

**Massachusetts Bay
Transportation Authority**

Red Blue Connector

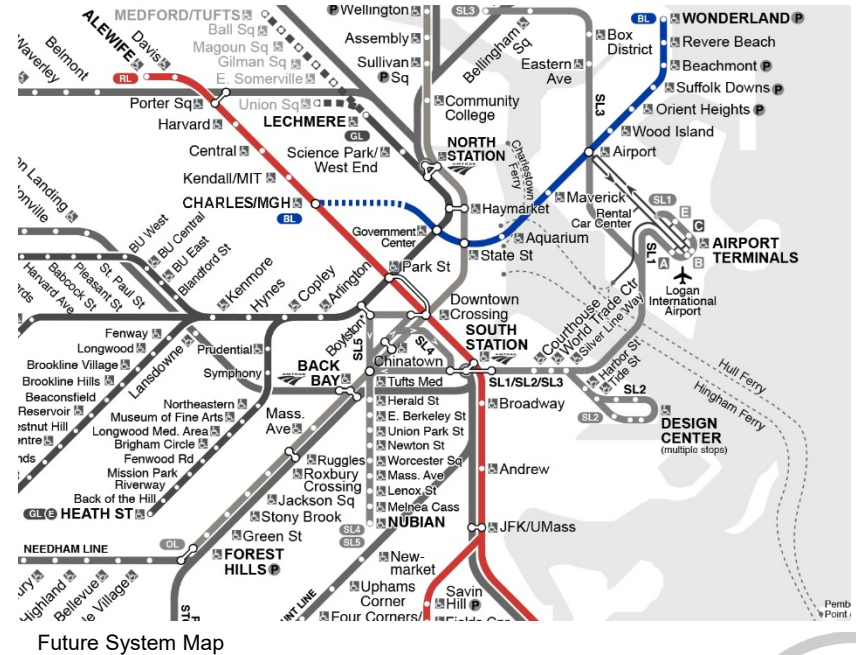
Fiscal and Management Control Board

June 7, 2021

Erik Stoothoff, Chief Engineer

Agenda

- Introduction
- Red Blue Connector History
- Constructability Study
- 2020 Concept Design
- Timeline
- Next Steps



Introduction

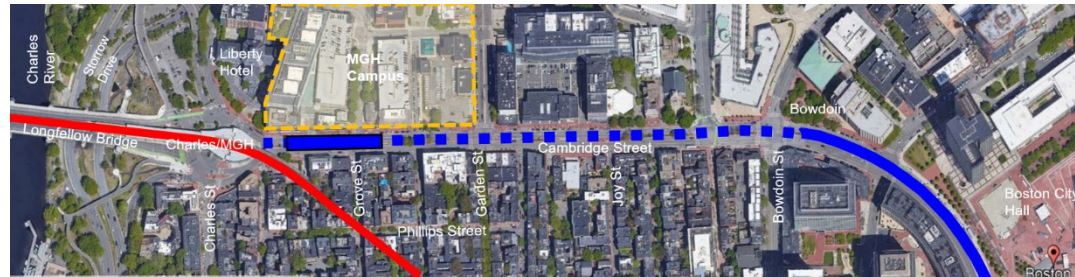
What is the Red Blue Connector?

Project that will reduce travel time and number of transfers for trips between East Boston/Revere and Cambridge, and reduce congestion at the downtown transfer stations. Major project elements include:

- 2500 ft two-track tunnel under Cambridge St.
- Blue Line Station Platform, with at least two means of egress and access
- Modifications to the existing Charles/MGH Station for Blue Line connection
- Connection within future MGH Clinical Building
- Bowdoin Station closure
- Overnight Train Storage Tracks (location TBD)
- Tunnel Ventilation
- Traction Power Substation



Current Alignment



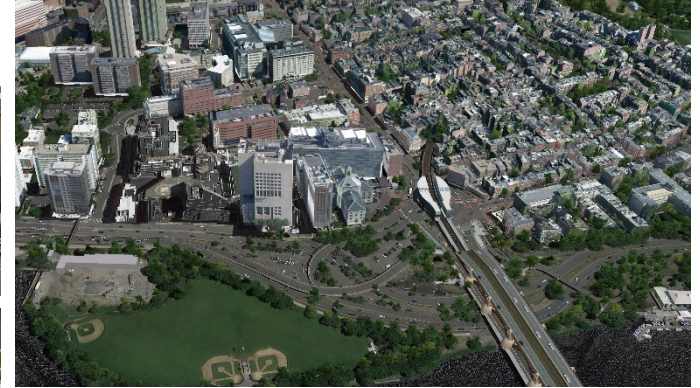
Future Alignment



Introduction

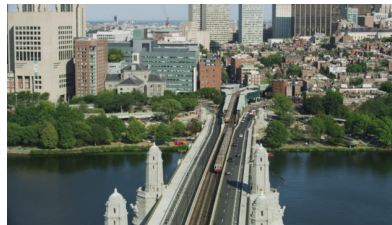
What does the Project need to consider?

- Charles Circle and Cambridge Street traffic
- MGH Master Plan
- MEEI Master Plan/ Parking expansion
- Red Line Longfellow Approach Viaduct



Coordination Approach

- Regular coordination over past 12 months with MGH and City of Boston
- Regular Coordination with these and other key stakeholders (MEEI, DCAMM) to be restarted concurrent with initiation of next phase
- Robust stakeholder engagement (residents, businesses, and elected officials) plan in development



Project History

1972

Boston Transportation Planning Review (BTPR)

- Concept included as part of the moratorium on expressways within Rt 128.

1986

Bowdoin Station & Charles Station Connector Study

- Underground connection found to be feasible
- Three station options explored
- Retained Bowdoin Station
- Does not meet current Standards

1990

1990 MOU Central Artery/Third Harbor Tunnel Commitment

- Design of Red Blue Connector included in commitments

2010

DEIR Red Line/Blue Line Connector Project

- 10% Concept Design prepared
- MEPA Certificate DEIR
- Design halted due to lack of funding

2014

Red Blue Connector Final Design Commitment Removed as Requirement from State Implementation Plan (SIP)

2018

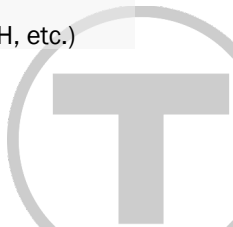
Tunnel Constructability Study: Update to the 2010 DEIR

- Focus on generic tunnel methodologies based on recent experience

2020

2020 Updated Conceptual Design

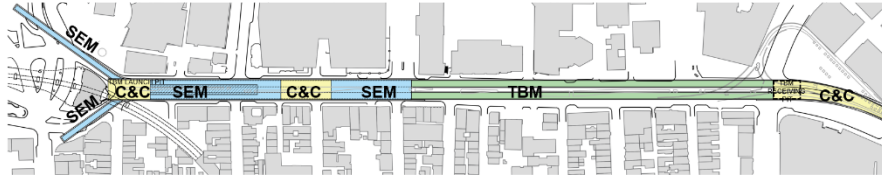
- Update Existing Conditions
- Advance Design of new Blue Line Station
- Incorporate Secondary Station Entrance to MGH Campus
- In depth evaluation of Tunnel Methodologies and Constructability
- Develop Design with Updated Building Codes
- Coordination with current Projects (LAVR, MGH, etc.)



Constructability Study

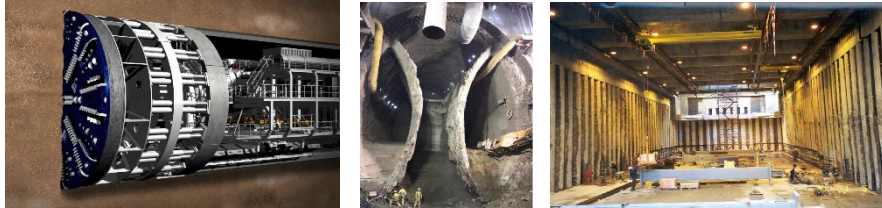
2010

Design utilized TBM, SEM, C&C



2018

Focus on refreshed tunnel methods experience and costs



2020

Detailed comparison of tunnel costs and impacts, and refreshed station design to current standards



Tunnel Boring Machine (TBM), Sequential Excavation Method (SEM) and Cut & Cover (C&C)

TBM and SEM perceived to lessen surface disruption, however:

- Surface disruption needed for C&C construction at the launch pits, reception pits and to stabilize the soils and control ground water.
- The SEM construction of the station area does not provide the volume needed for emergency ventilation.

Tunnel Construction Updates

- Latest TBM experience indicates reduced tunneling costs.
- C&C identified as most cost efficient.

All Tunneling Methodologies Evaluated – Cut & Cover Recommended:

- Shortest overall construction schedule and lowest cost.
- Local contractors are expert in this method.
- Traffic controls can be maintained in consistent manner.
- Utility relocations can be performed in advance of tunnel and station work, potentially as early action item.
- Method allows for station volume flexibility to facilitate the emergency ventilation system.

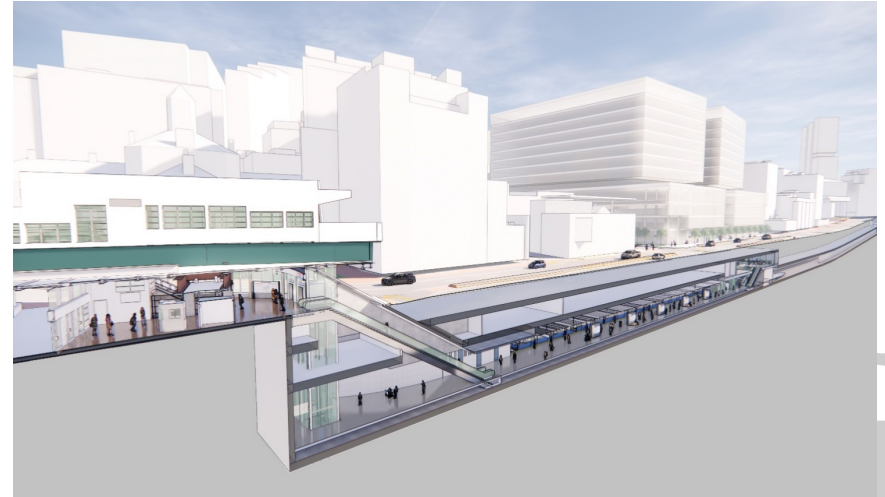
2020 Concept Design

Purpose:

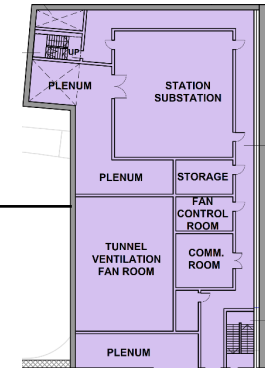
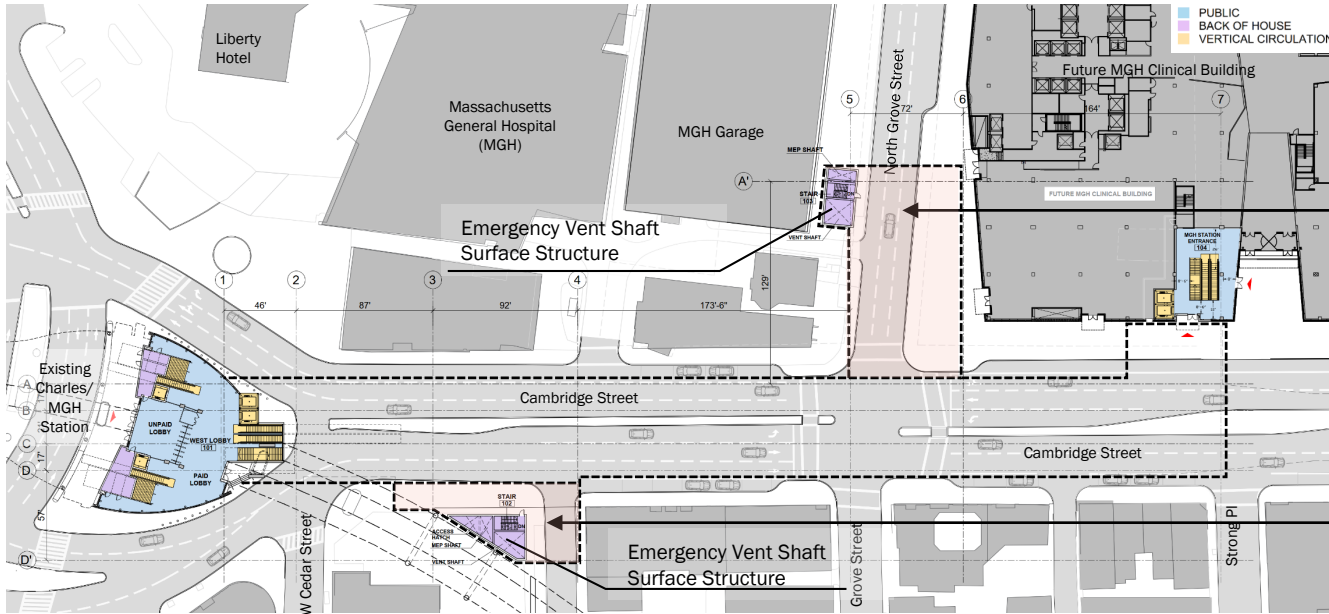
- Update Existing Conditions
- Advance Design of new Blue Line Station
- Review Tunnel Methodologies and Constructability
- Develop Design with Updated Building Codes (accessibility, ventilation, emergency egress, etc.)
- Retain MEP Concepts that are unchanged by current codes
- Coordination with current Projects (LAVR, MGH, etc.)

Key elements of the Updated Station Design include:

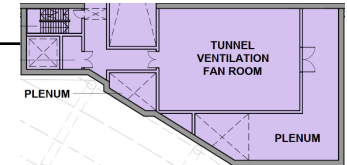
- Revised Tunnel Construction Methodology - Cut & Cover
- Recommended Constructability Approach – Top Down Construction
- Provided redundant elevators
- Configured escalators as first circulation element egressing from the platform and improved visibility to the elevators.
- Provided direct escalator runs from platform to Charles/MGH Station
- Provided additional station entrance at east end of platform to future MGH Clinical Building (*provides convenient connection to MGH campus and addresses improved access and egress requirements*)
- Incorporates significantly increased project components to improve: accessibility, safety, code requirements, and customer experience beyond prior designs



2020 Concept Design



Underground Structure for Tunnel Ventilation and Traction Power Substation



Underground Structure for Tunnel Ventilation

Resiliency:

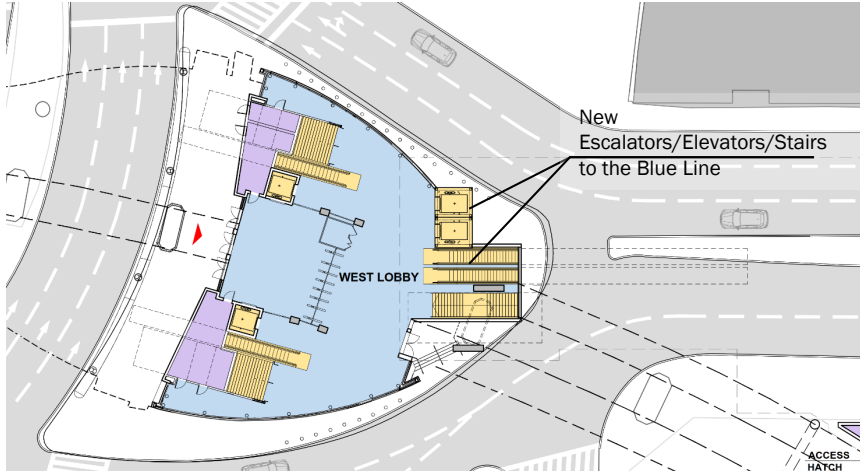
- MBTA 2019 Flood Resiliency Design Directive to be utilized
- Site outside climate change inundation limits per current BH-FRM
- BH-FRM being updated by MA Coast Flood Risk Model.
- Critical equipment to be protected
- Updates will be required as design progresses.

Storage tracks:

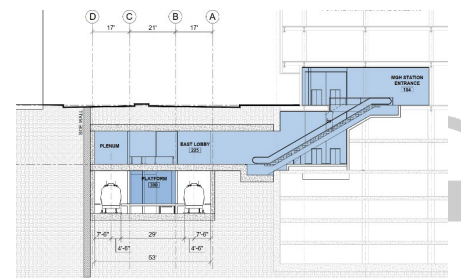
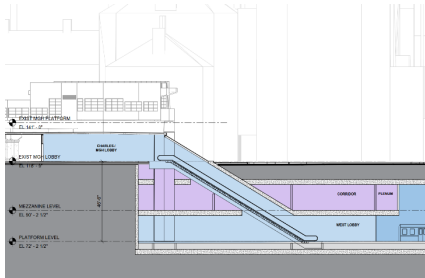
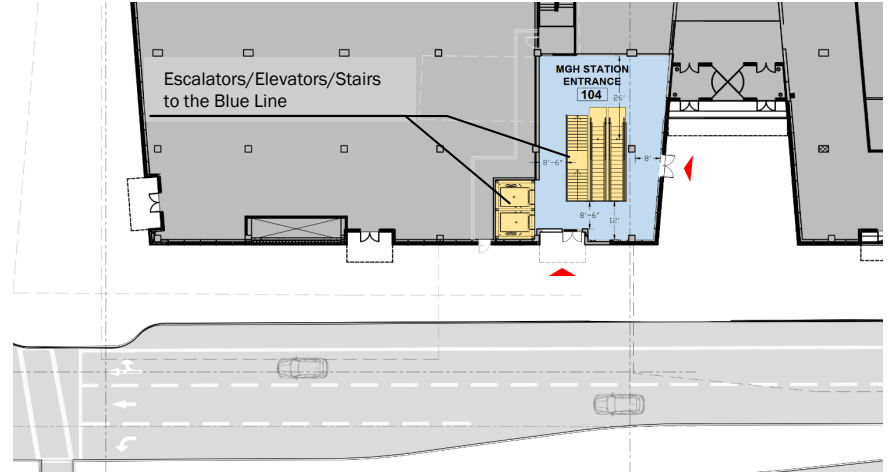
- 2010 Concept included overnight storage tracks for two consists
- Trains stored only during nonrevenue service
- Trains enter service at start of day
- Alternative concepts for storage tracks to be evaluated during design

2020 Concept Design

Station West Entrance



Station East Entrance (MGH Station Entrance)



*Agreement needed with MGH formalizing details

2020 Concept Design

CAPITAL COST OF THE PROJECT:

Project Element	Estimated Cost
Tunnel Structure (support walls, excavation, utility relocations)	\$ 270 million
New Blue Line Station (including stairs, elevators, escalators)	\$ 60 million
Secondary Station Access adjacent to future MGH Facility	\$ 20 million
Track and Signals (including new crossover track)	\$ 30 million
Streetscapes (including reconstruction of Cambridge Street)	\$ 20 million
Ventilation Buildings and Unit Substation	\$ 30 million
Storage Tracks*	\$ 40 million
Contingencies (30%)	\$ 140 million
Subtotal (year 2020 dollars)	\$ 610 million
Escalation to mid-point of Construction (21%)	\$ 130 million
Total Construction Cost	\$ 740 million
Supplemental Project Costs	
Preliminary and Final Design Costs	\$ 50 million
MBTA Administration Costs	\$ 30 million
Rolling Stock	\$ 30 million
Total Project Cost	\$ 850 million

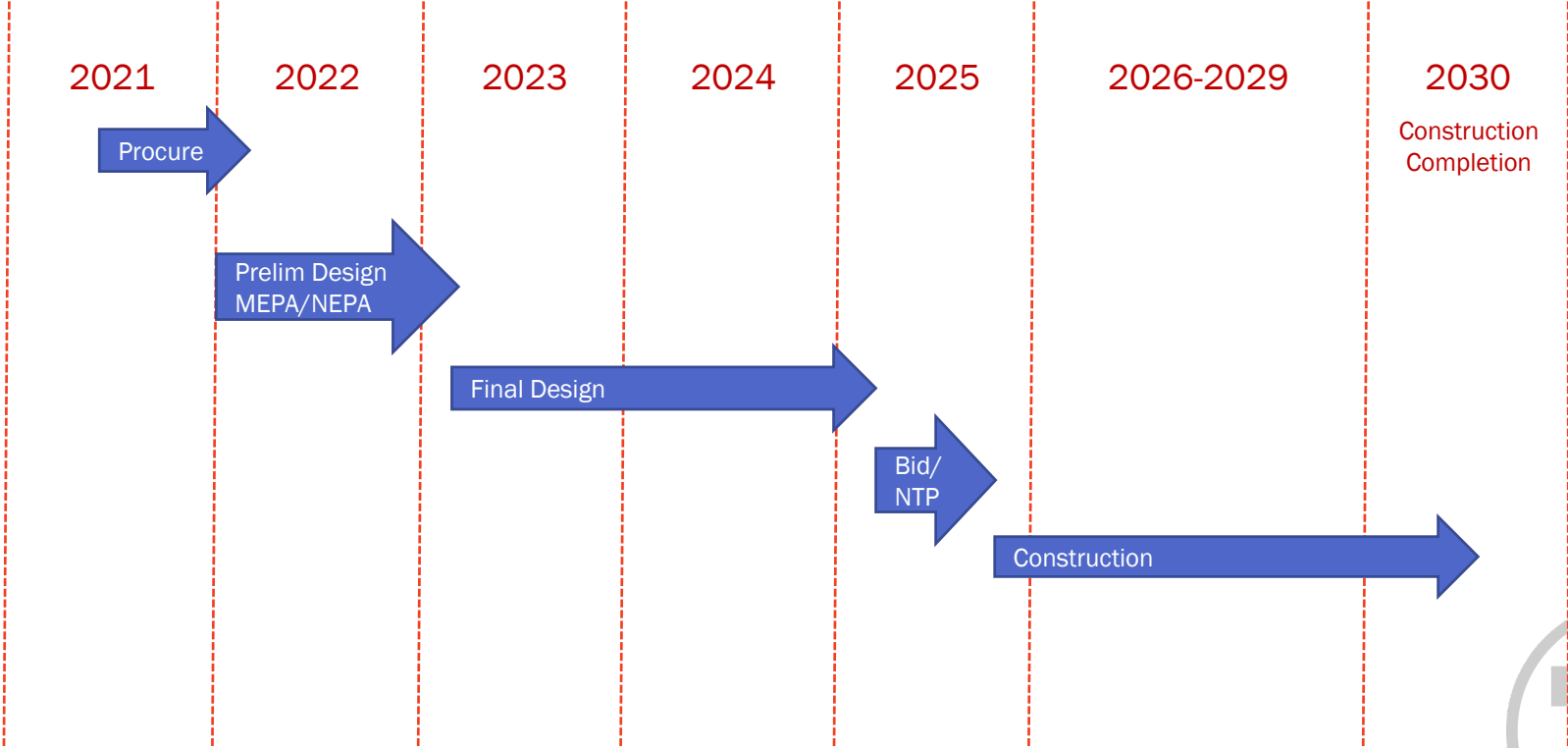


View at the Station East Entrance

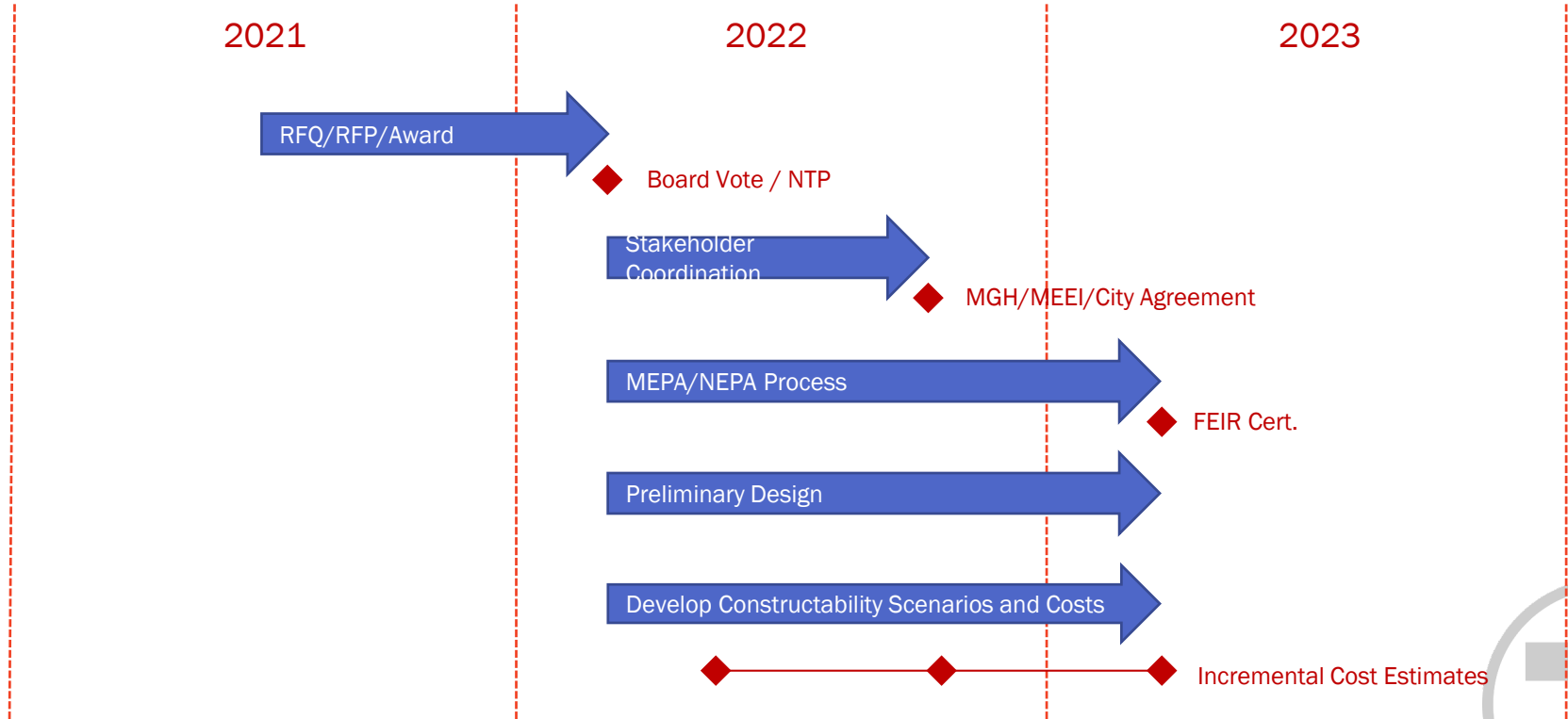


Blue Line Platform View

Project Timeline



Near Term Timeline



Note: Timeline unconstrained except for \$13M currently funded.

Next Steps

- **Identify funding necessary for full project**
- **Develop scope for upcoming RFQ/RFP**
To proceed with Preliminary Engineering and Environmental Review
- **Dedicated project staff**
Hire key Planning/Project Management Staff within OCE to lead project as primary job function
- **MEPA/NEPA coordination**
Advancement of Permitting
- **Climate change and resiliency**
Review opportunities & requirements
- **Continued coordination with FTA**
Review opportunities & requirements for federal funding
- **Continued coordination with MBTA departments**
- **Continued coordination with adjacent projects and stakeholders**
 - Massachusetts General Hospital
 - Longfellow Approach Viaduct Rehabilitation
 - Hurley Building
 - Boston Water & Sewer Commission
 - City of Boston
 - Utilities (*Electric, Telephone, CCTV, Gas, etc.*)
- **Identify opportunities for early action items that can leverage these and other projects which may advance sooner**



View from the Red Line Platform towards Blue Line Connection



View of the Blue Line Platform from the Escalators