater than the state average (6,100,000) and the national average (1,700,000).

- ***Hazardous Waste Proximity*** – This indicator identifies the presence of facilities that are permitted as Hazardous Waste TSDFs. As with all proximity-based indicators, proximity alone may not represent any actual risk or even exposure. Due to the density of the Project Area's urban location, there are more proximate TSDFs (47/km distance) than the state average (11/km distance) and national average (3.5/km distance).
- ***Underground Storage Tanks*** – This indicator assesses the density of underground storage tanks within the DGA, providing insight into potential environmental risks associated with the storage and handling of hazardous substances. USTs are commonly used for storing petroleum products and other hazardous materials, posing a risk of leakage and contamination of soil groundwater. The presence of USTs can lead to soil and water pollution posing threats to human health and the environment.

The density of USTs in the DGA is measured at 9.5 per square kilometer, greater than the state average (3.3/square km), and the national average (3.6 per square km).

- ***Drinking Water Non-Compliance***[12] – This indicator assesses populations served by community water systems that face challenges complying with health-based drinking water standards set by the Safe Drinking Water Act (SDWA). It considers the severity and age of violations to calculate non-compliance points, with data sourced from the EPA's Safe Drinking Water Information System. Non-compliance with SDWA regulations can be harmful to human health due to potential exposure to contaminants such as lead, nitrate, E. coli, and benzene, which pose significant health risks if consumed above the EPA's maximum contaminant levels.

12 U.S. Environmental Protection Agency. "EJSCREEN Indicators: Overview of Drinking Water Non-Compliance." EPA, https://www.epa.gov/ejscreen/ejscreen-indicators-overview-drinking-water-non-compliance

The drinking water non-compliance score for the DGA is 6.7, which is higher than both the average points in the state and in the U.S. (3.2 points and 2.2 points respectively).

4.4.3.1 RMAT Climate Resilience Tool

As discussed previously in **Chapter 3 – Environmental Considerations**, the MBTA has completed the required Resilient Massachusetts Action Team (RMAT) Climate Resilience Design Standards Tool to determine potential climate-related risks to the surrounding communities. Refer to **Appendix B** for a copy of the RMAT Tool report.

The report demonstrates that the Project Area has the following exposures and risks, broken down by various station locations as shown in **Table 4-7** below.

Table 4-7 RMAT Report Results

C Branch Stations	Sea Level Rise/ Storm Surge	Extreme Precipitation/ Riverine Flooding	Extreme Precipitation/ Urban Flooding	Extreme Heat
Hawes Street	Not Exposed	Moderate Exposure	High Exposure	High Exposure
St. Paul Street/ Kent Street	Not Exposed	Not Exposed	High Exposure	High Exposure
Summit Avenue/ Fairbanks Street/ Brandon Hall	Not Exposed	Not Exposed	High Exposure	High Exposure
Tappan Street/ Englewood Avenue/ Dean Road	Not Exposed	Not Exposed	High Exposure	High Exposure

Source: Resilience Massachusetts Action Team Tool Report

Refer to **Sections 4.5.2 and 4.5.3** below for further analysis and mitigation for climate related impacts.

4.5 Analysis of Impacts to Determine Disproportionate Adverse Effect

This section examines how Project impacts and benefits are likely to affect EJ populations versus non-EJ populations. Throughout design, it is a priority of the MBTA and the Town of Brookline to minimize potential adverse impacts as a result of the Project and improve the quality of life of the surrounding neighborhoods through improved accessibility and safety of transit systems.

The Project, with the specified minimization and mitigation measures, is not anticipated to have disproportionate adverse effects on EJ populations. This finding will be reassessed throughout design and construction.

4.5.1 Land Use

The Project is not anticipated to impact land use in the Project Area because the Project does not propose any increase in intensity or change of use. The Project aims to improve the existing physical characteristics of the C Branch corridor through station and roadway enhancements. No adverse impacts are anticipated, and thus, no disproportionate adverse effects to EJ populations from land use alterations are anticipated.

4.5.1.1 Public Shade Trees

The Project is anticipated to result in the removal of approximately 32 public shade trees (trees 14 or more inches in diameter at breast height) and because the Town of Brookline includes EJ populations the tree removal constitutes an anticipated impact on EJ populations. The loss of public shade trees is not a disproportionate impact because they will be replaced.

A tree survey was conducted in collaboration with Town of Brookline to determine the health of existing trees and extent of tree removal impacts. The MBTA will work closely with the Town to reduce and mitigate the impacts of tree removal through the following measures:

- Replacement trees will be planted to compensate tree loss as a result of the Project; and
- A tree planting and maintenance plan to ensure future protection of all trees along the shared road and rail ROW.

4.5.1.2 Transportation

The Project proposes adjusting roadway travel lanes and a combination of relocating and eliminating metered parking spaces to accommodate wider station platforms without a permanent reduction in the number of travel lanes on Beacon Street. The removal of approximately 69 metered and unmetered parking spaces owned by the Town of Brookline is not anticipated to adversely impact local businesses, due to the limited commercial and industrial land use on the affected streets, or EJ populations, because the metered parking is intended for short-term parking. Any accessible parking spaces removed would be replaced proximally. No permanent adverse impacts to traffic flow or mobility due to roadway improvements are anticipated. As no adverse impacts are anticipated, no disproportionate adverse effects to EJ populations from roadway changes and parking loss are anticipated.

4.5.1.3 Air Quality

The Project is not expected to be a significant source of emissions during standard operation. Since the Green Line is electrified, direct emissions are not anticipated from train movement unless emergency standby generators are used. Thus, no disproportionate adverse effects to EJ populations from air quality impacts are anticipated.

4.5.1.4 Noise and Vibration

This Project would not result in an increase in MBTA train operations, nor adjustments to the existing track alignment or special track work. Per the noise impact criteria established by the FTA, the Project would result in negligible noise increases that are not anticipated to impact

nearby sensitive receptors along the C Branch corridor. As no adverse impacts are anticipated, no disproportionate adverse effects to EJ populations from noise are anticipated.

4.5.1.5 Water Resources

Due to the MBTA's need to install hose connections for station washdowns, coordination with the Town of Brookline Department of Public Works Water and Sewer is required before construction. Since the Project will require work near MWRA water lines, an MWRA 8(m) permit will also be required. Minor changes to the storm drain system, such as catch basin relocations, are anticipated due to curb realignments. The Project does not require compliance with the Massachusetts Stormwater Standards as the work does not require the issuance of an Order of Conditions per the Massachusetts Wetlands Protection Act for work within wetland resource area. As the Project operations would involve stormwater discharge associated with station janitorial actions, a NPDES 2021 MSGP is required. Stormwater BMPs, such as good housekeeping practices, spill control procedures, and deep sump catch basins, will be implemented or installed to minimize stormwater pollution as required.

The Project Area is not located in proximity to wellhead protection areas, surface drinking water supplies, or outstanding resource waters, as the closest surface water supply/outstanding resource area is located at Fresh Pond in Cambridge, Massachusetts, over two miles away from the Project Area. No significant changes in impervious cover or peak flow rates are anticipated.

No adverse impacts to water resources are anticipated; thus, no disproportionate adverse effects to EJ populations from water resources are anticipated.

4.5.1.6 Hazardous Materials

No structures are anticipated to be demolished during construction phases of the Project, however, existing utility infrastructure (i.e., buried utility conduits) and other unanticipated waste materials may have the potential to contain hazardous building materials (e.g., lead-based paint, asbestos, etc.). Therefore a pre-demolition hazardous material survey is required during final design. Also, contract documents will include provisions for testing of suspect hazardous building materials as they are encountered, as well as requirements for abatement and/or disposal in accordance with state and federal regulations, if required.

4.5.1.7 Construction Period Impacts

The following section describes anticipated construction period impacts by resource category, and anticipated disproportionate adverse effect findings. (Note: these anticipated impacts are temporary in nature.)

Transportation

Temporary parking impacts and station closures are anticipated along Beacon Street during construction that would impact both EJ and non-EJ populations. As part of the mitigation, a temporary traffic control and detour plan would be developed and implemented. Additionally, temporary bus diversion boarding areas would be created and implemented to

mitigate impacts on Green Line services. Temporary features will be removed and conditions will be restored to pre-construction condition upon restoration of Green Line service.

As temporary impacts related to construction would be minimized and mitigated, no disproportionate adverse effects on EJ populations from construction activities are anticipated. The need for additional minimization or mitigation measures to address construction-related effects will be reevaluated throughout design and construction.

Air Quality

Temporary emissions from construction activities are expected from diesel-powered construction equipment and fugitive dust from earthwork. Emissions may increase from the increase of motor vehicles on local streets due to traffic disruptions.

The construction contractor would develop and implement a Construction Management Plan to address impacts from fugitive dust, construction equipment exhaust, and any additional dust control considerations. The MBTA and the Town of Brookline would contractually require the construction contractors to adhere to all applicable regulations regarding control of construction vehicles emissions, including after-engine emission controls, ultra-low sulfur diesel fuel, and diesel particulate filters to minimize emissions. The contractor will also be responsible for protective measures around the construction and demolition work to protect pedestrians and prevent dust and debris from leaving the Project Area or entering the surrounding community. The MBTA and the Town of Brookline will put idling restriction signs on the premises to remind drivers and construction personnel of the state's idling regulation. There will be regular sweeping of the pavement of adjacent roadway surfaces and other dust suppression methods during the construction period to minimize the potential for vehicular traffic to create airborne dust and particulate matter.

Following planned minimization and mitigation, no adverse impacts to EJ or non-EJ populations are anticipated, and thus, no disproportionate adverse effects to EJ populations are anticipated. As detailed in **Chapter 5 – Mitigation Summary**, adverse impacts and mitigation will be reevaluated throughout design and construction, including EJ-specific mitigation (discussed in **Section 5.2.2**).

Noise and Vibration

The construction contractor would minimize temporary noise conditions to the extent practicable by implementing construction noise abatement measures, including restriction of work hours and updating equipment with noise reducing features.

Hazardous Materials

Appropriate handing, transportation, and disposal requirements for demolition debris would be detailed in the contract documents. No structures are anticipated to be demolished during construction phases of the Project and therefore a pre-demolition hazardous building material survey has not been conducted. However, buried utility conduits and other unanticipated waste materials may have the potential to contain hazardous building materials (e.g., lead-based paint, asbestos, etc.). Therefore, the contract documents will

include provisions for testing of suspect hazardous building materials as they are encountered, as well as requirements for abatement and/or disposal in accordance with state and federal regulations, if required. No adverse impacts following proper abatement are anticipated.

There is the potential to encounter petroleum and/or hazardous substances in soil and/or groundwater during construction phases of the Project. Any contaminated soil and/or groundwater generated during construction will require proper management in accordance with the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000). Should any petroleum and/or hazardous substances be encountered during excavation that requires management or export, it must be handled under appropriate documentation.

The Project will also prioritize waste reduction and reuse opportunities and ensure recycling and composting where possible. Proper containers for waste and garbage will be provided on-site, and stormwater will be protected by properly storing hazardous materials and chemicals. Following proper handling and management of any potentially encountered contaminated soil and/or groundwater, no adverse impacts are anticipated; thus, no disproportionate adverse effects to EJ populations from water resources are anticipated.

4.5.2 Climate Change Adaptation and Resiliency

As indicated in the RMAT Report (provided for reference in **Appendix B**), the primary climate change impacts on the nearby EJ populations are related to potential flooding and higher temperatures. The Project is not anticipated to exacerbate impacts related to sea level rise or storm surge.

4.5.2.1 Measures to Address Potential Flooding

Designing for flood protection is critical to the functionality and longevity of MBTA systems, including station platforms, parking areas, tracks, maintenance facilities, utilities, and all other supporting infrastructure. When avoidance of flood risk is not feasible, the preferred design approach is to elevate assets above the potential flood elevation. The Project will be designed to elevate both critical and non-critical assets according to the coastal and inland flood design elevations. Critical assets should be designed for greater freeboard to further protect from flood risk.

For assets that cannot be elevated, design options include:

- Dry floodproofing, including permanent and temporary barrier deployment
- Wet floodproofing, including material selection that is resilient to flooding/wet conditions/saltwater intrusion

4.5.2.2 Measures to Address Potential Higher Temperatures/Heat Island Effect

As described in Section 3.2.5.3, urban heat island effect is measured on a larger scale beyond project limits and typically occurs in urban areas due to the heat retention of impervious surfaces, such as paved roads and building rooftops. The Project includes tree removal, including public shade trees (14 or more inches in diameter at breast height), which could

contribute to urban heat island effect within the Project Area. A tree survey was conducted in collaboration with Town of Brookline to determine the health of existing trees and extent of tree removal impacts. The MBTA is working closely with the Town to reduce and mitigate the impacts of tree removal, including urban heat island effect through the following measures:

- Replacement trees will be planted along the C Branch corridor, where feasible, as well as other locations in the Town to compensate tree loss and mitigate urban heat island effect as a result of the Project; and
- A tree planting and maintenance plan to ensure future protection of all trees along the shared road and rail ROW.

4.5.3 Project Benefits

The Project would allow the MBTA to improve reliability and quality of service, as well as station accessibility for all riders and communities, including EJ populations, served by the C Branch. The upgrades include fully accessible stations with boarding platforms level with train floors, enhanced accessibility across the right-of-way, and improved sidewalk and crosswalk access for pedestrians. Additionally, constructing at least two ways to exit each platform to nearby public areas would substantially improve safety and accessibility, offering more exit routes in emergencies and enhancing overall station accessibility for all riders.

4.5.4 Environmental Benefits

Through the station upgrades and increased accessibility, the Project will encourage transit use which can have impacts to the modes of travel throughout the community such as reducing reliance on personal vehicles, thereby reducing emissions.

4.6 Community and EJ Outreach

To enable the public to assess the impact of proposed projects that affect their environment, health and safety through the MEPA review process, it is important to provide opportunities for meaningful public involvement by EJ populations.

4.6.1 Enhanced Public Involvement Prior to the EENF Filing

As per the requirements stated under Section II of the Public Involvement Protocol, "Measures to Enhance Public Involvement Prior to Filing ENF/EENF," the MBTA has made a meaningful effort to engage with the community through expanded outreach.

The MBTA has performed outreach within the Town of Brookline to discuss major aspects of the Project including, but not limited to, station consolidation, MBTA station design, roadway cross section, and construction sequencing.

Starting in 2020, the MBTA has held monthly meetings with Town of Brookline officials, including the Department of Public Works and the Transportation Board to drive the design of the Project and goals of the Town of Brookline.

The MBTA has held the following public meetings on the Green Line activities:

- Transportation Board, open meeting (virtual), February 14, 2024
  - A presentation on the Project was provided during this meeting by MBTA staff. There were board and public comments on tree removal, accessible parking spaces, platform height in relation to the future Type 10 train cars, impacts during construction period, and community engagement.
- Open House at Brookline Public Library, Coolidge Corner, (in-person) February 15, 2024
  - This meeting was attended by approximately 22 residents and discussed travel time, tree removal, user-friendly signage, lighting improvements, seating, and the construction period impacts.
- Transportation Board, open meeting (virtual), July 17, 2024
  - This meeting included a presentation and discussion on the Project including stop consolidation, impacts to parking and trees on Beacon Street.
  - The Project team responded to comments on tree removal, parking space impacts, pedestrian safety, changes in travel time, and urban heat island effect.
- Commission on Disabilities (virtual) September 11, 2024
  - This meeting included discussion of proposed station geometric requirements and proposed layouts, roadway and parking impacts, the need for and locations of tree clearing and a project timeline.
- Joint Meeting of the Shared Mobility Committee/Pedestrian advisory Committee/ Bicycle Advisory Committee 10/30/24 (design proposal)
  - This meeting included discussion of proposed station geometric requirements and proposed layouts, roadway and parking impacts, the need for and locations of tree clearing and a project timeline.
- Public Open house 2/15/24 (initial project overview)
  - This meeting included discussion of proposed station geometric requirements and proposed layouts, roadway and parking impacts, the need for and locations of tree clearing and a project timeline.

The MBTA will continue to coordinate on the municipal level and identify the most effective strategies for reaching affected parties.

As recommended in the Public Involvement Protocol, the MBTA has taken additional measures to ensure positive outreach, including:

- Distributed the EJ Screening Form, translated into Spanish; Chinese; and Russian, to the list of EJ Community-Based Organizations more than 45 days before filing this EENF.
- Created a public website to present an overview of the Project, a construction timeline, features, benefits, and contact information for questions and comments. The website is available at the following link: https://www.mbta.com/projects/c-branch-station-accessibility-improvements

The MBTA is committed to implementing a robust Public Involvement Plan (**Appendix D**) that is inclusive and welcomes participation from communities, riders, and abutters. The outreach will focus on notification/communication, community meetings, and physical signage.

Multiple strategies and tools for communicating information and gathering input will broaden the reach of this Project and offer community members ways to participate at times and in locations that are convenient. The outreach program is designed to meet the particular needs and expectations of the public and stakeholder groups affected by the Project.

Key features of the Public Involvement Plan include:

› Development of clear and targeted materials that provide information on the Project. Materials may include flyers, social media posts, and email notifications.

› Communication with local community and business groups, abutters and stakeholders to publicize community meetings employing the Project database and other outreach strategies. The MBTA will notify the entire EJ CBO List and other interested groups of all public meetings and open houses.

› Translation services for appropriate languages as identified by the Languages Spoken in Massachusetts tab of the Environmental Justice Populations in Massachusetts map.

Refer to **Appendix D** for the Public Involvement Plan which describes the full list of measures that the MBTA is taking to ensure meaningful engagement with local stakeholders and communities.

4.6.2 Public Involvement After the EENF Filing

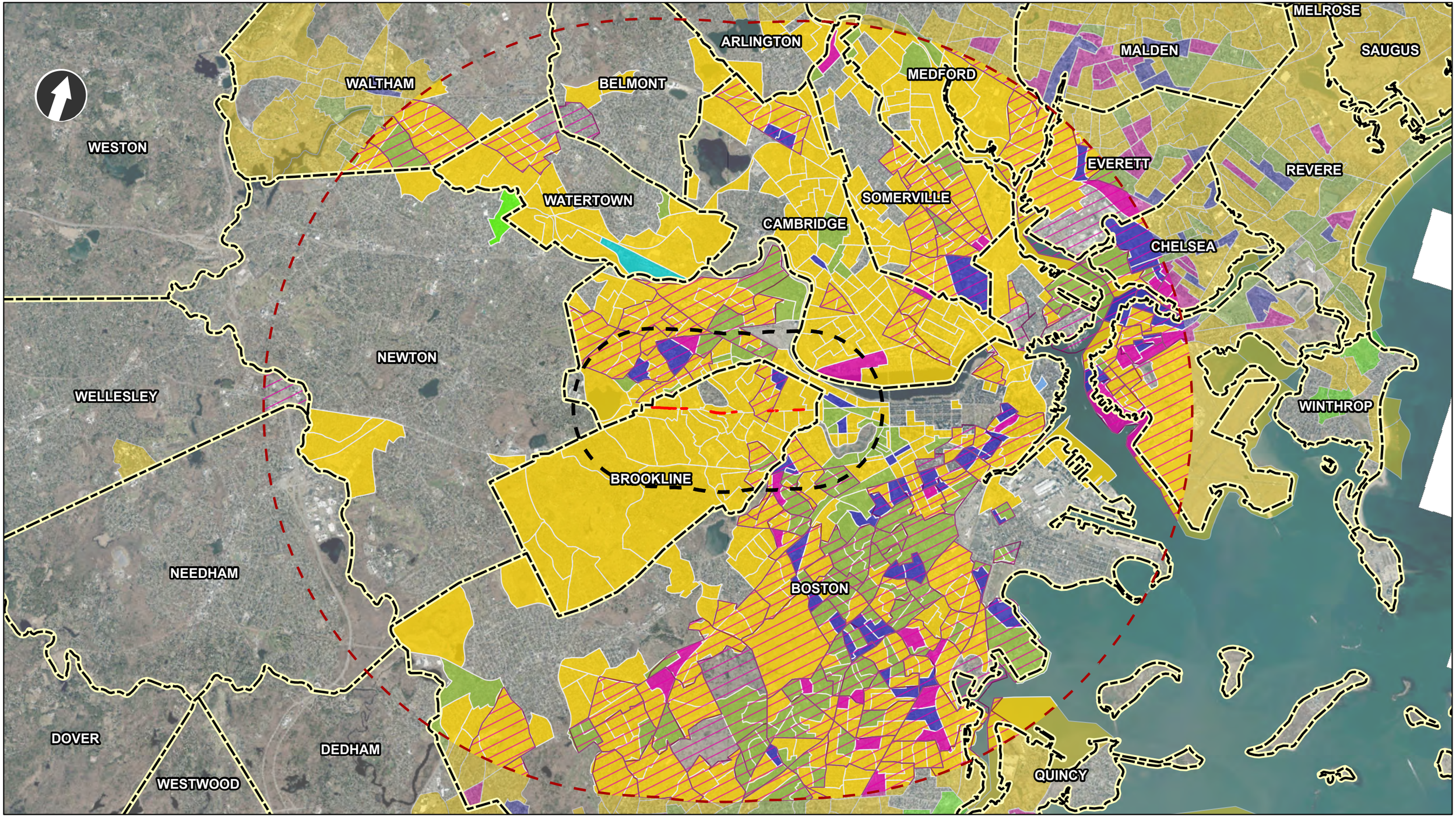
The Proponent will build upon practices outlined in the MEPA Public Involvement Protocol to promote meaningful public involvement throughout the MEPA review process including:

› Informational pop-up booths at various locations along the C Branch corridor.

› Pre-Construction and construction period notices posted along the C Branch corridor with information of service interruptions and shuttles.

› Public notices to be translated and published in local newspapers including:

- The Boston Globe (English and Russian)
- El Mundo (Spanish translated)
- Sampan (Chinese translated)



Massachusetts Bay Transportation Authority

Project Area
Municipal Boundary
Study Area (1-Mile Radius)
Study Area (5-Mile Radius)

MA 2020 Environmental Justice Block Groups
Language isolation
Income
Income and English isolation
Minority
Minority and English isolation
Minority and Income
Minority, Income and English isolation
Census Tract where >5% of the population speaks a language other than English

0 3000 6000 12000 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Green Line C Branch Station Accessibility Upgrades Project
Brookline, Massachusetts
Figure 4.1
Environmental Justice Populations

5

Mitigation Summary

This chapter provides an overview of the mitigation measures and other Project commitments proposed to address potential environmental impacts resulting from this Project. This chapter also includes draft Section 61 Findings for each state Agency Action anticipated to be required for the Project.

5.1 Mitigation Summary

Table 5-1 below presents a summary of the mitigation measures proposed to address potential environmental impacts, as well as other beneficial commitments associated with the Project. Only those environmental impact categories for which measures are proposed are presented. No potential environmental impacts requiring mitigation are anticipated for air quality, noise and vibration, natural resources, and historic and archeological resources because of the Project.

Construction is anticipated to begin in late-2025 or early 2026 and be substantially completed in 2026. It is anticipated that work would be limited to early access (9 PM to 5 AM shifts), and extended weekend outages and surges that require multi-day closures with daytime and nighttime construction shifts as needed. Short term station closures would be required if large construction equipment must be positioned within rail infrastructure foul areas to rebuild the station platforms. Any temporary disruption to C Branch service would be replaced by shuttle bus services with accessible temporary bus stops.

The state permit required for the Project (MWRA 8(m) Permit) is associated with the 'Temporary Construction Impacts' impact category and the proposed mitigation measures are reflected in that section under 'Utility Disruption' in **Table 5-1** below. Section 5.3 includes the draft Section 61 Finding for the MWRA 8(m) Permit required for the Project.

Table 5-1 Summary of Proposed Mitigation Measures and Commitments

Transportation (Public Shade Trees) and Parking		
Proposed Mitigation Measure	**Responsible Party**	**Timing**
Conduct a tree survey in consultation with the Town of Brookline to determine the health of existing trees within the Project Area and confirm extent of tree removal impacts.	MBTA	Conceptual Design
Plant replacement trees along the C Branch corridor, where feasible, as well as other locations in the Town in coordination with the Town.	MBTA/ Town of Brookline	Final Design/ Construction
Develop a tree planting and maintenance agreement plan to ensure future protection of planted trees.	MBTA/ Town of Brookline	Operations
Replace impacted accessible parking spaces, in proximity to the existing locations, in coordination with the Town of Brookline.	MBTA	Final Design/ Construction
Proposed Commitment		
None	NA	NA
Climate Change Resiliency		
Proposed Mitigation Measure	**Responsible Party**	**Timing**
None required	NA	NA
Proposed Commitment		
To reduce impacts associated with tree removal, such as urban heat island effect and flooding, the Project will adhere to the MBTA's vegetation management plan during site construction and operation.	MBTA	Construction/ Operations
In accordance with the MBTA Flood Directive, both critical and non-critical assets will be elevated to the flood design elevations. Critical assets will be designed for greater freeboard to further protect from flood risk to the greatest extent practicable.	MBTA	Final Design/ Construction
In accordance with the MBTA Flood Directive, for assets that cannot be elevated, dry floodproofing, including permanent and temporary barrier deployment or watertight shields would be considered. (Note, if temporary barrier deployment is utilized, the MBTA will consider maintenance requirements, as well as ability to put in place operational procedures for sufficient warning time for deployment.)	MBTA	Final Design/ Construction
In accordance with the MBTA Flood Directive, for assets that cannot be elevated, wet floodproofing, including material selection that is resilient to flooding/wet conditions/saltwater intrusion would be considered. Wet floodproofing uses design strategies, including selection of flood damage resistant materials, that will allow for flooding to occur, but with minimal or no operational downtime and without short- or long-term damage to the asset.	MBTA	Final Design/ Construction

Land/Stormwater Management/Water Quality		
Proposed Mitigation Measure	**Responsible Party**	**Timing**
None required	NA	NA
Proposed Commitment		
Stormwater Best Management Practices, such as good housekeeping practices, spill control procedures, and deep sump catch basins, will be implemented or installed to minimize stormwater pollution as required.	MBTA	Operations

Hazardous Materials		
Proposed Mitigation Measure	**Responsible Party**	**Timing**
None required	NA	NA
Proposed Commitment		
Maximize diversion opportunities for discarded materials, prioritizing waste reduction and reuse opportunities and recycling and/or composting where applicable. Proper containers for waste and garbage collection will be provided on-site and stormwater will be protected by properly storing hazardous materials and chemicals.	MBTA/Contractor	Construction
Applicable regulations for hazardous waste handling and ACM include the MassDEP Hazardous Waste Regulations (310 CMR 30.000), the MassDEP Asbestos Regulations (310 CMR 7.15), NESHAP, and the Massachusetts Air Pollution Control Regulations.	MBTA/Contractor	Construction
Any contaminated soil and/or groundwater generated during excavation will be managed in accordance with the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000). If petroleum and/or hazardous substances are encountered during excavation and require management or export, they must be handled with appropriate documentation such as Material Shipping Records, Bills of Lading, or manifests, following the MBTA Specification Section 02282 for Handling, Transportation, and Disposal of Excavated Materials.	MBTA/Contractor	Construction

Temporary Construction Impacts		
Proposed Mitigation Measure	**Responsible Party**	**Timing**
Traffic/Transit Disruptions		
› Temporary traffic controls, detours, and accessible bus diversion plans will be implemented to maintain transit services, including potential station bypasses or diversions and preliminary roadway traffic management measures. No long-term or permanent traffic impacts are anticipated because of Project activities.		
› Alternative shuttle service would be provided by the MBTA during periods of service outages. Because construction may result in temporary closure of stations during construction, a diversion service plan would be developed to maintain transit service throughout construction. This may involve temporary station bypasses and or replacement shuttle service. Bus diversion concepts and preliminary roadway traffic management plans meeting accessibility requirements would be created and implemented to prevent further impact on transit services.	MBTA	Construction
› Existing bicycle lanes along Beacon Street will remain open during construction.		

Utility Disruption		
› The utility mains located within the Project Area would require review and possible relocation, or protection in place, to maintain system capacities. › Due to the Project involving the installation of hose connections for station washdowns, coordinate with Brookline Water Resources and MWRA as design advances. › Conduct design, construction, and excavation in accordance with all federal and state safety regulations including, but not limited, to federal OSHA regulations (29 CFR 1926) and Massachusetts Department of Public Safety regulations (520 CMR 14.00). › Implement monitoring and incorporate appropriate sheeting and shoring measures during construction to protect the integrity of MWRA's water main, with the associated design, stamped by a Massachusetts licensed Professional Engineer, submitted to MWRA prior to the start of construction. › Adjust MWRA frames and covers to grade within limits of work.	MBTA/Contractor	Construction
Noise		
› Minimize construction noise to the extent practicable and implement measures to assure that construction equipment is functioning properly and is equipped with mufflers and other noise reducing features. › Noise abatement measures may include: • Restrictions on working hours, where possible; • Scheduling of noisy works to less sensitive working hours; • Adopting quiet working methods, using equipment with lower noise emission levels; • Use of electrically powered equipment in preference to internal combustion powered equipment; • Installation of site hoardings or perimeter noise barriers; and • Use of temporary acoustic enclosures or screens around specific noisy stationary equipment.	MBTA/Contractor	Construction
Air Quality		
› The Construction Management Plan would include an emissions control plan to address impacts of fugitive dust, construction equipment and vehicle exhaust, and any additional dust control considerations.	MBTA	Construction
Water Quality		
› In accordance with the NPDES CGP, appropriate construction-period controls would be implemented to prevent potential off-site impacts, including development of and adherence to a Stormwater Pollution Prevention Plan, implementation of erosion and sediment controls, and inspection and maintenance of controls throughout construction. › If groundwater is encountered during construction and discharged to an MWRA sewer, an MWRA Temporary Construction Site Dewatering Discharge Permit would be required. If sampling results obtained for compliance with the 2022 NPDES CGP indicate the need for coverage under the new NPDES Dewatering and Remediation General Permit, then coverage would be requested, and requirements met.	MBTA/Contractor	Construction

Hazardous Materials		
› Appropriate handing, transportation, and disposal requirements for demolition debris would be detailed in the contract documents. No structures are anticipated to be demolished during construction phases of the Project and therefore a pre-demolition hazardous building material survey has not been conducted. However, buried utility conduits and other unanticipated waste materials may have the potential to contain hazardous building materials (e.g., lead-based paint, asbestos, etc.). Therefore, the contract documents will include provisions for testing of suspect hazardous building materials as they are encountered, as well as requirements for abatement and/or disposal in accordance with state and federal regulations, if required. › The MBTA would consult with the MassDEP regarding the planning and implementation of demolition and management of contaminated materials to confirm consistency with applicable regulations and provide adequate protection to workers and sensitive receptors. › Any contaminated soil and/or groundwater generated during construction will require proper management in accordance with the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000). › Proper containers for waste and garbage collection will be provided on-site and stormwater will be protected by properly storing hazardous materials and chemicals.	MBTA	Construction
Proposed Commitment		
None	NA	NA

NA = Not Applicable

5.2 Environmental Justice

To assess potential community disruption and impacts to EJ populations, an analysis was completed using the MA EJ Maps Viewer within the Project's DGA. As described in **Chapter 1**, *Project Description*, the Project proposes work on nine subject stations along the Green Line C Branch.

5.2.1 Summary of Disproportionate Adverse Effects

As described in Section 4.5 of **Chapter 4**, *Environmental Justice and Public Health*, the Project, with the specified minimization and mitigation measures detailed herein and described below, is not anticipated to have disproportionate adverse effects on EJ populations. This finding will be reassessed throughout design and construction.

5.2.2 EJ-Specific Mitigation Measures

The MBTA is committed to reducing the Project's impacts on the surrounding EJ populations including the following measures:

› The MBTA and Town of Brookline are committed to replacing trees and developing a maintenance plan/agreement for the protection of future trees.

› Ensure replacement of accessible parking spaces owned by the Town of Brookline.

In order to ensure a meaningful public process, the MBTA will:

- Expand the EJ public involvement process to include public meetings and opportunity for residents to discuss directly with the Project team.
- Continuously provide construction period updates through the Project website, flyers, media outreach, and other means.

Refer to Chapter 4, *Environmental Justice and Public Health*, for more information regarding mitigation measures taken to protect EJ populations.

5.3 Draft Section 61 Findings

The following presents the draft Section 61 Findings for the MWRA 8(m) Permit required for the Project.

DRAFT ONLY

December 16, 2024

Massachusetts Water Resources Authority
Deer Island
33 Tafts Avenue
Boston, MA 02128

RE: Green Line C Branch Station Accessibility Upgrades Project

Each agency of the Commonwealth that is taking an Agency Action (e.g., issuing a permit, financial assistance) must make a finding, pursuant to MGL Chapter 30, Section 61, that all feasible measures have been taken by the Proponent to avoid damage to the environment, or, to the extent damage to the environment cannot be avoided, to minimize and mitigate damage to the environment to the maximum extent practicable. These Section 61 Findings specify the entity responsible for funding and implementing any such mitigation measures, and the anticipated mitigation implementation schedule.

The proposed mitigation measures for the Green Line C Branch Station Accessibility Upgrades Project (the "Project") are described in the dual Expanded Environmental Notification Form and Proposed Environmental Impact Report (EENF/PEIR) submitted with a request to allow a Rollover EIR on December 16, 2024. The following sections provide a summary of possible impacts expected as a result of the Project. The proposed impact avoidance, minimization, and mitigation measures are the basis upon which Section 61 Findings may be made by the MWRA. All impact minimization measures and mitigation measures outlined herein will be funded or implemented by the MBTA (the "Proponent").

Project Description

The Project will address accessibility conditions for nine station locations on the MBTA Green Line C Branch in the Town of Brookline to achieve accessibility by widening platforms and improving pedestrian access and egress from the stations.

The Project includes the following upgrades to the Green Line C Branch subject stations:

- Raise existing platforms to 8 inches above the top of the adjacent rail elevation for a minimum of a 140-foot length.
- Widen platforms to a minimum 7 feet 6 inches, measured from the platform edge to the back of the accessible surface, including truncated dome panel edges. Wider platforms may be necessary in some cases to achieve accessibility where existing fixed obstructions (e.g., OCS poles) constrain passage.
- Construct at least two means of egress from each platform between stations to the public right-of-way (ROW) to improve safety for passengers in compliance with NFPA 130.
- Construct sloped walkways leading to the proposed raised platform levels and position or reposition pedestrian track crossings to the lower end of the transition walkways.
- Construct a new accessible, covered ramp at the consolidated Fairbanks and Brandon Hall station.
- Restripe crosswalks and repaint pedestrian track crossings.
- Adjust roadway layouts and street parking layouts to widen platforms, which may involve redesign of roadway, traffic, and utility systems.
- Install wayfinding and lighting per MBTA station standards. Pole-mounted lights may be located at the back edge of platforms. Emergency power (i.e., standby generators) would be established in the designs at each station location where feasible.
- Consolidate the existing Fairbanks Street Station and Brandon Hall Station at a new location between the existing stations meeting accessibility standards.
- Decommission the existing Kent Street Station.

Permit Requirements

An 8(m) permit is required for the Project if any construction is being done within the vicinity of a MWRA water line and/or or sewer line.

Project Impacts

Work associated with the Project, including temporary construction activities may take place in sufficient proximity to MWRA water line and/or or sewer line.

Mitigation Measures

The Project Area will be designed to minimize impacts to the MWRA system. Proposed work will comply with MWRA standard and special permit terms and conditions upon issuance of an 8(m) permit or permits. These conditions are anticipated to include:

- Coordination with the MWRA to avoid interference with the agency's activities or operations at the Project Site.
- Opportunity for MWRA review and approval of proposed work as MWRA deems necessary.
- Written approval by MWRA for changes in work scope.
- No blasting, drilling, or other activity that could affect the integrity or operability of MWRA's property without prior written approval.

- Conducting design, construction, and excavation in accordance with all federal, state, and local safety regulations including, but not limited, to federal OSHA regulations (29 CFR 1926) and Massachusetts Department of Public Safety regulations (520 CMR 14.00).
- Implementation of monitoring and incorporation of appropriate sheeting and shoring measures during construction to protect the integrity of MWRA's water main, with the associated design, stamped by a Massachusetts licensed Professional Engineer, submitted to MWRA prior to the start of construction.
- Adjusting MWRA frames and covers to grade within limits of work.

Section 61 Findings

The potential environmental impacts of the Project and associated improvements of the Project quantified in the EENF/PEIR are incorporated by reference into this Section 61 Finding. Throughout the planning and environmental review processes, which includes coordination with MWRA, the Proponent has developed measures to mitigate impacts of the Project. With the mitigation proposed and carried out in cooperation with state agencies, MWRA finds that there are no significant unmitigated impacts.

For the reasons stated above, MWRA hereby finds that pursuant to MGL c. 30, § 61, the construction of the Project as described above, and with the implementation by the Proponent of the noted mitigation measures, all practicable means and measures will be taken to avoid or minimize adverse environmental impacts related to the Project.

Agency: _____

Commissioner: _____

Date: _____

APPENDIX A: EENF/PEIR DISTRIBUTION LIST

EENF/PEIR Distribution List

Below is a list of state and municipal agencies from whom the Proponent will seek permits or approvals, and other parties, as specified in 301 CMR 11.16. Environmental Justice (EJ) Community Based Organizations provided by the MEPA Office as part of the Project-specific EJ Reference List dated July 16, 2024, are also listed below.

State and Regional Agencies and Officials

Executive Office of Energy and Environmental Affairs Attn: Tori Kim, Director of the Massachusetts Environmental Policy Act Office 100 Cambridge Street Boston, MA 02114 MEPA@mass.gov tori.kim@mass.gov	Executive Office of Energy and Environmental Affairs Attn: Environmental Justice Director 100 Cambridge Street Boston, MA 02144 MEPA-EJ@mass.gov
Massachusetts Department of Transportation Public/Private Development Unit 10 Park Plaza Boston, MA 02116 MassDOTPPDU@dot.state.ma.us	Massachusetts Water Resource Authority 100 First Avenue Charlestown Navy Yard Boston, MA 02129 Hillary.Monahan@mwra.com
Department of Environmental Protection One Winter Street Boston, MA 02108 helena.boccadoro@mass.gov	Metropolitan Area Planning Council 60 Temple Place Boston, MA 02111 afelix@mapc.org mpillsbury@mapc.org
Massachusetts Department of Transportation District #6 185 Kneeland Street Boston, MA 02111 michael.garrity@dot.state.ma.us	Department of Environmental Protection Northeast Regional Office 150 Presidential Way Woburn, MA 01801 john.d.viola@mass.gov
Massachusetts Historical Commission[1] 220 Morrissey Boulevard Boston, MA 02125 brona.simon@sec.state.ma.us	

[1] A hardcopy of the EENF/Proposed EIR will be mailed to the Massachusetts Historical Commission.

Town of Brookline

Planning and Community Development Department 333 Washington Street Brookline, MA 02445 kbrewton@brooklinema.gov	Select Board 333 Washington Street Brookline, MA 02445 SelectBoard@brooklinema.gov
Public Health Department 11 Pierce Street Brookline, MA 02445 publichealth@brooklinema.gov	Conservation Commission 333 Washington Street Brookline, MA 02445 tbrady@brooklinema.gov
Department of Public Works 333 Washington Street Brookline, MA 02445 aingles@brooklinema.gov	Preservation Commission 333 Washington Street Brookline, MA 02445 tmccarthy@brooklinema.gov

Environmental Justice Community Based Organizations

Unitarian Universalist Mass Action Network	Chinatown Resident Association
The Trust for Public Land	Browning the Green Space
Community Action Works	Appalachian Mountain Club
Conservation Law Foundation	Environmental League of Massachusetts
Environment Massachusetts	Mass Land Trust Coalition
Clean Water Action	Neighbor to Neighbor Massachusetts
Ocean River Institute	Sierra Club Massachusetts
Mass Audubon	Mystic River Watershed Association
Boston Farms Community Land Trust	Save the Harbor/Save the Bay
Boston Harbor Now	Chinese Progressive Association
Mass Community Labor United	Chinatown Community Land Trust
New England United for Justice	Allston Brighton Health Collaborative
Fairmount/Indigo Line Community Development Corporation Collaborative	Codman Square Neighborhood Development Corporation
Harbor Point Community Task Force	Upham's Corner Main Street
Vietnamese American Initiative for Development	Southwest Boston CDC
GreenRoots, Inc.	Mass Rivers Alliance
Alternatives for Community & Environment	Nuestra Comunidad CDC
Dudley Street Neighborhood Initiative	Charles River Conservancy
Charles River Watershed Assoc.	Neponset River Watershed Association
Coalition for Social Justice	

Federal and State Tribal Organizations

Chappaquiddick Tribe of the Wampanoag Nation, Whale Clan	Chappaquiddick Tribe of the Wampanoag Nation
Wampanoag Tribe of Gay Head (Aquinnah)	Massachusetts Commission on Indian Affairs
Nipmuc Nation (Hassanamisco Nipmucs)	Pocassett Wampanoag Tribe
North American Indian Center of Boston	Massachusetts Tribe at Ponkapoag
Herring Pond Wampanoag Tribe	Mashpee Wampanoag Tribe

APPENDIX B: Climate Change Supporting Documentation

- **Hawes Street Station**
- **Saint Paul Street Station/Kent Street Station**
- **Summit Avenue Station/Fairbanks Station/Brandon Hall Station**
- **Tappan Street Station/Englewood Avenue Station/Dean Road Station**

Climate Resilience Design Standards Tool Project Report

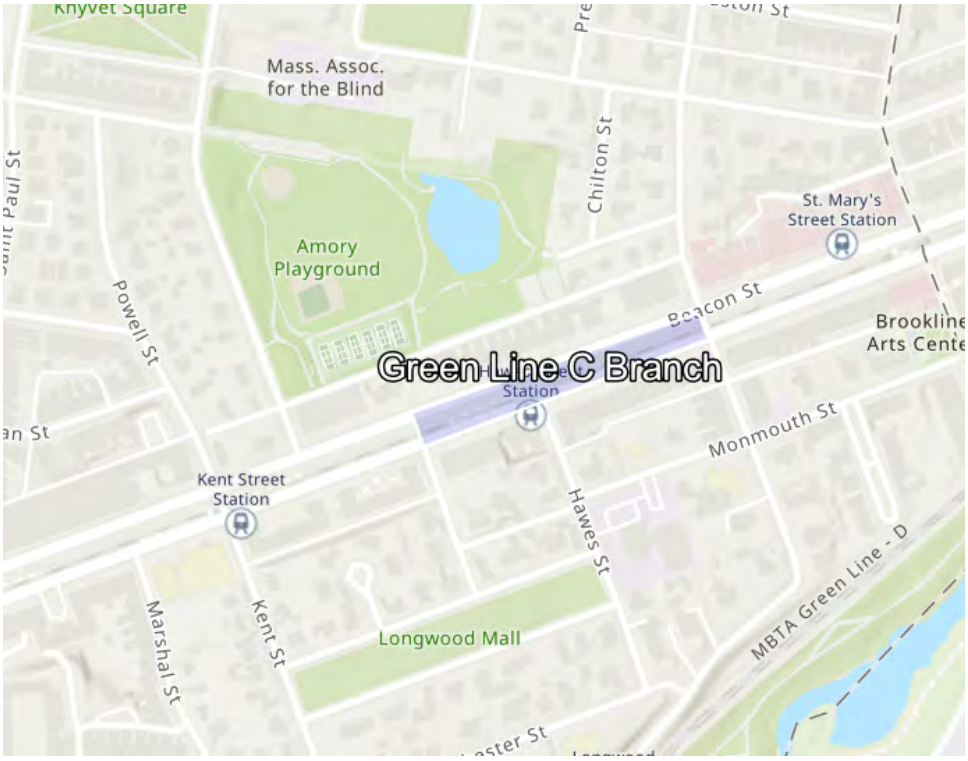
Green Line C Branch Hawes Street
Date Created: 7/15/2024 9:25:28 AM
Created By: MKarasik
Date Report Generated: 9/18/2024 7:37:24 PM
Tool Version: Version 1.2
Project Contact Information: Michael Karasik (mkarasik@vhb.com)

Project Summary

Link to Project

Estimated Capital Cost: $5000000.00
End of Useful Life Year: 2078
Project within mapped Environmental Justice neighborhood: Yes

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



Asset Preliminary Climate Risk Rating Summary

Number of Assets: 1

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
MBTA Facilities	Low Risk	High Risk	Moderate Risk	High Risk

Climate Resilience Design Standards Summary

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
MBTA Facilities					
Extreme Precipitation					
MBTA Facilities	2070			25-yr (4%)	Tier 3
Extreme Heat					
MBTA Facilities	2070		50th		Tier 3

Scoring Rationale - Project Exposure Score

The purpose of the Exposure Score output is to provide a preliminary assessment of whether the overall project site and subsequent assets are exposed to impacts of natural hazard events and/or future impacts of climate change. For each climate parameter, the Tool will calculate one of the following exposure ratings: Not Exposed, Low Exposure, Moderate Exposure, or High Exposure. The rationale behind the exposure rating is provided below.

Sea Level Rise/Storm Surge

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

- Not located within the predicted mean high water shoreline by 2030
- No historic coastal flooding at project site
- Not located within the Massachusetts Coast Flood Risk Model (MC-FRM)

Extreme Precipitation - Urban Flooding

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

- Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life
- Existing impervious area of the project site is greater than 50%
- No historic flooding at project site
- No increase to impervious area

Extreme Precipitation - Riverine Flooding

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

- Part of the project is within 500ft of a waterbody and less than 20ft above the waterbody
- 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 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
- Not located within 100 ft of existing water body
- Existing trees are being removed as part of the proposed project
- Existing impervious area of the project site is greater than 50%
- No increase to the impervious area of the project site

Scoring Rationale - Asset Preliminary Climate Risk Rating

A Preliminary Climate Risk Rating is determined for each infrastructure and building asset by considering the overall project Exposure Score and responses to Step 4 questions provided by the user in the Tool. Natural Resource assets do not receive a risk rating. The following factors are what influenced the risk ratings for each asset.

Asset - MBTA Facilities
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable during natural hazard event, but must be accessible/operable within one day after natural hazard event
- Less than 100,000 people would be directly affected by the loss/inoperability of the asset
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would be expected to cause a loss of confidence in government agency
- Cost to replace is less than $10 million
- Spills and/or releases of hazardous materials would be relatively easy to clean up

Project Climate Resilience Design Standards Output

Climate Resilience Design Standards and Guidance are recommended for each asset and climate parameter. The Design Standards for each climate parameter include the following: recommended planning horizon (target and/or intermediate), recommended return period (Sea Level Rise/Storm Surge and Precipitation) or percentile (Heat), and a list of applicable design criteria that are likely to be affected by climate change. Some design criteria have numerical values associated with the recommended return period and planning horizon, while others have tiered methodologies with step-by-step instructions on how to estimate design values given the other recommended design standards.

Asset: MBTA Facilities — Infrastructure

Sea Level Rise/Storm Surge — Low Risk

Applicable Design Criteria

Projected Tidal Datums: NOT APPLICABLE

Projected Water Surface Elevation: NOT APPLICABLE

Projected Wave Action Water Elevation: NOT APPLICABLE

Projected Wave Heights: NOT APPLICABLE

Projected Duration of Flooding: NOT APPLICABLE

Projected Design Flood Velocity: NOT APPLICABLE

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation — High Risk

Target Planning Horizon: 2070
Return Period: 25-yr (4%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

While Total Precipitation Depth & Peak Intensity for 24-hour Design Storms are useful to inform planning and design, it is recommended to also consider additional longer- and shorter-duration precipitation events and intensities in accordance with best practices. Longer-duration, lower-intensity storms allow time for infiltration and reduce the load on infrastructure over the duration of the storm. Shorter-duration, higher-intensity storms often have higher runoff volumes because the water does not have enough time to infiltrate infrastructure systems (e.g., catch basins) and may overflow or back up during such storms, resulting in flooding. 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. While the Tool does not provide recommended design standards for these scenarios, users should still consider both short- and long-duration precipitation events and how they may impact the asset.

The projected values, standards, and guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence

Applicable Design Criteria

Tiered Methodology: Tier 3

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

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
MBTA Facilities	2070	25-Year (4%)	8.6	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Extreme Heat High Risk

Target Planning Horizon: 2070
Percentile: 50th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Heat Index: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): NOT APPLICABLE

Project Inputs

Core Project Information

Name:	Green Line C Branch Hawes Street
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)?	2078
Location of Project:	Brookline
Estimated Capital Cost:	$5,000,000
Who is the Submitting Entity?	State Agency Massachusetts Department of Transportation Michael Karasik (mkarasik@vhb.com)
Is this project identified as an agency priority project, such as in the State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)?	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?	Yes
Brief Project Description:	The Project will improve conditions for seven station locations on the C Branch in the Town of Brookline to achieve accessibility by widening platforms and improving pedestrian access and egress from the stations. The project requires MEPA review.

Project Submission Comments:

Project Ecosystem Service Benefits

No Ecosystem Service Benefits are provided by this project

Factors to Improve Output

- ✓ Incorporate nature-based solutions that may provide flood protection
- ✓ Incorporate nature-based solutions that may reduce storm damage
- ✓ 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 green infrastructure or nature-based solutions that recharge groundwater
- ✓ Incorporate green infrastructure to filter stormwater
- ✓ Incorporate nature-based solutions that improve water quality
- ✓ 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	No
Recharges groundwater	No
Protects public water supply	No
Filters stormwater using green infrastructure	No
Improves water quality	No
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 (unrelated to water/sewer damages)?	No
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?	No
Are existing trees being removed as part of the proposed project?	Yes

Project Assets

Asset: MBTA Facilities
Asset Type: Transportation
Asset Sub-Type: Railways (rail and rapid transit)
Construction Type: Major Repair/Retrofit
Construction Year: 2028
Useful Life: 50

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.
Infrastructure may be inaccessible/inoperable during natural hazard event, but must be accessible/operable within one day after natural hazard event.

Identify the geographic area directly affected by permanent loss or significant inoperability of the infrastructure.
Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss or significant inoperability of the infrastructure.
Less than 100,000 people

Identify if the infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

Will the infrastructure reduce the risk of flooding?
No

If the infrastructure 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 infrastructure would not be expected to result in injuries

If there are hazardous materials in your infrastructure, what are the extents of impacts related to spills/releases of these materials?
Spills and/or releases of hazardous materials are expected with relatively easy cleanup

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?
Minor – Inoperability will not likely affect other facilities, assets, or buildings

If the infrastructure was damaged beyond repair, how much would it approximately cost to replace?
Less than $10 million

Does the infrastructure function as an evacuation route during emergencies? This question only applies to roadway projects.
No

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?
No impact on surrounding natural resources is expected

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the infrastructure is not able to serve or operate its intended users or function)?
Loss of infrastructure is not expected to reduce the ability to maintain government services

What are the impacts to loss of confidence in government resulting from loss of infrastructure functionality (i.e. the infrastructure asset is not able to serve or operate its intended users or function)?
Loss of confidence in government agency

Report Comments

N/A

Climate Resilience Design Standards Tool Project Report

Green Line C Branch St.Paul/Kent
Date Created: 7/16/2024 1:56:05 PM
Date Report Generated: 9/18/2024 7:39:20 PM
Project Contact Information: Michael Karasik (mkarasik@vhb.com)

Created By: MKarasik
Tool Version: Version 1.2

Project Summary

Link to Project

Estimated Capital Cost: $5000000.00
End of Useful Life Year: 2078
Project within mapped Environmental Justice neighborhood: Yes

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

Asset Preliminary Climate Risk Rating Summary

Number of Assets: 1

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
MBTA Facilities	Low Risk	High Risk	Low Risk	High Risk

Climate Resilience Design Standards Summary

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
MBTA Facilities					
Extreme Precipitation					
MBTA Facilities	2070			25-yr (4%)	Tier 3
Extreme Heat					
MBTA Facilities	2070		50th		Tier 3

Scoring Rationale - Project Exposure Score

The purpose of the Exposure Score output is to provide a preliminary assessment of whether the overall project site and subsequent assets are exposed to impacts of natural hazard events and/or future impacts of climate change. For each climate parameter, the Tool will calculate one of the following exposure ratings: Not Exposed, Low Exposure, Moderate Exposure, or High Exposure. The rationale behind the exposure rating is provided below.

Sea Level Rise/Storm Surge

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

- Not located within the predicted mean high water shoreline by 2030
- No historic coastal flooding at project site
- Not located within the Massachusetts Coast Flood Risk Model (MC-FRM)

Extreme Precipitation - Urban Flooding

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

- Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life
- Existing impervious area of the project site is greater than 50%
- No historic flooding at project site
- No increase to impervious area

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
- Not located within 100 ft of existing water body
- Existing trees are being removed as part of the proposed project
- Existing impervious area of the project site is greater than 50%
- No increase to the impervious area of the project site

Scoring Rationale - Asset Preliminary Climate Risk Rating

A Preliminary Climate Risk Rating is determined for each infrastructure and building asset by considering the overall project Exposure Score and responses to Step 4 questions provided by the user in the Tool. Natural Resource assets do not receive a risk rating. The following factors are what influenced the risk ratings for each asset.

Asset - MBTA Facilities
Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Less than 100,000 people would be directly affected by the loss/inoperability of the asset
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would be expected to cause a loss of confidence in government agency
- Cost to replace is less than $10 million
- Spills and/or releases of hazardous materials would be relatively easy to clean up

Project Climate Resilience Design Standards Output

Climate Resilience Design Standards and Guidance are recommended for each asset and climate parameter. The Design Standards for each climate parameter include the following: recommended planning horizon (target and/or intermediate), recommended return period (Sea Level Rise/Storm Surge and Precipitation) or percentile (Heat), and a list of applicable design criteria that are likely to be affected by climate change. Some design criteria have numerical values associated with the recommended return period and planning horizon, while others have tiered methodologies with step-by-step instructions on how to estimate design values given the other recommended design standards.

Asset: MBTA Facilities — Infrastructure

Sea Level Rise/Storm Surge — Low Risk

Applicable Design Criteria

Projected Tidal Datums: NOT APPLICABLE

Projected Water Surface Elevation: NOT APPLICABLE

Projected Wave Action Water Elevation: NOT APPLICABLE

Projected Wave Heights: NOT APPLICABLE

Projected Duration of Flooding: NOT APPLICABLE

Projected Design Flood Velocity: NOT APPLICABLE

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation — High Risk

Target Planning Horizon: 2070
Return Period: 25-yr (4%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

While Total Precipitation Depth & Peak Intensity for 24-hour Design Storms are useful to inform planning and design, it is recommended to also consider additional longer- and shorter-duration precipitation events and intensities in accordance with best practices. Longer-duration, lower-intensity storms allow time for infiltration and reduce the load on infrastructure over the duration of the storm. Shorter-duration, higher-intensity storms often have higher runoff volumes because the water does not have enough time to infiltrate infrastructure systems (e.g., catch basins) and may overflow or back up during such storms, resulting in flooding. 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. While the Tool does not provide recommended design standards for these scenarios, users should still consider both short- and long-duration precipitation events and how they may impact the asset.

The projected values, standards, and guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence

Applicable Design Criteria

Tiered Methodology: Tier 3

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

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
MBTA Facilities	2070	25-Year (4%)	8.6	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: NOT APPLICABLE

Extreme Heat — High Risk

Target Planning Horizon: 2070
Percentile: 50th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Heat Index: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): NOT APPLICABLE

Project Inputs

Core Project Information

Name:	Green Line C Branch St.Paul/Kent
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)?	2078
Location of Project:	Brookline
Estimated Capital Cost:	$5,000,000
Who is the Submitting Entity?	State Agency Massachusetts Department of Transportation Michael Karasik (mkarasik@vhb.com)
Is this project identified as an agency priority project, such as in the State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)?	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?	Yes
Brief Project Description:	The Project will improve conditions for seven station locations on the C Branch in the Town of Brookline to achieve accessibility by widening platforms and improving pedestrian access and egress from the stations. The project requires MEPA review.
Project Submission Comments:	

Project Ecosystem Service Benefits

No Ecosystem Service Benefits are provided by this project

Factors to Improve Output

- ✓ Incorporate nature-based solutions that may provide flood protection
- ✓ Incorporate nature-based solutions that may reduce storm damage
- ✓ 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 green infrastructure or nature-based solutions that recharge groundwater
- ✓ Incorporate green infrastructure to filter stormwater
- ✓ Incorporate nature-based solutions that improve water quality
- ✓ 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	No
Recharges groundwater	No
Protects public water supply	No
Filters stormwater using green infrastructure	No
Improves water quality	No
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 (unrelated to water/sewer damages)?	No
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?	No
Are existing trees being removed as part of the proposed project?	Yes

Project Assets

Asset: MBTA Facilities
Asset Type: Transportation
Asset Sub-Type: Railways (rail and rapid transit)
Construction Type: Major Repair/Retrofit
Construction Year: 2028
Useful Life: 50

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.
Infrastructure 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 infrastructure.
Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss or significant inoperability of the infrastructure.
Less than 100,000 people

Identify if the infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

Will the infrastructure reduce the risk of flooding?
No

If the infrastructure 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 infrastructure would not be expected to result in injuries

If there are hazardous materials in your infrastructure, what are the extents of impacts related to spills/releases of these materials?
Spills and/or releases of hazardous materials are expected with relatively easy cleanup

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?
Minor – Inoperability will not likely affect other facilities, assets, or buildings

If the infrastructure was damaged beyond repair, how much would it approximately cost to replace?
Less than $10 million

Does the infrastructure function as an evacuation route during emergencies? This question only applies to roadway projects.
No

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?
No impact on surrounding natural resources is expected

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the infrastructure is not able to serve or operate its intended users or function)?
Loss of infrastructure is not expected to reduce the ability to maintain government services

What are the impacts to loss of confidence in government resulting from loss of infrastructure functionality (i.e. the infrastructure asset is not able to serve or operate its intended users or function)?
Loss of confidence in government agency

Report Comments

N/A

Climate Resilience Design Standards Tool Project Report

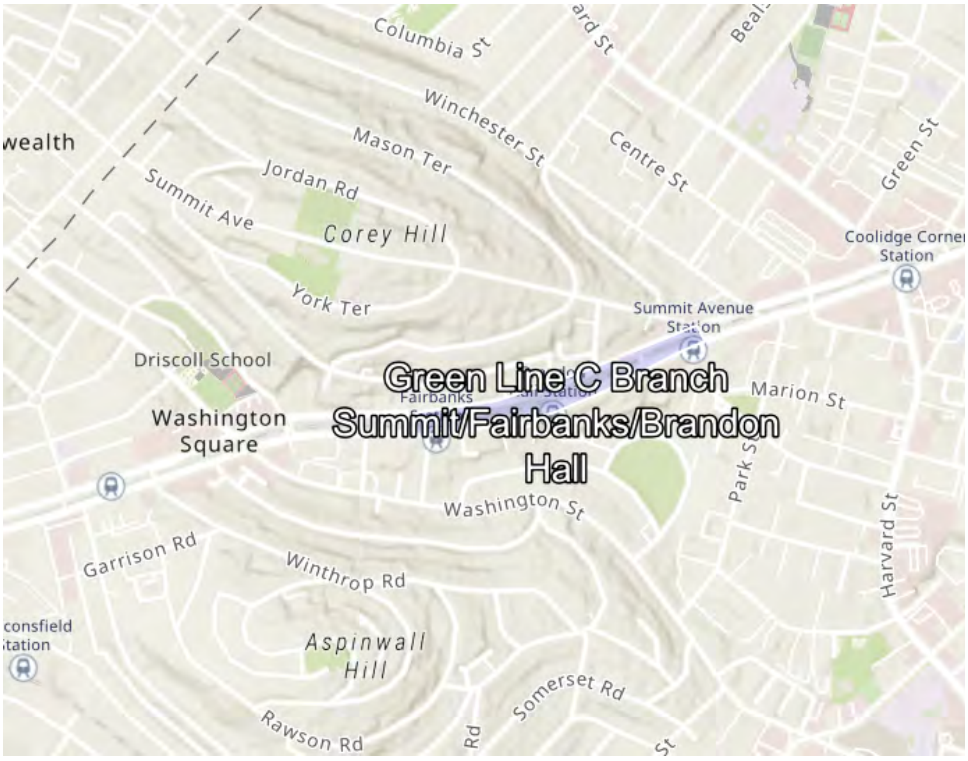
Green Line C Branch Summit/Fairbanks/Brandon Hall
Date Created: 7/16/2024 1:59:09 PM
Created By: MKarasik
Date Report Generated: 9/18/2024 7:38:15 PM
Tool Version: Version 1.2
Project Contact Information: Michael Karasik (mkarasik@vhb.com)

Project Summary

Link to Project

Estimated Capital Cost: $5000000.00
End of Useful Life Year: 2078
Project within mapped Environmental Justice neighborhood: Yes

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



Asset Preliminary Climate Risk Rating Summary

Number of Assets: 1

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
MBTA Facilities	Low Risk	High Risk	Low Risk	High Risk

Climate Resilience Design Standards Summary

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
MBTA Facilities					
Extreme Precipitation					
MBTA Facilities	2070			25-yr (4%)	Tier 3
Extreme Heat					
MBTA Facilities	2070		50th		Tier 3

Scoring Rationale - Project Exposure Score

The purpose of the Exposure Score output is to provide a preliminary assessment of whether the overall project site and subsequent assets are exposed to impacts of natural hazard events and/or future impacts of climate change. For each climate parameter, the Tool will calculate one of the following exposure ratings: Not Exposed, Low Exposure, Moderate Exposure, or High Exposure. The rationale behind the exposure rating is provided below.

Sea Level Rise/Storm Surge

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

- Not located within the predicted mean high water shoreline by 2030
- No historic coastal flooding at project site
- Not located within the Massachusetts Coast Flood Risk Model (MC-FRM)

Extreme Precipitation - Urban Flooding

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

- Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life
- Existing impervious area of the project site is greater than 50%
- No historic flooding at project site
- No increase to impervious area

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
- Not located within 100 ft of existing water body
- Existing trees are being removed as part of the proposed project
- Existing impervious area of the project site is greater than 50%
- No increase to the impervious area of the project site

Scoring Rationale - Asset Preliminary Climate Risk Rating

A Preliminary Climate Risk Rating is determined for each infrastructure and building asset by considering the overall project Exposure Score and responses to Step 4 questions provided by the user in the Tool. Natural Resource assets do not receive a risk rating. The following factors are what influenced the risk ratings for each asset.

Asset - MBTA Facilities
Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Less than 100,000 people would be directly affected by the loss/inoperability of the asset
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would be expected to cause a loss of confidence in government agency
- Cost to replace is less than $10 million
- Spills and/or releases of hazardous materials would be relatively easy to clean up

Project Climate Resilience Design Standards Output

Climate Resilience Design Standards and Guidance are recommended for each asset and climate parameter. The Design Standards for each climate parameter include the following: recommended planning horizon (target and/or intermediate), recommended return period (Sea Level Rise/Storm Surge and Precipitation) or percentile (Heat), and a list of applicable design criteria that are likely to be affected by climate change. Some design criteria have numerical values associated with the recommended return period and planning horizon, while others have tiered methodologies with step-by-step instructions on how to estimate design values given the other recommended design standards.

Asset: MBTA Facilities — Infrastructure

Sea Level Rise/Storm Surge — Low Risk

Applicable Design Criteria

Projected Tidal Datums: NOT APPLICABLE

Projected Water Surface Elevation: NOT APPLICABLE

Projected Wave Action Water Elevation: NOT APPLICABLE

Projected Wave Heights: NOT APPLICABLE

Projected Duration of Flooding: NOT APPLICABLE

Projected Design Flood Velocity: NOT APPLICABLE

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation — High Risk

Target Planning Horizon: 2070
Return Period: 25-yr (4%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

While Total Precipitation Depth & Peak Intensity for 24-hour Design Storms are useful to inform planning and design, it is recommended to also consider additional longer- and shorter-duration precipitation events and intensities in accordance with best practices. Longer-duration, lower-intensity storms allow time for infiltration and reduce the load on infrastructure over the duration of the storm. Shorter-duration, higher-intensity storms often have higher runoff volumes because the water does not have enough time to infiltrate infrastructure systems (e.g., catch basins) and may overflow or back up during such storms, resulting in flooding. 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. While the Tool does not provide recommended design standards for these scenarios, users should still consider both short- and long-duration precipitation events and how they may impact the asset.

The projected values, standards, and guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence

Applicable Design Criteria

Tiered Methodology: Tier 3

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

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
MBTA Facilities	2070	25-Year (4%)	8.6	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: NOT APPLICABLE

Extreme Heat — High Risk

Target Planning Horizon: 2070
Percentile: 50th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Heat Index: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): NOT APPLICABLE

Project Inputs

Core Project Information

Name:	Green Line C Branch Summit/Fairbanks/Brandon Hall
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)?	2078
Location of Project:	Brookline
Estimated Capital Cost:	$5,000,000
Who is the Submitting Entity?	State Agency Massachusetts Department of Transportation Michael Karasik (mkarasik@vhb.com)
Is this project identified as an agency priority project, such as in the State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)?	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?	Yes
Brief Project Description:	The Project will improve conditions for seven station locations on the C Branch in the Town of Brookline to achieve accessibility by widening platforms and improving pedestrian access and egress from the stations. The project requires MEPA review.
Project Submission Comments:	

Project Ecosystem Service Benefits

No Ecosystem Service Benefits are provided by this project

Factors to Improve Output

- ✓ Incorporate nature-based solutions that may provide flood protection
- ✓ Incorporate nature-based solutions that may reduce storm damage
- ✓ 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 green infrastructure or nature-based solutions that recharge groundwater
- ✓ Incorporate green infrastructure to filter stormwater
- ✓ Incorporate nature-based solutions that improve water quality
- ✓ 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	No
Recharges groundwater	No
Protects public water supply	No
Filters stormwater using green infrastructure	No
Improves water quality	No
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 (unrelated to water/sewer damages)?	No
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?	No
Are existing trees being removed as part of the proposed project?	Yes

Project Assets

Asset: MBTA Facilities
Asset Type: Transportation
Asset Sub-Type: Railways (rail and rapid transit)
Construction Type: Major Repair/Retrofit
Construction Year: 2028
Useful Life: 50

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.
Infrastructure 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 infrastructure.
Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss or significant inoperability of the infrastructure.
Less than 100,000 people

Identify if the infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

Will the infrastructure reduce the risk of flooding?
No

If the infrastructure 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 infrastructure would not be expected to result in injuries

If there are hazardous materials in your infrastructure, what are the extents of impacts related to spills/releases of these materials?
Spills and/or releases of hazardous materials are expected with relatively easy cleanup

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?
Minor – Inoperability will not likely affect other facilities, assets, or buildings

If the infrastructure was damaged beyond repair, how much would it approximately cost to replace?
Less than $10 million

Does the infrastructure function as an evacuation route during emergencies? This question only applies to roadway projects.
No

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?
No impact on surrounding natural resources is expected

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the infrastructure is not able to serve or operate its intended users or function)?
Loss of infrastructure is not expected to reduce the ability to maintain government services

What are the impacts to loss of confidence in government resulting from loss of infrastructure functionality (i.e. the infrastructure asset is not able to serve or operate its intended users or function)?
Loss of confidence in government agency

Report Comments

N/A

Climate Resilience Design Standards Tool Project Report

Green Line C Branch Tappan/Englewood/Dean
Date Created: 7/16/2024 3:01:51 PM
Created By: MKarasik
Date Report Generated: 9/18/2024 5:21:48 PM
Tool Version: Version 1.2
Project Contact Information: Michael Karasik (mkarasik@vhb.com)

Project Summary

Link to Project

Estimated Capital Cost: $5000000.00
End of Useful Life Year: 2078
Project within mapped Environmental Justice neighborhood: Yes

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

Asset Preliminary Climate Risk Rating Summary

Number of Assets: 1

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
MBTA Facilities	Low Risk	High Risk	Low Risk	High Risk

Climate Resilience Design Standards Summary

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
MBTA Facilities					
Extreme Precipitation					
MBTA Facilities	2070			25-yr (4%)	Tier 3
Extreme Heat					
MBTA Facilities	2070		50th		Tier 3

Scoring Rationale - Project Exposure Score

The purpose of the Exposure Score output is to provide a preliminary assessment of whether the overall project site and subsequent assets are exposed to impacts of natural hazard events and/or future impacts of climate change. For each climate parameter, the Tool will calculate one of the following exposure ratings: Not Exposed, Low Exposure, Moderate Exposure, or High Exposure. The rationale behind the exposure rating is provided below.

Sea Level Rise/Storm Surge

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

- Not located within the predicted mean high water shoreline by 2030
- No historic coastal flooding at project site
- Not located within the Massachusetts Coast Flood Risk Model (MC-FRM)

Extreme Precipitation - Urban Flooding

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

- Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life
- Existing impervious area of the project site is greater than 50%
- No historic flooding at project site
- No increase to impervious area

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
- Not located within 100 ft of existing water body
- Existing trees are being removed as part of the proposed project
- Existing impervious area of the project site is greater than 50%
- No increase to the impervious area of the project site

Scoring Rationale - Asset Preliminary Climate Risk Rating

A Preliminary Climate Risk Rating is determined for each infrastructure and building asset by considering the overall project Exposure Score and responses to Step 4 questions provided by the user in the Tool. Natural Resource assets do not receive a risk rating. The following factors are what influenced the risk ratings for each asset.

Asset - MBTA Facilities
Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Less than 100,000 people would be directly affected by the loss/inoperability of the asset
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would be expected to cause a loss of confidence in government agency
- Cost to replace is less than $10 million
- Spills and/or releases of hazardous materials would be relatively easy to clean up

Project Climate Resilience Design Standards Output

Climate Resilience Design Standards and Guidance are recommended for each asset and climate parameter. The Design Standards for each climate parameter include the following: recommended planning horizon (target and/or intermediate), recommended return period (Sea Level Rise/Storm Surge and Precipitation) or percentile (Heat), and a list of applicable design criteria that are likely to be affected by climate change. Some design criteria have numerical values associated with the recommended return period and planning horizon, while others have tiered methodologies with step-by-step instructions on how to estimate design values given the other recommended design standards.

Asset: MBTA Facilities — Infrastructure

Sea Level Rise/Storm Surge — Low Risk

Applicable Design Criteria

Projected Tidal Datums: NOT APPLICABLE

Projected Water Surface Elevation: NOT APPLICABLE

Projected Wave Action Water Elevation: NOT APPLICABLE

Projected Wave Heights: NOT APPLICABLE

Projected Duration of Flooding: NOT APPLICABLE

Projected Design Flood Velocity: NOT APPLICABLE

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation — High Risk

Target Planning Horizon: 2070
Return Period: 25-yr (4%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

While Total Precipitation Depth & Peak Intensity for 24-hour Design Storms are useful to inform planning and design, it is recommended to also consider additional longer- and shorter-duration precipitation events and intensities in accordance with best practices. Longer-duration, lower-intensity storms allow time for infiltration and reduce the load on infrastructure over the duration of the storm. Shorter-duration, higher-intensity storms often have higher runoff volumes because the water does not have enough time to infiltrate infrastructure systems (e.g., catch basins) and may overflow or back up during such storms, resulting in flooding. 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. While the Tool does not provide recommended design standards for these scenarios, users should still consider both short- and long-duration precipitation events and how they may impact the asset.

The projected values, standards, and guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence

Applicable Design Criteria

Tiered Methodology: Tier 3

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

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
MBTA Facilities	2070	25-Year (4%)	8.6	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: NOT APPLICABLE

Extreme Heat — High Risk

Target Planning Horizon: 2070
Percentile: 50th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Heat Index: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE
Methodology to Estimate Projected Values : Tier 3

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): NOT APPLICABLE

Project Inputs

Core Project Information

Name:	Green Line C Branch Tappan/Englewood/Dean
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)?	2078
Location of Project:	Brookline
Estimated Capital Cost:	$5,000,000
Who is the Submitting Entity?	State Agency Massachusetts Department of Transportation Michael Karasik (mkarasik@vhb.com)
Is this project identified as an agency priority project, such as in the State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)?	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?	Yes
Brief Project Description:	The Project will improve conditions for seven station locations on the C Branch in the Town of Brookline to achieve accessibility by widening platforms and improving pedestrian access and egress from the stations. The project requires MEPA review.
Project Submission Comments:	

Project Ecosystem Service Benefits

No Ecosystem Service Benefits are provided by this project

Factors to Improve Output

- ✓ Incorporate nature-based solutions that may provide flood protection
- ✓ Incorporate nature-based solutions that may reduce storm damage
- ✓ 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 green infrastructure or nature-based solutions that recharge groundwater
- ✓ Incorporate green infrastructure to filter stormwater
- ✓ Incorporate nature-based solutions that improve water quality
- ✓ 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	No
Recharges groundwater	No
Protects public water supply	No
Filters stormwater using green infrastructure	No
Improves water quality	No
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 (unrelated to water/sewer damages)?	No
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?	No
Are existing trees being removed as part of the proposed project?	Yes

Project Assets

Asset: MBTA Facilities
Asset Type: Transportation
Asset Sub-Type: Railways (rail and rapid transit)
Construction Type: Major Repair/Retrofit
Construction Year: 2028
Useful Life: 50

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.
Infrastructure 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 infrastructure.
Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss or significant inoperability of the infrastructure.
Less than 100,000 people

Identify if the infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

Will the infrastructure reduce the risk of flooding?
No

If the infrastructure 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 infrastructure would not be expected to result in injuries

If there are hazardous materials in your infrastructure, what are the extents of impacts related to spills/releases of these materials?
Spills and/or releases of hazardous materials are expected with relatively easy cleanup

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?
Minor – Inoperability will not likely affect other facilities, assets, or buildings

If the infrastructure was damaged beyond repair, how much would it approximately cost to replace?
Less than $10 million

Does the infrastructure function as an evacuation route during emergencies? This question only applies to roadway projects.
No

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?
No impact on surrounding natural resources is expected

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the infrastructure is not able to serve or operate its intended users or function)?
Loss of infrastructure is not expected to reduce the ability to maintain government services

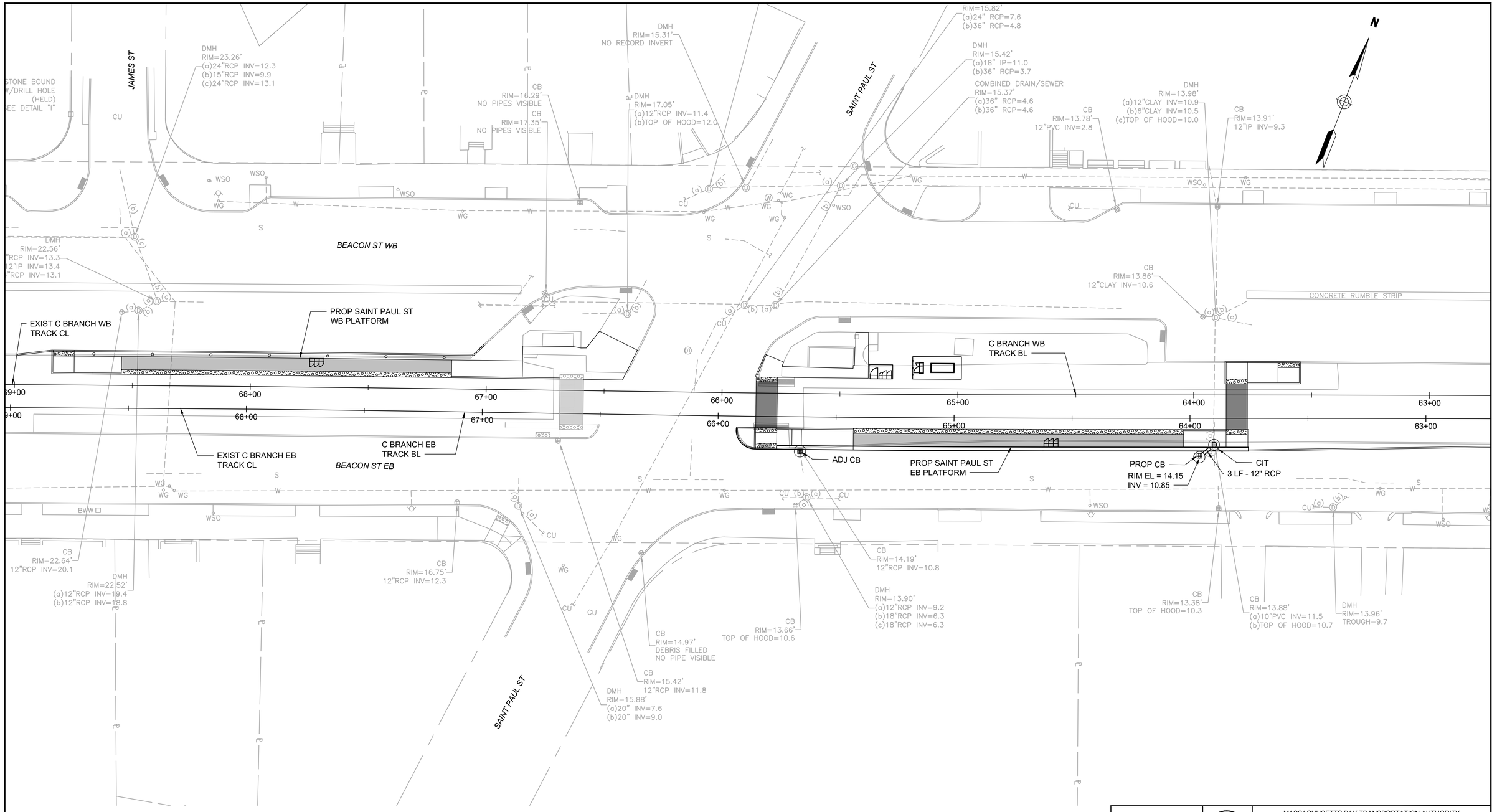
What are the impacts to loss of confidence in government resulting from loss of infrastructure functionality (i.e. the infrastructure asset is not able to serve or operate its intended users or function)?
Loss of confidence in government agency

Report Comments

N/A

APPENDIX C: Stormwater Management Supporting Documentation

- **Saint Paul Street Station**
- **Tappan Street Station**
- **Dean Road Station**



0 20 50 100

SCALE: 1" = 20'

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

GREEN LINE

C BRANCH STATION ACCESSIBILITY UPGRADES PROJECT
MBTA CONTRACT NO. Z91PS25, TASK ORDER 11

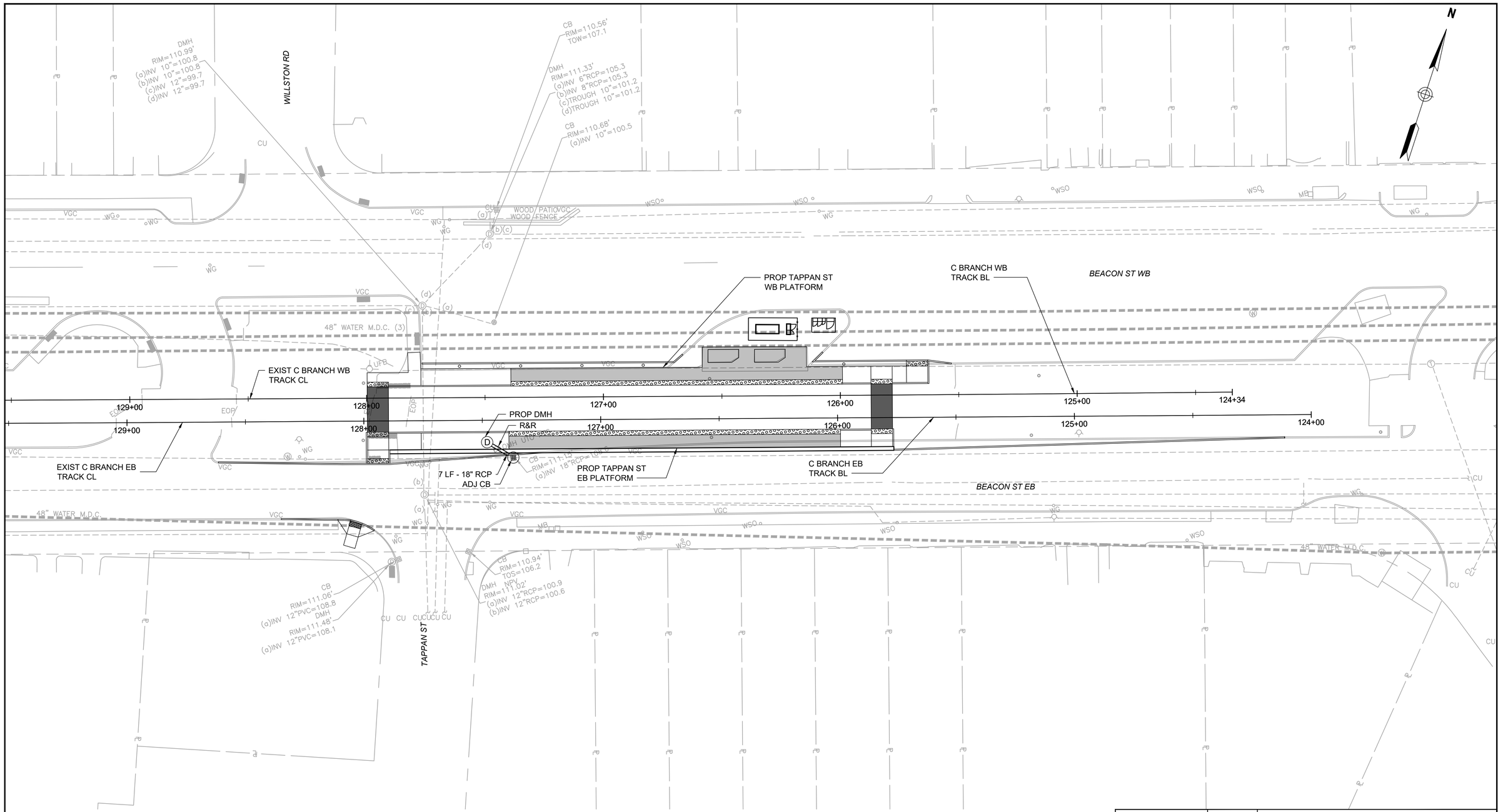
DRAINAGE PLAN
SAINT PAUL ST STATION

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

PRELIMINARY DESIGN

HORIZ: AS NOTED	DES. BY	DR. BY	CHK. BY	PLAN NO.	ISSUE
VERT: AS NOTED	JS	AG	EM		
DATE: 5/23/2024				SHEET: C-110	

PLOTTED: 05/22/24 4:17PM BY:AGASCON
DRAWING: C:\USERS\AGASCON\DC\ACCDOCS\MOTT MACDONALD\Z91PS25T11-14STATION\PROJECT FILES\02 - WIPIC - CIVIL\02 SHTS\SHT_C-BRANCH\Z91PS25TO11-C-SHT-XX-ST PAUL DRAINAGE.DWG [C-110] 05/22/24 4:11PM



MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

GREEN LINE

C BRANCH STATION ACCESSIBILITY UPGRADES PROJECT
MBTA CONTRACT NO. Z91PS25, TASK ORDER 11

DRAINAGE PLAN
TAPPAN ST STATION

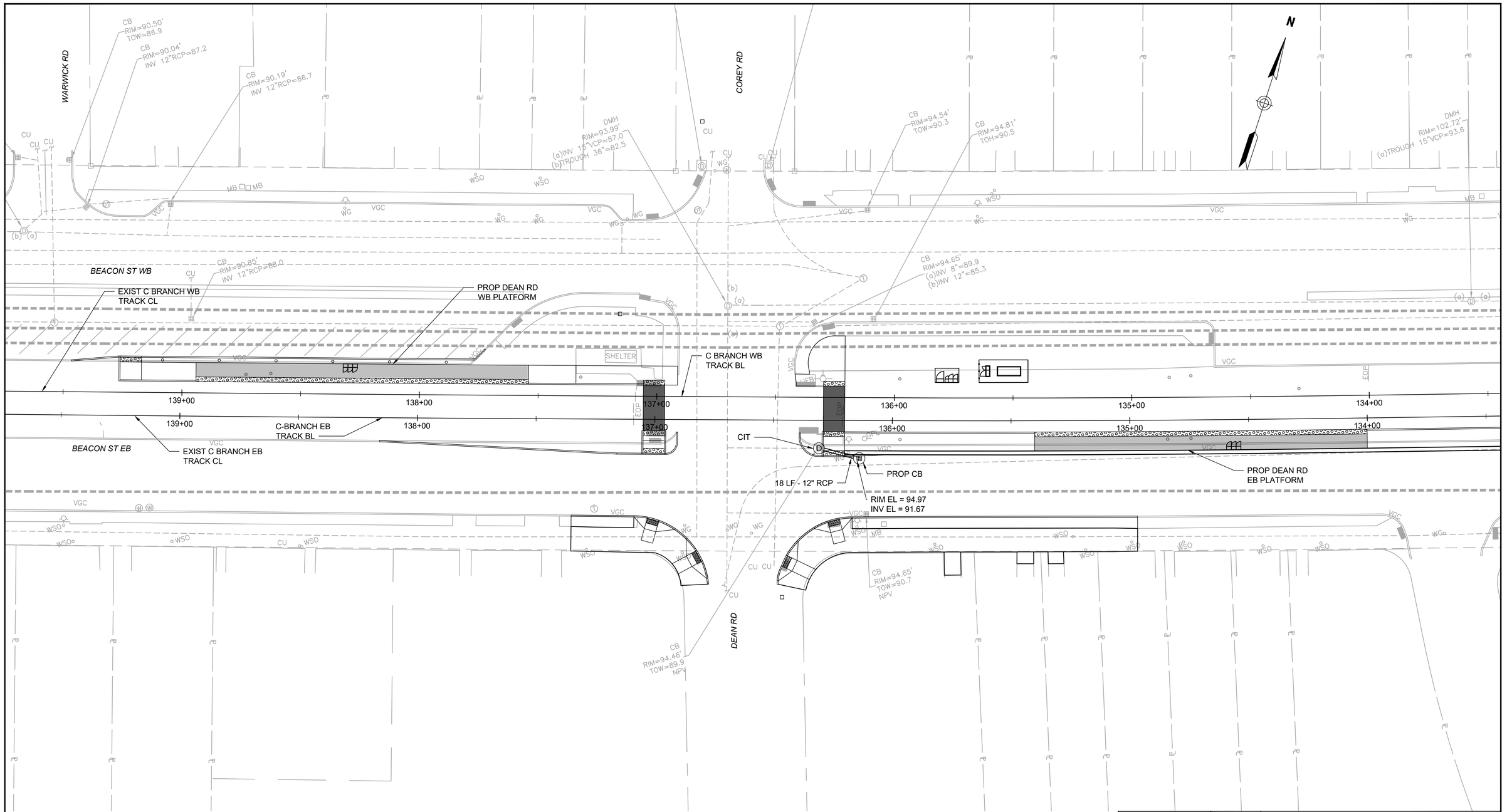
ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

PRELIMINARY DESIGN

HORIZ:	AS NOTED	DES. BY	DR. BY	CHK. BY	PLAN NO.	ISSUE
VERT:	AS NOTED	JS	AG	EM		
DATE:	5/23/2024				SHEET: C-111	

3

PLOTTED: 05/22/24 4:19PM BY: AGASCON
DRAWING: C:\USERS\AGASCON\DC\ACCDOCS\MOTT MACDONALD\Z91PS25TO11-C-SHT-XX-TAPPAN DRAINAGE.DWG [C-111] 05/22/24 4:10PM



PLOTTED: 05/22/24 4:21PM BY:AGASCON
DRAWING: C:\USERS\AGASCON\DC\ACCDOCS\MOTT MACDONALD\Z91PS25T11-14STATION\PROJECT FILES\02 - WIP\C - CIVIL\02 SHTS\HT_C-BRANCH\Z91PS25TO11-C-SHT-XX-DEAN DRAINAGE.DWG [C-112] 05/22/24 4:11PM

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

GREEN LINE

C BRANCH STATION ACCESSIBILITY UPGRADES PROJECT
MBTA CONTRACT NO. Z91PS25, TASK ORDER 11

DRAINAGE PLAN
DEAN RD STATION

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

PRELIMINARY DESIGN

HORIZ: AS NOTED	DES. BY: JS	DR. BY: AG	CHK. BY: EM	PLAN NO.	ISSUE
VERT: AS NOTED					
DATE: 5/23/2024				SHEET: C-112	

APPENDIX D: Environmental Justice and Public Health Supporting Documentation

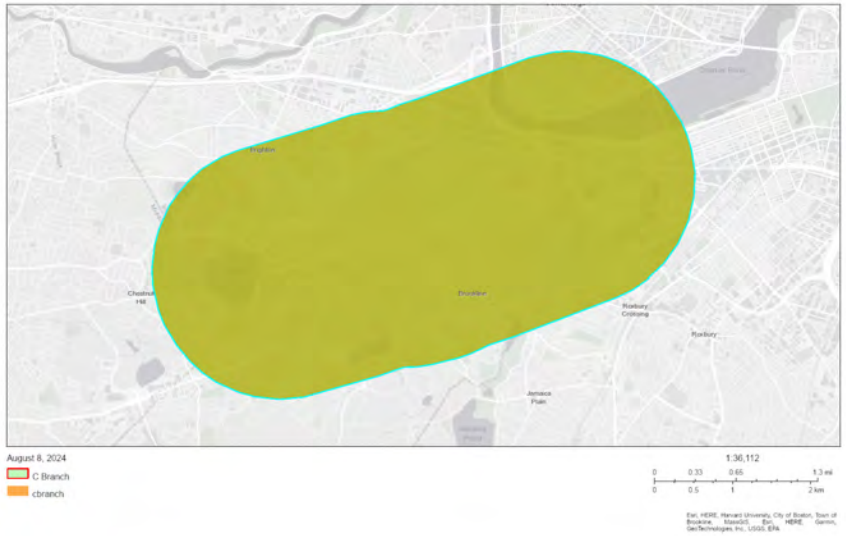
- **EPA EJ Screen Community Report**
- **EJ Screening Form**
- **Public Involvement Plan**

EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Brookline, MA

the User Specified Area
Population: 156,875
Area in square miles: 8.13



COMMUNITY INFORMATION

- Low income: 30 percent
- People of color: 40 percent
- Less than high school education: 4 percent
- Limited English households: 10 percent
- Unemployment: 6 percent
- Persons with disabilities: 9 percent
- Male: 47 percent
- Female: 53 percent
- 82 years — Average life expectancy
- N/A — Per capita income
- Number of households: 62,631
- Owner occupied: 25 percent

BREAKDOWN BY RACE

- White: 60%
- Black: 5%
- American Indian: 0%
- Asian: 19%
- Hawaiian/Pacific Islander: 0%
- Other race: 1%
- Two or more races: 5%
- Hispanic: 10%

BREAKDOWN BY AGE

LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	65%
Spanish	8%
French, Haitian, or Cajun	2%
German or other West Germanic	1%

Russian, Polish, or Other Slavic	3%
Other Indo-European	6%
Korean	1%
Chinese (including Mandarin, Cantonese)	8%
Vietnamese	1%
Other Asian and Pacific Island	3%
Arabic	1%
Other and Unspecified	2%
Total Non-English	35%

From Ages 1 to 4	3%
From Ages 1 to 18	9%
From Ages 18 and up	91%
From Ages 65 and up	10%

LIMITED ENGLISH SPEAKING BREAKDOWN

Speak Spanish	11%
Speak Other Indo-European Languages	38%
Speak Asian-Pacific Island Languages	49%
Speak Other Languages	1%

Notes: Numbers may not sum to totals due to rounding. Hispanic population can be of any race.
Source: U.S. Census Bureau, American Community Survey (ACS) 2018-2022. Life expectancy data comes from the Centers for Disease Control.

Report for the User Specified Area

Report produced August 8, 2024 using EJScreen Version 2.3

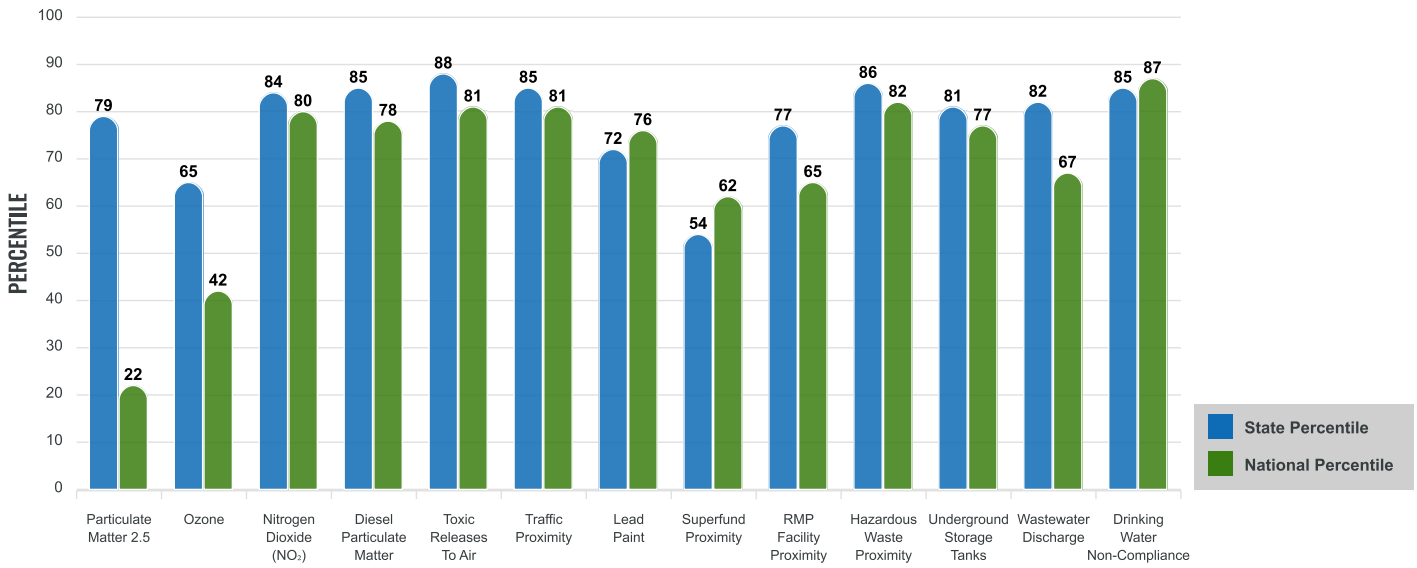
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

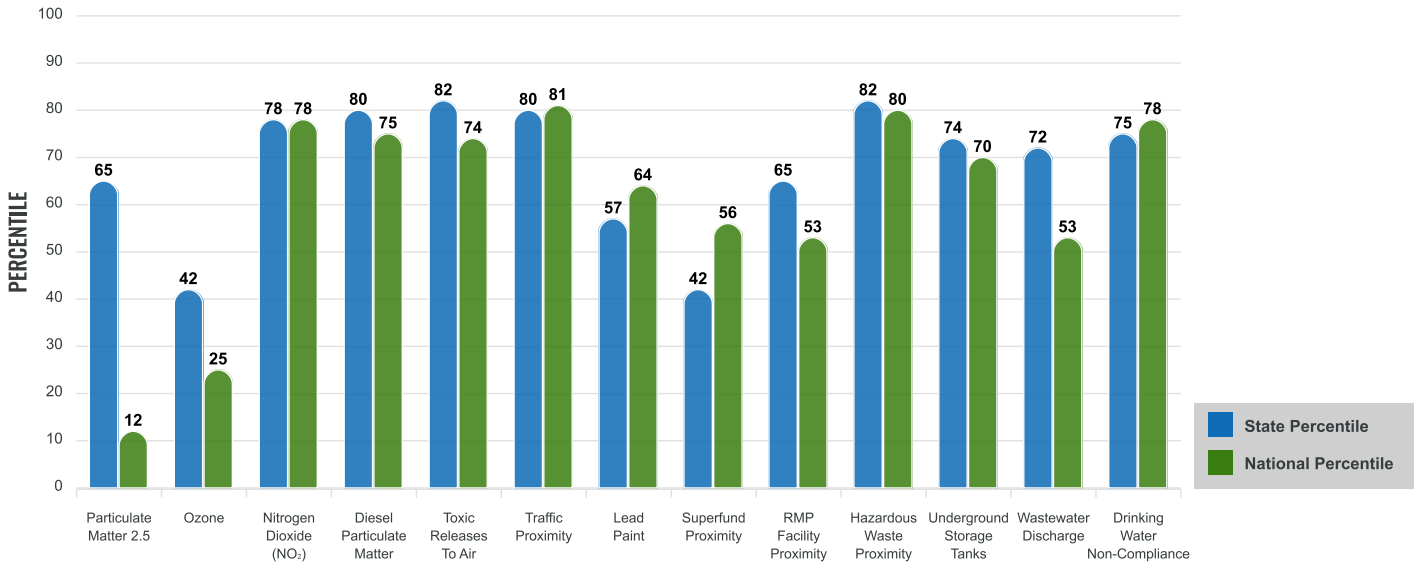
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low income, percent persons with disabilities, percent less than high school education, percent limited English speaking, and percent low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



Report for the User Specified Area

Report produced August 8, 2024 using EJScreen Version 2.3

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
ENVIRONMENTAL BURDEN INDICATORS					
Particulate Matter 2.5 ($\mu g/m^3$)	6.63	6.52	59	8.45	12
Ozone (ppb)	55.7	56.7	36	61.8	26
Nitrogen Dioxide (NO_2) (ppbv)	16	8.8	94	7.8	97
Diesel Particulate Matter ($\mu g/m^3$)	0.341	0.176	91	0.191	88
Toxic Releases to Air (toxicity-weighted concentration)	4,500	2,800	88	4,600	85
Traffic Proximity (daily traffic count/distance to road)	16,000,000	6,100,000	94	1,700,000	99
Lead Paint (% Pre-1960 Housing)	0.58	0.51	56	0.3	79
Superfund Proximity (site count/km distance)	0.052	0.34	40	0.39	56
RMP Facility Proximity (facility count/km distance)	0.35	0.37	65	0.57	55
Hazardous Waste Proximity (facility count/km distance)	47	11	96	3.5	99
Underground Storage Tanks (count/km^2)	9.5	3.3	91	3.6	89
Wastewater Discharge (toxicity-weighted concentration/m distance)	110	760	73	700000	56
Drinking Water Non-Compliance (points)	6.7	3.2	79	2.2	91
SOCIOECONOMIC INDICATORS					
Demographic Index USA	1.39	N/A	N/A	1.34	59
Supplemental Demographic Index USA	1.33	N/A	N/A	1.64	36
Demographic Index State	1.62	1.19	74	N/A	N/A
Supplemental Demographic Index State	1.41	1.52	54	N/A	N/A
People of Color	40%	31%	70	40%	58
Low Income	30%	22%	73	30%	56
Unemployment Rate	6%	5%	69	6%	68
Limited English Speaking Households	10%	6%	78	5%	84
Less Than High School Education	4%	9%	41	11%	31
Under Age 5	3%	5%	36	5%	31
Over Age 64	10%	18%	24	18%	26

*Diesel particulate matter index is from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

Sites reporting to EPA within defined area:

Superfund 0

Other community features within defined area:

Schools 23

Hazardous Waste, Treatment, Storage, and Disposal Facilities	27
Water Dischargers	125
Air Pollution	85
Brownfields	0
Toxic Release Inventory	6

Hospitals	23
Places of Worship	69

Other environmental data:

Air Non-attainment	Yes
Impaired Waters	Yes

Selected location contains American Indian Reservation Lands*	No
Selected location contains a "Justice40 (CEJST)" disadvantaged community	Yes
Selected location contains an EPA IRA disadvantaged community	Yes

Report for the User Specified Area

Report produced August 8, 2024 using EJScreen Version 2.3

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS

INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	9%	17%	0	20%	0
Heart Disease	2.8	5.2	4	5.8	3
Asthma	11.1	11.2	52	10.3	74
Cancer	3.9	6.9	4	6.4	7
Persons with Disabilities	8.8%	12.1%	27	13.7%	21

CLIMATE INDICATORS

INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	22%	12%	85	12%	86
Wildfire Risk	0%	0%	0	14%	0

CRITICAL SERVICE GAPS

INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	8%	9%	55	13%	43
Lack of Health Insurance	2%	3%	53	9%	14
Housing Burden	Yes	N/A	N/A	N/A	N/A
Transportation Access Burden	Yes	N/A	N/A	N/A	N/A
Food Desert	Yes	N/A	N/A	N/A	N/A

Report for the User Specified Area

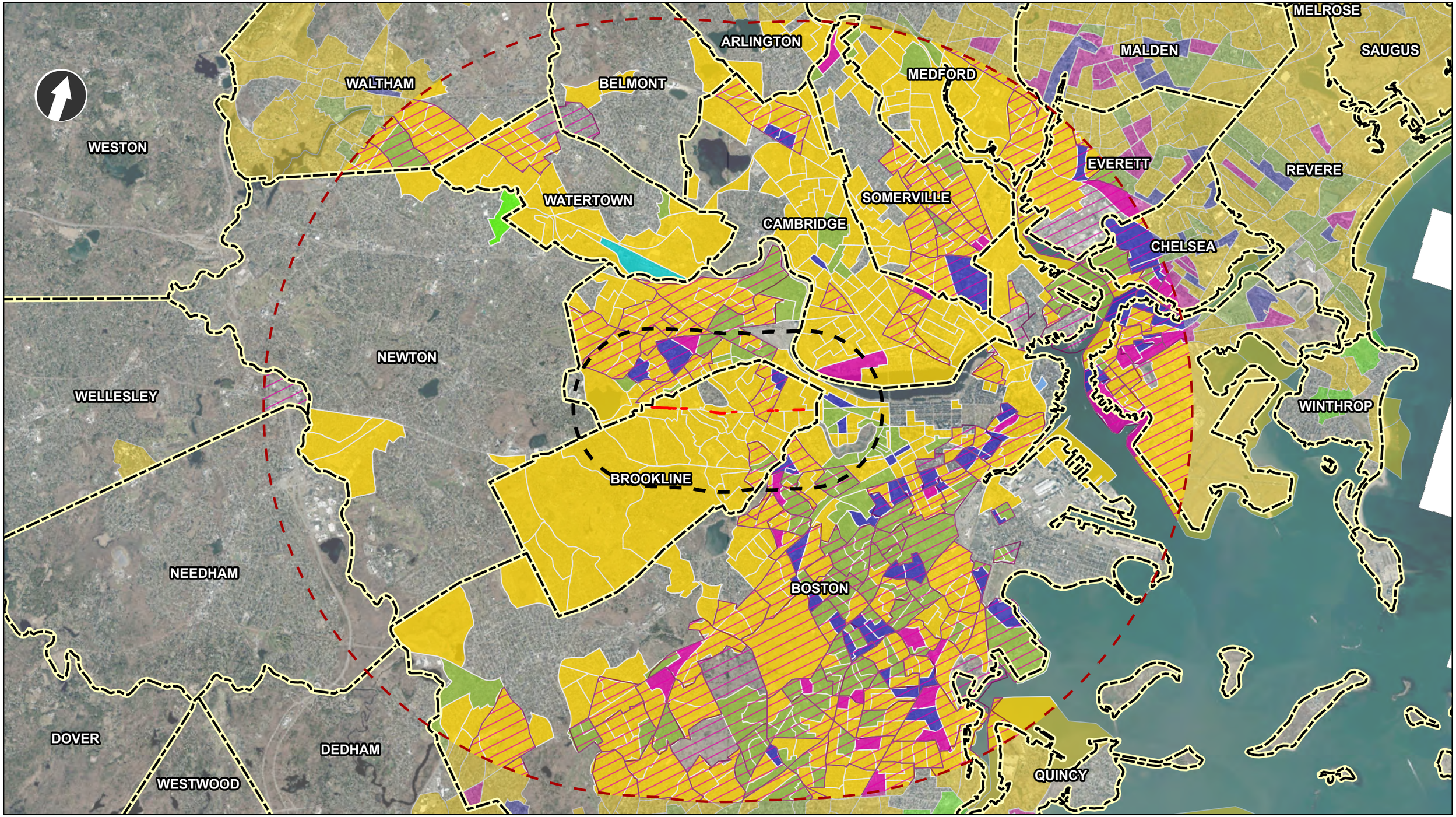
Report produced August 8, 2024 using EJScreen Version 2.3

ENVIRONMENTAL JUSTICE SCREENING FORM

Project Name	Green Line C Branch Station Accessibility Upgrades Project (Project)
Anticipated Filing Date	December 16, 2024
Proponent Name	Massachusetts Bay Transportation Authority (MBTA)
Contact Information	Tess Paganelli (tpaganelli@mbta.com)
Project Website	C Branch Station Accessibility Improvements | Projects | MBTA https://www.mbta.com/projects/c-branch-station-accessibility-improvements
Municipality	Within Limit of Disturbance (LOD): Town of Brookline Within 1 Mile of the LOD, or the Designated Geographic Area (DGA): Boston, Brookline, Cambridge, and Newton
Project Type	Transportation – Roadways/Transit
Project Description	The purpose of the Project is to create accessible station platforms for seven station locations along Beacon Street in the Town of Brookline on the MBTA Green Line C Branch. The stations included are Hawes Street, Kent Street (to be consolidated at the existing Saint Paul Street station location), Saint Paul Street, Summit Avenue, Fairbanks Street (consolidated with Brandon Hall at a midpoint between stations), Brandon Hall (consolidated with Fairbanks Street at a midpoint between stations), Tappan Street, Dean Road, and Englewood Avenue. The Project involves accessibility improvements at these C Branch station platforms. Measures include raising platform heights to 8 inches above the rail and extending platforms to a minimum 140 feet in length. Platform widths will be increased to a minimum of 7 feet 6 inches, and sloped walkways will ensure access to the raised platforms. Safety enhancements include constructing at least two means of egress from each platform, adjusting roadway and street parking layouts, and installing wayfinding and lighting consistent with MBTA standards.
MEPA Review Threshold	The Project exceeds the following Environmental Notification Form review threshold: *310 CMR 11.03(6)(b)2.b. – Construction, widening or maintenance of a roadway or its right-of-way that will cut five or more living public shade trees of 14 or more inches in diameter at breast height.* An Environmental Impact Report (EIR) is required as the Project Area is within 1 mile of EJ populations.
FEMA Floodplain	The Project Area is not within the FEMA-mapped Floodplain.
Estimated Building GHG Emissions	The Project will not alter operations that generate GHG emissions. The Project involves creating accessible station platforms and making infrastructure adjustments on the MBTA Green Line C Branch, which will not affect the frequency or capacity of transit operations, thus not influencing GHG emissions.
Anticipated Permits and Approvals	• U.S. Environmental Protection Agency (EPA) – National Pollutant Discharge Elimination System (NPDES) Construction General Permit (if applicable) • U.S. EPA –National Pollutant Discharge Elimination System Sector Specific Industrial Multi-Sector General Permit (if applicable)

	• Federal Transit Administration (FTA) – Section 106 Review and Finding • FTA – National Environmental Policy Act (NEPA) Undocumented Categorical Exclusion • FTA and U.S. Fish and Wildlife Service – Endangered Species Act (Section 7) • Massachusetts Historical Commission (MHC) – Section 106 Review and Finding • Massachusetts Department of Environmental Protection (MassDEP) – Massachusetts Contingency Plan Review/Preliminary Determination • MassDEP – Environmental Results Program Certification for Emergency Generators • Massachusetts Water Resources Authority – 8(m) Permit
Environmental Justice Populations	There are 157 Environmental Justice (EJ) populations within a 1-mile radius of the Project, as listed below by EJ criteria. Please refer to the attached EJ Map for the EJ populations within the DGA (a 1-mile radius) and a 5-mile radius. *Block group is abbreviated as BG and Census Tract is abbreviated as CT.*
Vulnerable Health EJ Criteria	The Massachusetts Department of Public Health (DPH) EJ Tool indicates that census block groups within 1 mile of the Project Site meet the Vulnerable Health EJ criteria for elevated blood lead (13) or low birth weight (12). The Massachusetts DPH EJ Tool indicates that within the DGA, the City of Boston does not meet the Vulnerable Health EJ criteria for heart attack or childhood blood lead, but does meet the criteria for childhood asthma and low birth weight. does not meet any Vulnerable Health EJ Criteria. The Town of Brookline, City of Cambridge, and the City of Newton do not exhibit any Vulnerable Health EJ Criteria.
Project Benefits	The following anticipated Project benefits are expected to affect both EJ and non-EJ populations: • Accessible stations that offer light rail train boarding platforms that support roll-on access between the platforms and the train floor; • Improved reliability and overall quality of service for all riders and communities served by the Green Line C Branch; • Enhanced station accessibility across the ROW for all riders and communities; • Sidewalk and crosswalk improvements will provide better access for pedestrians; and • Improved safety and accessibility for passengers by constructing at least two ways to exit each platform to nearby public areas, providing more exit routes in emergencies, and enhancing overall station accessibility for all riders.
Potential Impacts to EJ Populations	The following Project impacts could affect both EJ and non-EJ populations: • Roadway lanes will be adjusted to accommodate wider station platforms; • Loss of Town of Brookline parking spots is anticipated, with replacement of all impacted accessible parking spaces;

	• Parking impacts along Beacon Street during construction are anticipated. Potential temporary impacts to traffic operations due to construction, including station closures or bypasses, bus diversions, and short-term (workday) lane restrictions, will be minimized through a diversion service plan and a traffic control and detour plan; • Construction will be within MBTA property, with no long-term increase in vehicle traffic anticipated,; • Encounters with contaminated soil and groundwater may occur during construction but will be properly managed with a soil and groundwater management plan; • Temporary air quality impacts due to construction may occur but will be kept to a minimum through an emissions control plan; and • Temporary noise impacts due to construction may occur but will be kept to a minimum through abatement measures.
How to Request Additional Information	Community members can request: • A meeting to discuss the Project; • Additional language translation and interpretation services; and/or • Other accommodations, including meetings after business hours and/or at locations near public transportation. Please call (617) 549-4357 or email Tess Paganelli (tpaganelli@mbta.com) to make a request.



Massachusetts Bay Transportation Authority

Project Area
Municipal Boundary
Study Area (1-Mile Radius)
Study Area (5-Mile Radius)

MA 2020 Environmental Justice Block Groups
Language isolation
Income
Income and English isolation
Minority
Minority and English isolation
Minority and Income
Minority, Income and English isolation
Census Tract where >5% of the population speaks a language other than English

0 3000 6000 12000 Feet

Source: MassGIS, Nearmap
Aerial Date: October 2023

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Environmental Justice Populations

Green Line C Branch Station Accessibility Upgrades Project

Brookline, Massachusetts

Public Involvement Plan

Introduction

The Massachusetts Bay Transportation Authority (MBTA) has developed this Public Involvement Plan (PIP) for the Green Line C Branch Station Accessibility Upgrades Project (Project) that frames the outreach by the MBTA to the Town of Brookline, local stakeholders, environmental justice (EJ) populations, and other interested parties. The PIP has been created to outline the outreach strategies of the Project as it is reviewed by the Massachusetts Environmental Policy Act (MEPA) Office. In accordance with the *MEPA Public Involvement Protocol for Environmental Justice Populations,* this PIP identifies enhanced public engagement with local community organizations and EJ populations in proximity to the Project.

Project Overview

According to a letter from the Federal Transit Administration (FTA) dated October 2020, the track replacement work that the MBTA performed at several inaccessible Green Line station platforms triggered an Americans with Disabilities Act (ADA) compliance requirement, including nine C Branch stations listed below. This Project aims to bring those nine station locations into compliance with FTA, ADA, National Fire Protection Association (NFPA), Massachusetts Architectural Access Board (MAAB), and all applicable MBTA regulations, guidelines, and design directives.

The Project will improve conditions for nine station locations located in the Town of Brookline to achieve accessibility by widening platforms and improving pedestrian access and egress from the stations.

The following Green Line C Branch stations will undergo accessibility improvements:

- Hawes Street Station
- Kent Street (to be decommissioned)
- Saint Paul Street Station
- Summit Avenue Station
- Fairbanks Street Station (consolidated with Brandon Hall Station)
- Brandon Hall Station (consolidated with Fairbanks Street Station)
- Tappan Street Station
- Dean Road Station
- Englewood Avenue Station

Public Involvement Plan Framework

The MBTA has developed a robust public involvement and outreach plan that is inclusive and welcomes participation from communities, riders, and abutters. The Project's outreach will prioritize **municipal coordination**, **notification and communication**, **public meetings**, and **physical signage**.

Multiple strategies and tools for communicating information and gathering input will broaden the reach of this Project and offer community members ways to participate at times and in locations that are convenient. The outreach program is designed to meet the needs of the public, stakeholders, and the EJ communities affected by the Project.

Municipal Coordination

The MBTA has performed outreach with the Town of Brookline to discuss major aspects of the Project including, but not limited to, station consolidation, MBTA station design, roadway cross section, and construction sequencing.

Starting in 2020, the MBTA has held monthly meetings with Town of Brookline officials, including the Department of Public Works and the Transportation Board, to drive the design of the Project and goals of the Town of Brookline.

The MBTA has also held the following public meetings on the Green Line activities:

- Brookline Transportation Board, open meeting (virtual), February 14, 2024
  - A presentation on the Project was provided during this meeting by MBTA staff. There were board member and public comments on tree removal, accessible parking spaces, platform height in relation to the future Type 10 train cars, construction period impacts, and community engagement.
- Open House at Brookline Public Library, Coolidge Corner, (in-person) February 15, 2024
  - This meeting was attended by approximately 22 residents and discussed travel time, tree removal, user-friendly signage, lighting improvements, seating, and the construction period impacts.
- Brookline Transportation Board, open meeting (virtual), July 17, 2024
  - This meeting included a presentation and discussion on the Project including station consolidation and impacts to parking and trees on Beacon Street.
  - The Project team responded to comments on tree removal, parking space impacts, pedestrian safety, changes in travel time, and heat island effect.
- Commission on Disabilities (virtual) September 11, 2024

The MBTA will continue to identify the most effective strategies for reaching interested parties. Additional input from the Town of Brookline and stakeholders will be needed to finalize the design. The final designer will coordinate with the Town of Brookline on an ongoing basis and hold a public meeting at each major phase of design.

Notification and Communications Strategy

The Project's outreach effort aims to engage the public on various fronts, including:

- Local and state officials
- Community Based-Organizations (CBOs), federal Tribes, and Indigenous organizations, as identified in the EJ Reference List provided by the MEPA Office
- Targeted local community groups, particularly in Brookline and Boston
- Transportation advocacy groups
- Green Line customers
- Bike and pedestrian groups
- Abutters, local residents, and business owners affected by construction
- Educational institutions

- Agencies and organizations related to accessibility
- Individuals who request to be added to the database as part of the MEPA review process

To reach the greatest number of interested parties, the MBTA will use various methods of outreach listed below.

- Development of clear and targeted printed and electronic materials that describe the Project and provide opportunities to learn about it. Such materials can be shared in briefings, public meetings, and through email.
- Employment of a Project-specific email address as the primary contact for all Project-related questions and comments.
- Distribution of the EJ Screening Form to the EJ CBO List on November 1, 2024.
- Translation of Project documents into appropriate languages as identified by the Languages Spoken in Massachusetts tab of the Environmental Justice Populations in Massachusetts map.
    - Languages identified include Spanish, Chinese, and Russian.
- Publication of public notices in local newspapers.
- Development of a Project website with information pertaining to design elements, construction schedule, transit service impacts, public filings, as well as a mechanism to collect feedback. The website can be accessed through the following link: https://www.mbta.com/projects/c-branch-station-accessibility-improvements
- Distribution and translation of babel notices with contact information and ways to obtain more information.
- Real-time Project information/updates to be posted on the MBTA social media sites, including Facebook, X (formerly known as Twitter), Blog, YouTube, and Flickr, as directed by the MBTA.
- Circulation of notices of the MEPA Site Visit and any other relevant notices.
- Virtual and in-person public meetings that include interpreters for locally spoken languages to be held.
- Development of a public engagement survey that targets populations who cannot make public meetings, or people of certain demographics that do not typically attend public meetings (younger population). This survey could be shared through a QR code on Green Line trains or through a ride-along where a person has a tablet with the survey.
    - Survey or other project information can be shared via Facebook ads which allows for filtering of demographic groups (ex. age, geographical location, etc.).
- Pop-up booths to be held along the C Branch corridor to engage Green Line users and provide information on the Project as well as answer questions.

Public Meetings

The MBTA will hold public meetings throughout the MEPA process to provide public agencies and interested parties access to the Project team.

- The MBTA will maintain communication with the local community, community organizations, abutters and stakeholders. To ensure accessibility of public meetings, the MBTA will employ the following tactics:

- Hold meetings after work hours and in locations accessible by public transit and with building accessibility.
- Interpreters will be made available at public meetings, as required, for languages that are spoken above ten percent in the Project's designated geographic area.

Physical Signage

- Flyers will be posted at convenient locations along the Green Line C Branch corridor with information on the Project, construction updates, and notice of public meetings.
- Flyers will be distributed at key community locations in advance of public meeting dates and other key milestones.
- Flyers will be provided in Spanish, Chinese, and Russian.
- Prior to construction, information will be disseminated regarding construction impacts (such as interruptions in C Branch schedule, dust, vibration, noise and truck traffic).

Appendix A: Project Stakeholder List

Local and Regional Stakeholders

Town of Brookline

- Department of Public Works
- Department of Planning and Community Development
- Health Department
- Preservation Commission
- Select Board
- Conservation Commission

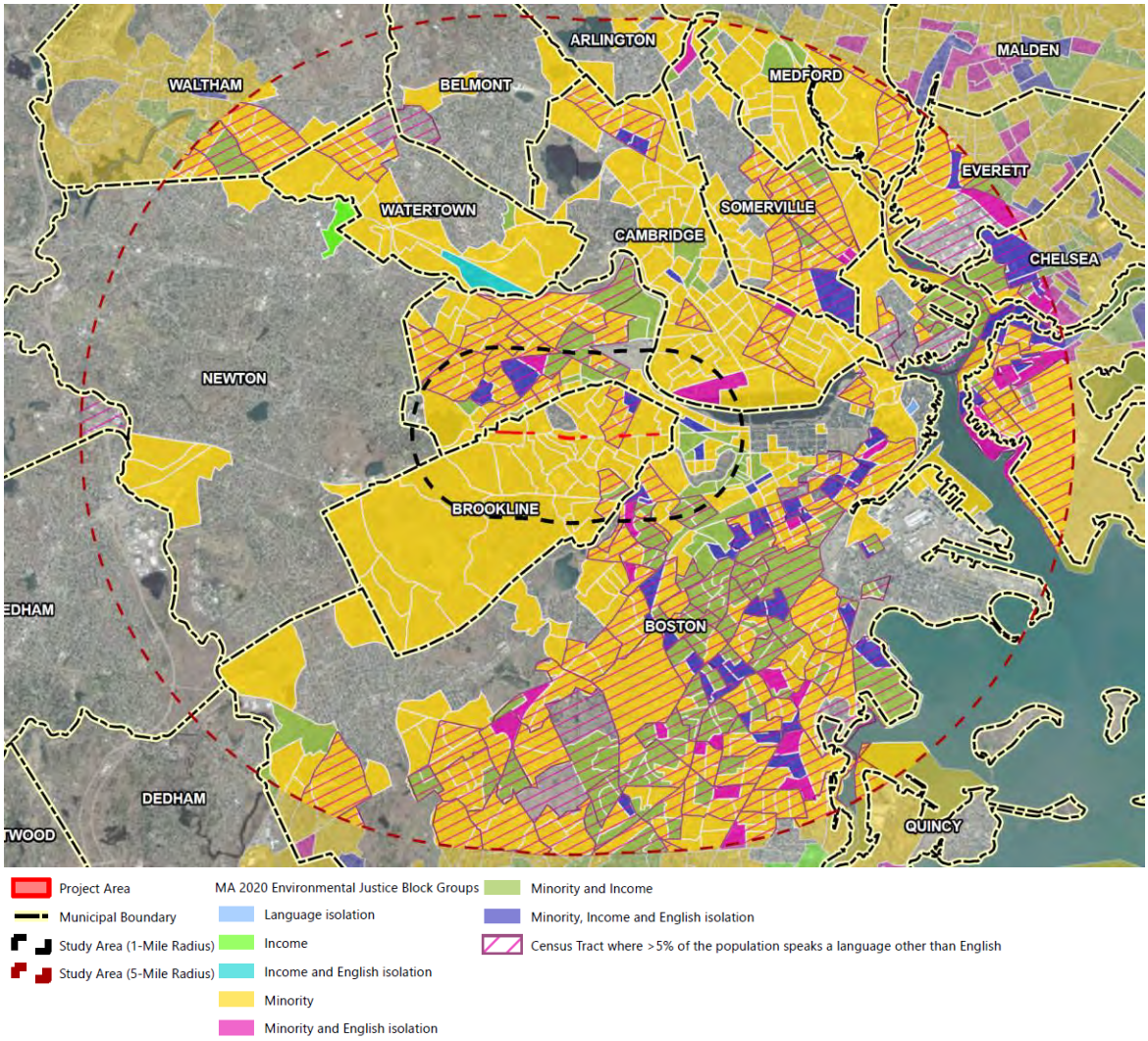
Regional

- Metropolitan Area Planning Council

Environmental Justice Community Based Organizations

Unitarian Universalist Mass Action Network	GreenRoots, Inc.
Mass Rivers Alliance	Pocassett Wampanoag Tribe
The Trust for Public Land	Alternatives for Community & Environment
Browning the GreenSpace	Chappaquiddick Tribe of the Wampanoag Nation
Community Action Works	Nuestra Comunidad CDC
Appalachian Mountain Club	Dudley Street Neighborhood Initiative
Conservation Law Foundation	Charles River Conservancy
Charles River Watershed Assoc.	New England United for Justice
North American Indian Center of Boston	Neponset River Watershed Association
Environmental League of Massachusetts	Coalition for Social Justice
Environment Massachusetts	Wampanoag Tribe of Gay Head (Aquinnah)
Mass Land Trust Coalition	Mashpee Wampanoag Tribe
Clean Water Action	Chinatown Community Land Trust
Neighbor to Neighbor Mass.	Chinatown Resident Association
Ocean River Institute	Mystic River Watershed Association
Sierra Club MA	Chinese Progressive Association
Mass Audubon	Boston Farms Community Land Trust
Save the Harbor/Save the Bay	Boston Harbor Now
Nipmuc Nation (Hassanamisco Nipmucs)	Air, Inc.
Codman Square Neighborhood Development Corporation	Chappaquiddick Tribe of the Wampanoag Nation, Whale Clan
Herring Pond Wampanoag Tribe	Massachusetts Tribe at Ponkapoag
Harbor Point Community Task Force	Mass Community Labor United
Upham's Corner Main Street	Allston Brighton Health Collaborative
Vietnamese American Initiative for Development	Massachusetts Commission on Indian Affairs
Fairmount/Indigo Line CDC Collaborative	Southwest Boston CDC

Appendix B: Environmental Justice and Language Access



Language access information was provided by examining mapping and data from the Massachusetts Energy and Environmental Affairs, as well as data from both the American Community Survey (ACS) and Department of Early and Secondary Education (DESE). Within the 1-mile radius there are languages spoken by 5% of the population or more for Spanish, Chinese, and Russian.

The MBTA will continue to tailor outreach to the needs of this specific Project; preparing materials that are accessible and comply with federal and state standards; meet the standards of MEPA's Environmental Justice policy; and organize meetings and events that meet Massachusetts Department of Transportation's Office of Diversity and Civil Rights (ODCR) Public Participation Plan, Language Access Plan and Accessible Meeting Policy, and Engage tool.