EAST-WEST PASSENGER RAIL STUDY

Advisory Committee Meeting #2 – Springfield, MA

July 23, 2019

Meeting Agenda

- Presentation
  - Welcome and Introductions
  - Meeting Objectives
  - Study Overview
  - Corridor Existing Conditions
  - East-West Corridor Alternatives
    - Alternatives development and screening
    - Six proposed alternatives
  - Next Steps
- Questions and Discussion

Meeting Objectives

Inform

Review the purpose and goals for improving connectivity and mobility in the East – West Corridor

Narrow a wide range of options for improving mobility to six (6) alternatives for analysis

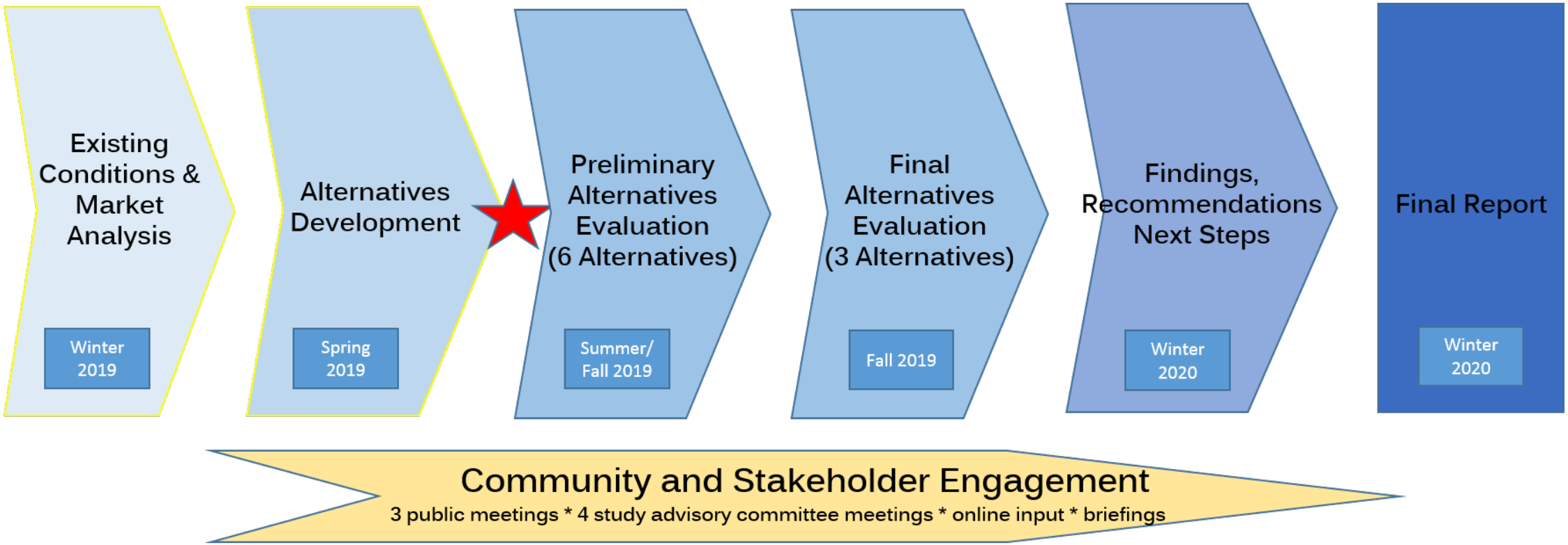
Learn and Solicit Feedback from Advisory Committee

How well do the proposed alternatives reflect public and advisory committee priorities?

Are there any refinements you would suggest?

Study Overview

Purpose: To conduct a conceptual planning study to evaluate benefits, costs, and impacts of a range of alternatives for improved connectivity and mobility in the East – West Corridor.



East-West Corridor Existing Conditions

Existing Rail Conditions

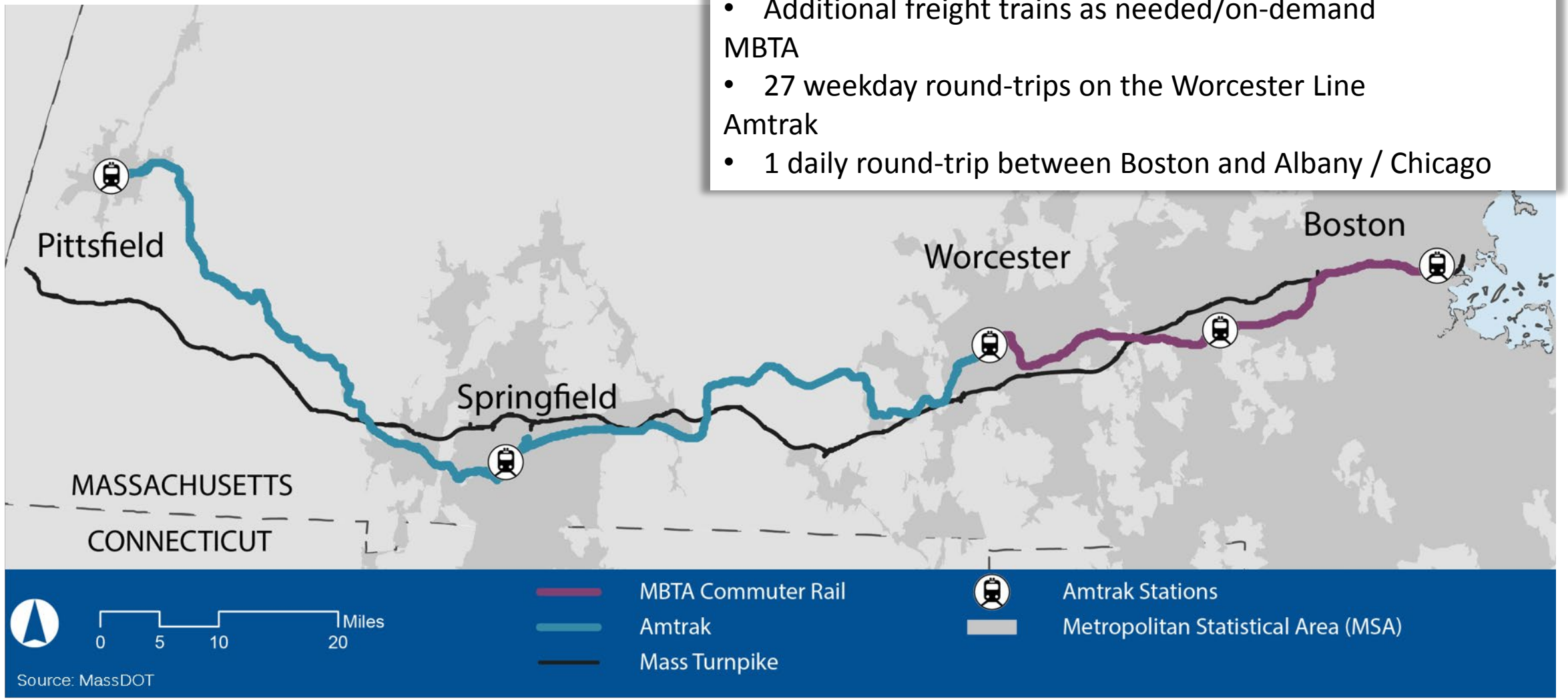
Challenges and Opportunities

Study Corridor

CSX
- 14 regularly operated freight trains each day
- Additional freight trains as needed/on-demand

MBTA
- 27 weekday round-trips on the Worcester Line

Amtrak
- 1 daily round-trip between Boston and Albany / Chicago



Existing Rail Conditions

Physical and operating conditions inform capital investments needed for improved rail service.

Physical Inventory

- Curves
- Terrain (grades)
- Track maintenance standards (track class)
- Track condition
- Train control
- Station stops
- Vehicle type
- Number of tracks
- Terminal capacity
- Adjacent development/ structures
- Wetlands/ protected resources

Operations

- MBTA service
- Amtrak Lake Shore Limited
- CSX freight service

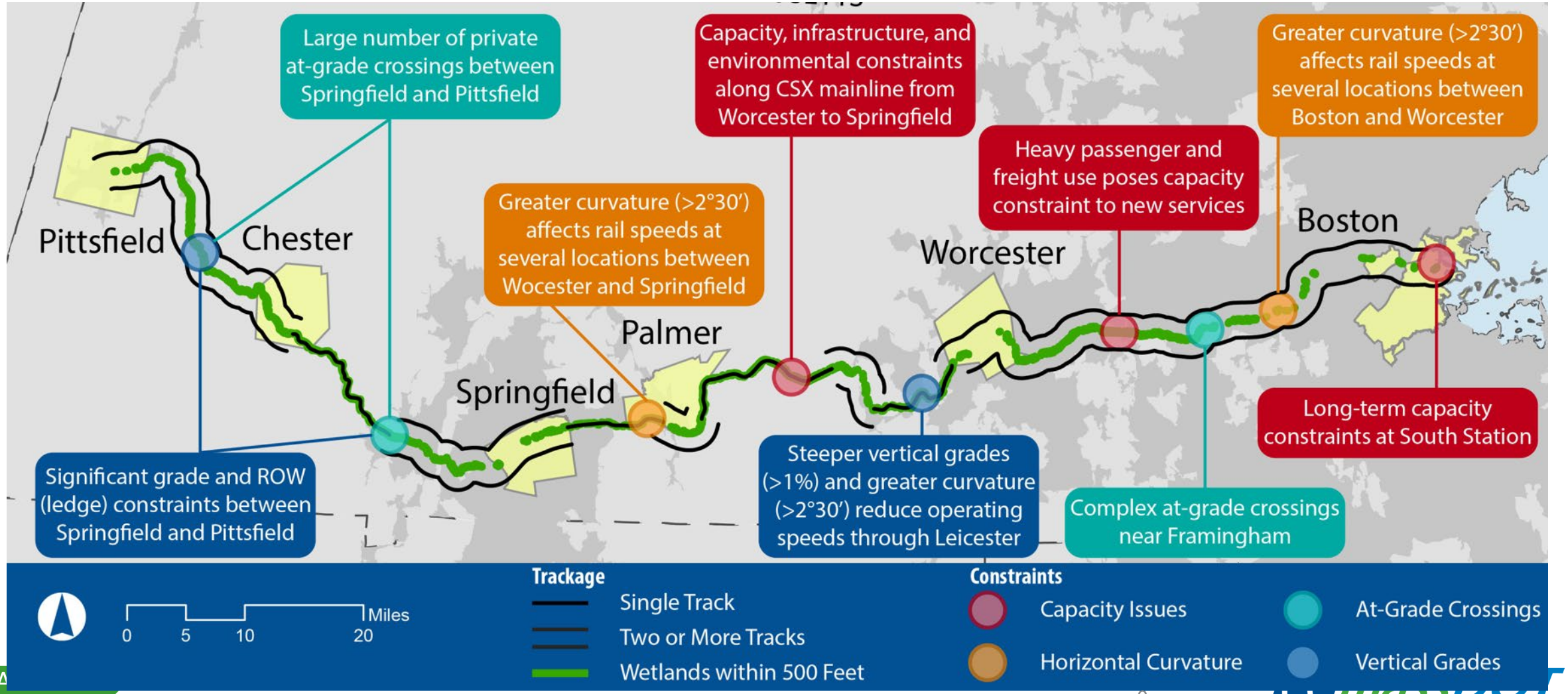
Existing Freight Conditions

- Boston – Albany rail line is owned by CSX from Worcester to New York
- Freight rail reduces truck traffic, reduces CO2 emissions, and provides economic benefits to MA consumers and businesses
- Shared track for freight and passenger rail is challenging due to capacity constraints, safety concerns, and expectations of higher speed for passenger service
- Under federal law, Amtrak has the right to provide passenger service on freight-owned lines, but the host railroad has the right to set the terms for an operating agreement

Recent right-of-way upgrades and expansion of the Worcester intermodal facility have increased freight operations on the CSX rail corridor west of Worcester

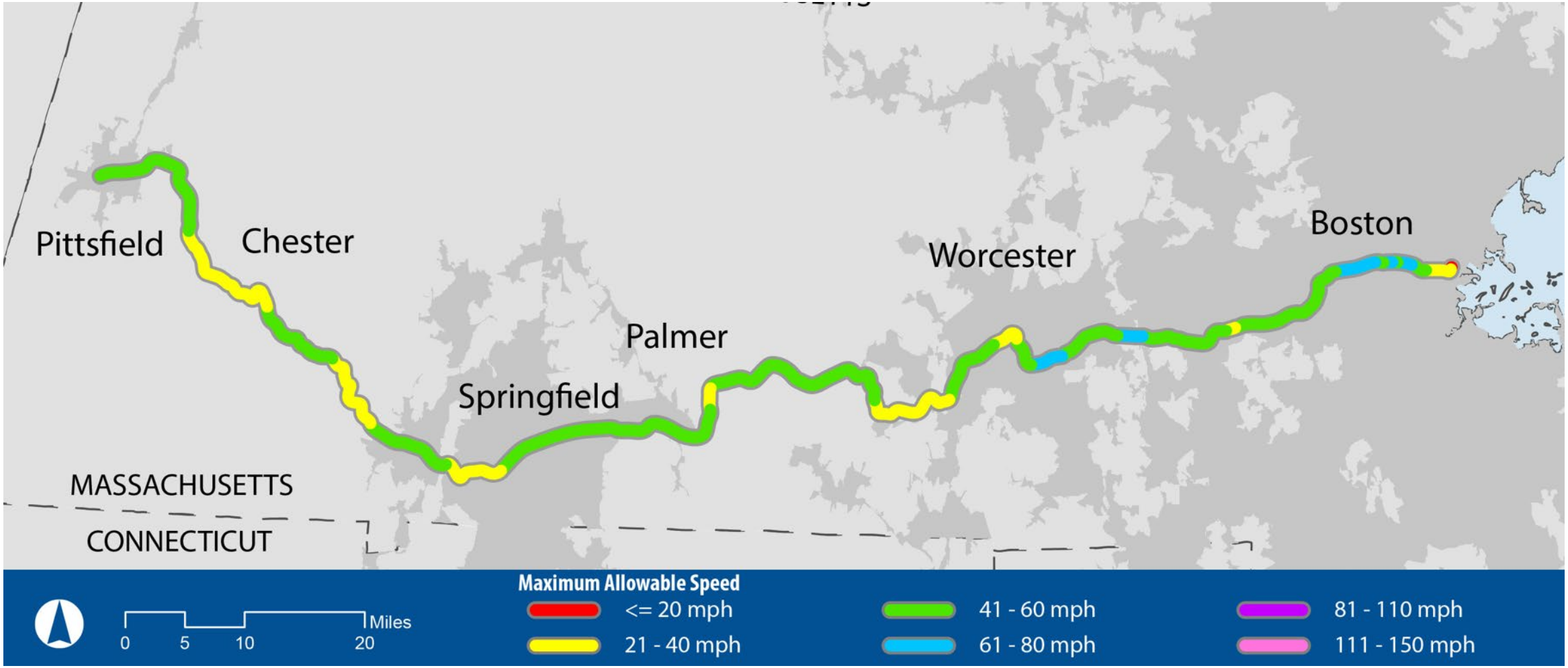
Existing Conditions – Physical Constraints

Key Constraints Along the Corridor



Existing Conditions – Travel Speeds

Existing Maximum Passenger Speeds



East-West Corridor Alternatives Development

Goals for Service Alternatives

Alternatives Screening and Development Process

Goals for Service Alternatives

Based on input from Advisory Committee, residents, and stakeholders

- Provide better **transportation options** to/from Western MA
- Support **economic development**
- Improve attractiveness of Western MA as **an affordable place to live**
- Reduce the number of **automobile trips** along the corridor
- Reduce **greenhouse gas emissions** and **air quality impacts** from transportation

KEY CONSIDERATIONS

- Impacts to freight
- Environmental and community impacts
- Cost

Public Feedback Informing Alternatives

- Feedback received at Advisory Committee Meeting #1 (Dec 18, 2018), Public Meeting #1 (March 12, 2019), and via email/website (~75 comments)
- Key issues and suggestions from public and Advisory Committee input:
  - Rail will spur economic development and quality of life in western MA
  - Affordable homes in western MA will become more accessible in eastern MA
  - Rail service should be provided to the smaller towns, such as Palmer and Chester
  - Better connections between western & eastern MA are paramount, and could include bus service
  - Faster service is a high priority
  - Launching service sooner is more of a priority than faster service
  - Frequent service (multiple trips per day) is a high priority
  - Getting cars off the roads and reducing congestion on I-90 is an important benefit
  - It is important to connect other western MA towns to Springfield
  - Express service between Springfield and Boston is a priority
  - Connections for western MA residents to Logan Airport are important
  - Look at other corridors besides the existing CSX route, e.g. the Pan Am Railways “Northern Tier”

Rail Service in East – West Corridor

Factors that affect rail service characteristics

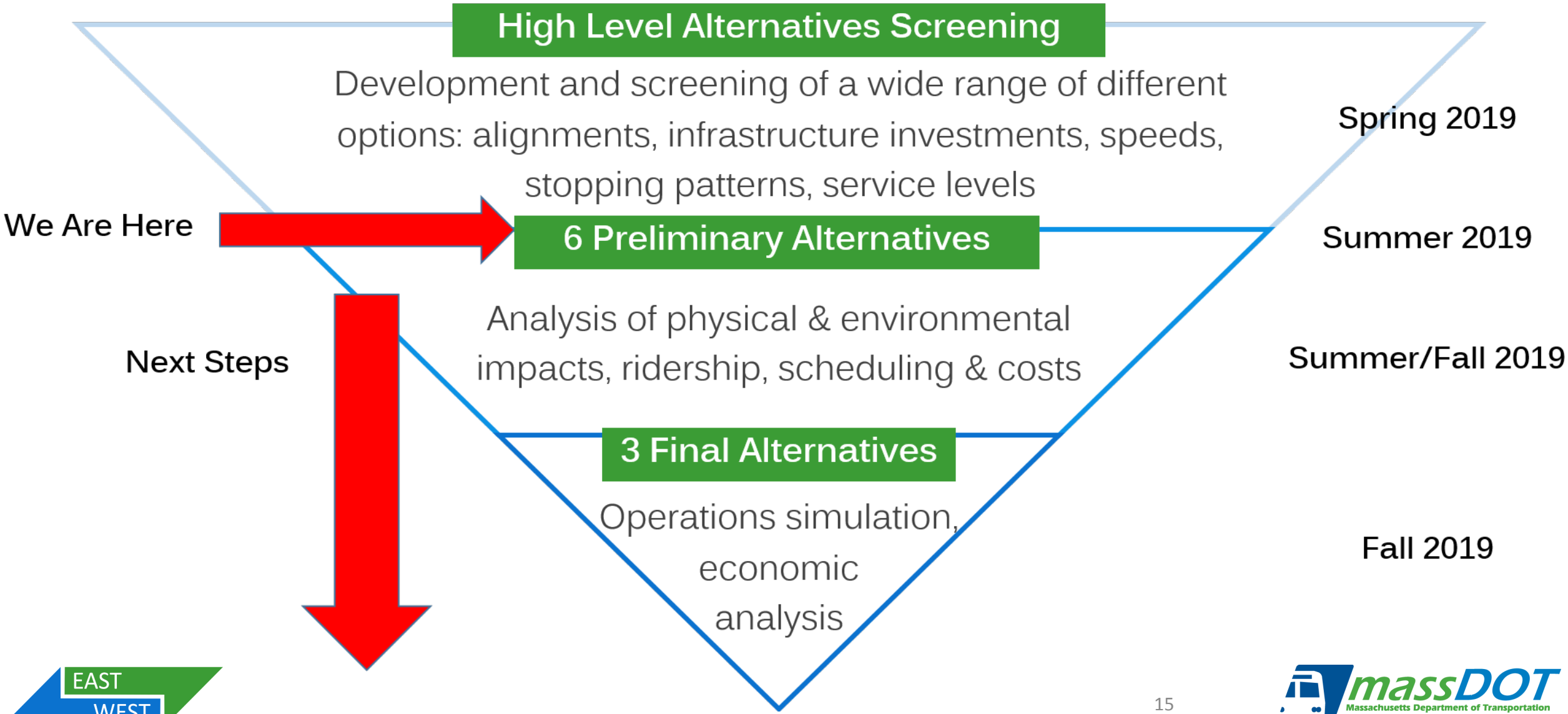
Demand Factors

- Demographics (population, density, income)
- Travel patterns (employment, other)
- Competitiveness of other modes
- Major destinations

Rail Service Parameters

- Travel time
- Frequency
- Cost of fare
- Amenities (both on-board and at stations)
- Span of service
- Connections

Alternatives Development & Analysis Process



Alternatives Screening – Options Reviewed

● One-Seat Ride
○ Transfer Required

EAST / WEST CORRIDOR STUDY - UNIVERSE OF STOPPING PATTERNS

POTENTIAL STATIONS ARRAYED FROM WEST TO EAST

● Selected MBTA Service
B Bus Connection or Trip

SHARED / IMPROVED RAIL CORRIDOR CONCEPTS	New Haven	State St.	Wallingford	Meriden	Berlin	Hartford	Windsor	Windsor Locks	Greenfield	No. Hampton	Holyoke	Pittsfield	Chester	Springfield	Palmer	Worcester	Grafton	Westborough	Southborough	Ashland	Framingham	West Natick	Natick Center	Wellesley Square	Wellesley Hills	Wellesley Farm	Auburndale	West Newton	Newtonville	Boston Landing	Lansdowne	Back Bay	South Station
Springfield to Boston																																	
S-1 SPG - Base Pattern														●		●																●	●
S-2 SPG - Options Pattern														●	●	●					●										●	●	●
Pittsfield to Boston																																	
P-1 PIT - Base Pattern												●	●	●		●																●	●
P-2 PIT - Options Pattern												●	●	●	●	●					●										●	●	●
P-3 PIT - Shuttle Option												○	○	●	●	●					●										●	●	●
Greenfield to Boston																																	
G-1 GFD - Base Pattern									●	●	●			●		●																●	●
G-2 GFD - Options Pattern									●	●	●			●	●	●					●										●	●	●
G-3 GFD - Shuttle Option									○	○	○			●	●	●					●										●	●	●
New Haven to Boston																																	
N-1 NHV - Base Pattern	●			●		●		●						●		●																●	●
N-2 NHV - Options Pattern	●	●	●	●	●	●	●	●						●	●	●					●										●	●	●
N-3 NHV - Shuttle Option	○	○	○	○	○	○	○	○						●	●	●					●										●	●	●
MBTA Extensions																																	
T-1 SPG - Base Extn.														●		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	●	●	●
T-2 SPG - Options Extn.														●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	-	●	●	●	●
T-3 SPG - Shuttle Options	○	○	○	○	○	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	-	●	●	●	●
Hybrid Rail / Bus																																	
H-1 Bus -SPG to WOR														B	B	●																●	●
H-2 Bus -PIT to WOR												B	B	B	B	●																●	●
H-3 Bus -GFD / PIT to WOR									B	B	B	B	B	B	B	●																●	●
H-4 Bus -PIT to SPG												B	B	●	●	●																●	●
H-5 Bus -GFD / PIT to SPG									B	B	B	B	B	●	●	●																●	●
H-6 Bus in Off Peak														●	●	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	●	●
														B	B	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	B	B

SEPARATE HIGH-SPEED ALIGNMENT CONCEPTS	STATION LOCATIONS TO BE DETERMINED - PENDING SELECTED ALIGNMENT	Pittsfield	Lee?	Pittsfield	Lee?	Springfield		Worcester				Framingham									Back Bay	Boston
Bus Rapid Transit																						
K PIT - Base Pattern		S	-	S	-	S		S	-	-	-	-	-	-	-	-	-	-	-	-		S
L PIT - Options Pattern		S	S	S	S	S		S	-	-	-	?	-	-	-	-	-	-	-	-	?	S
High Speed Rail																						
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O PIT - Base Pattern		S	-	S	-	S		?	-	-	-	-	-	-	-	-	-	-	-	-		S
P PIT - Options Pattern		S	S	S	S	S		?	-	-	-	?	-	-	-	-	-	-	-	-	?	S
Maglev																						
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R SPG - Options Pattern						S		?	-	-	-	?	-	-	-	-	-	-	-	-	?	S
S PIT - Base Pattern		S	-	S	-	S		?	-	-	-	-	-	-	-	-	-	-	-	-		S
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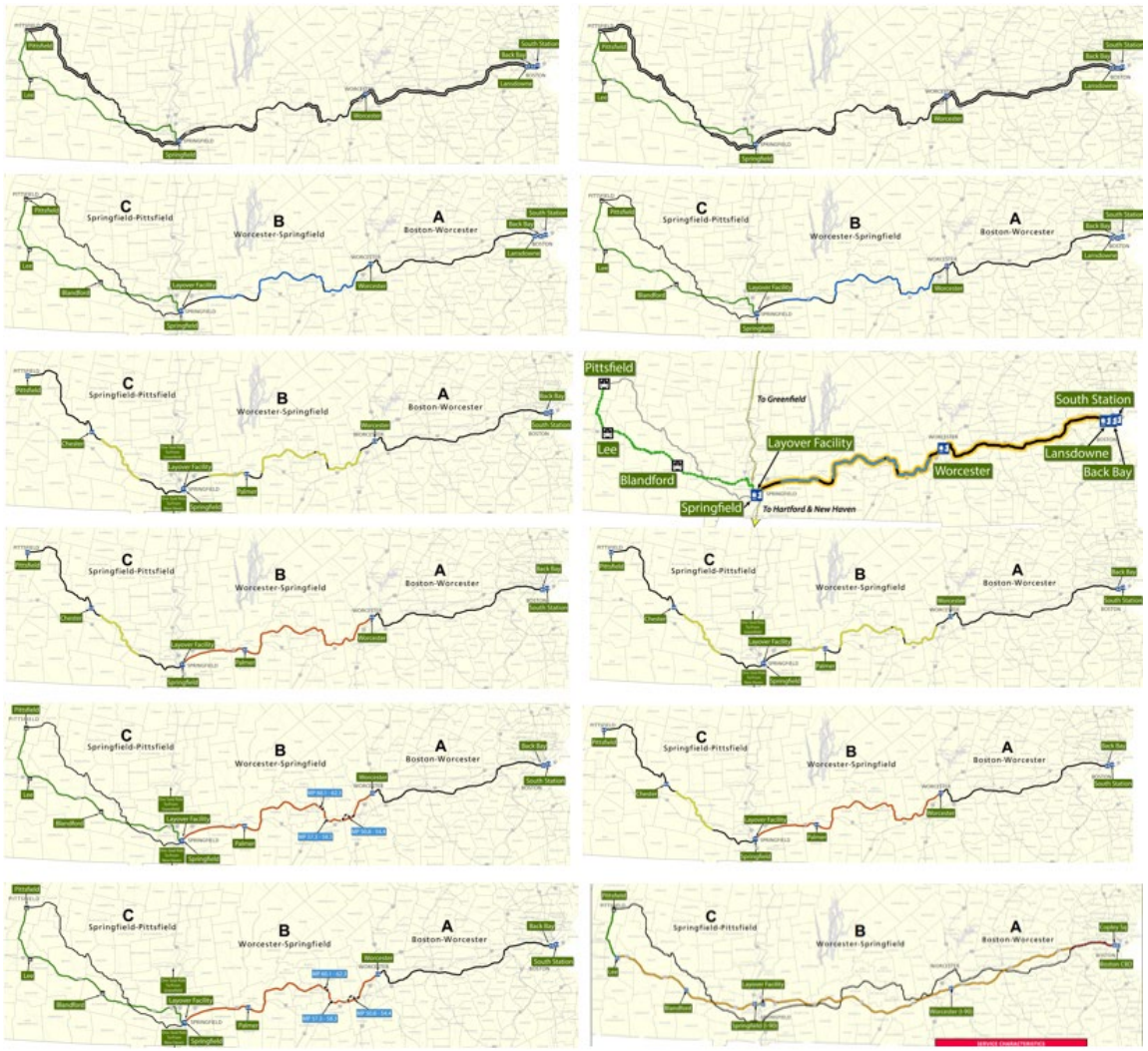
East / West Corridor Study - Revised: 7/9/2019



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Alternatives Screening – Key Characteristics

- **Corridor type**
  - Shared corridor – existing CSX rail corridor
    - Upgrade existing railroad track – double-track, track and signal upgrades, shared freight – passenger operations on the same tracks
    - Build new track infrastructure – new tracks next to existing tracks in existing CSX property, with some realignments onto private property
  - Separate corridor – Massachusetts Turnpike/Interstate 90
- **Travel speed**
  - Corridor type (shared v. separate, above)
  - Curvature and grade
  - Track infrastructure
  - Conflicts with other rail traffic – MBTA commuter rail, CSX freight, Amtrak
- **Stopping patterns**
  - Direct service v. transfers
  - Express/limited stop v. more local stops
- **Frequency**
- **Anticipated impacts**

Screening of Maglev, Hyperloop Options

- MagLev lines in service – very expensive to build and operate (compared to HSR)
- HyperLoop technology completely untested/unproven – planning level evaluation not possible due to highly experimental nature
- Neither technology can share existing rail infrastructure with existing rail modes
  - Completely new alignment required along entire corridor (I-90 not adequate) – very large number of property acquisitions, environmental impacts
  - Inability to share existing infrastructure at main stations
- Physical constraints in Route 128 – Boston segment would require new tunnel for both technologies
- Prohibitive costs and impacts (property, homes, environmental)

East-West Corridor Alternatives

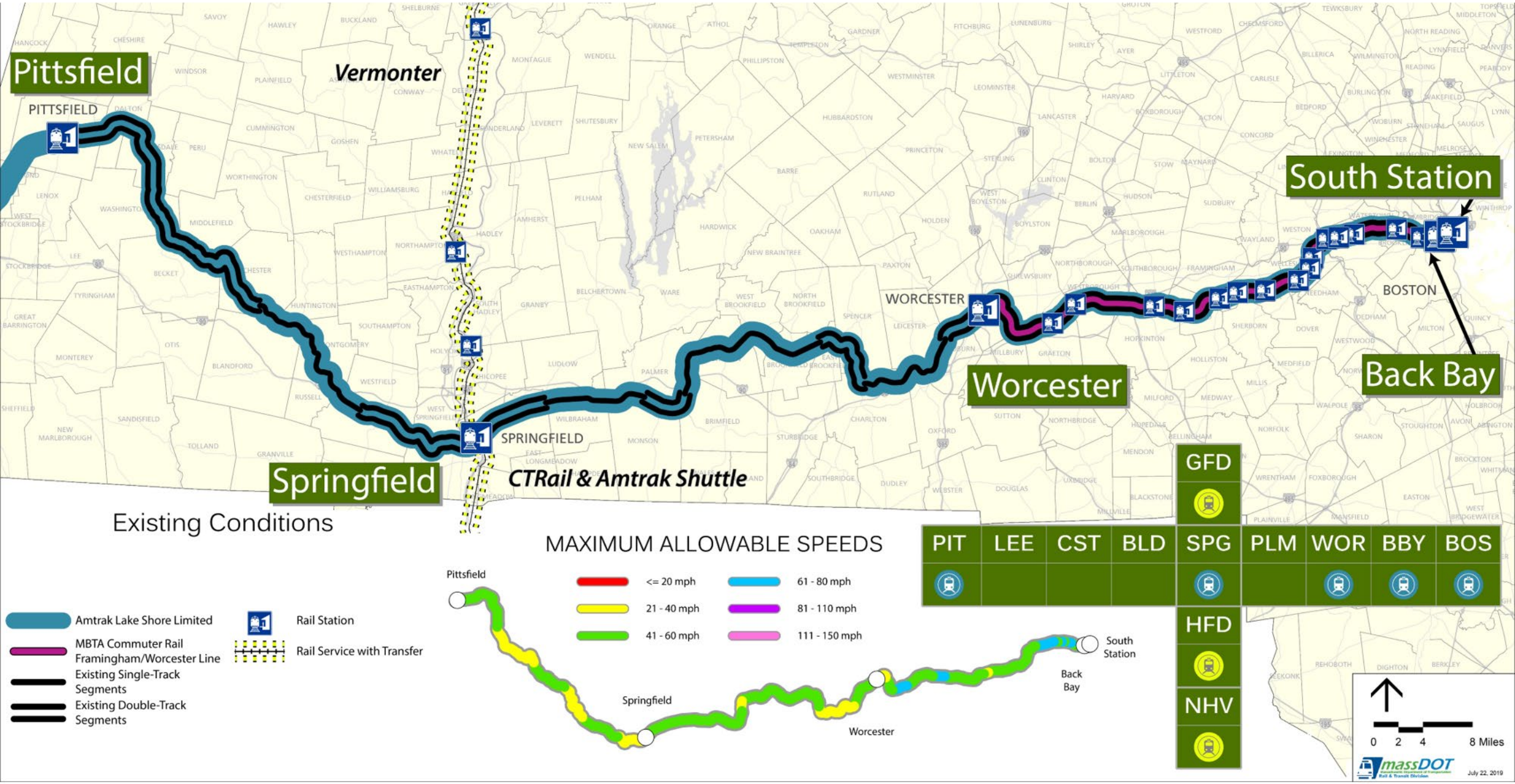
6 Potential Service Alternatives

Progressive Increases in Speed, Cost, Impacts

Summary of Key Parameters

Existing Conditions (No-Build)

- **Shared corridor on existing rail alignment**
  - Existing infrastructure and services
  - 1 round trip train per day on E-W Corridor (Lake Shore Limited)
- **Infrastructure – No new track improvements**
- **Connections**
  - Pittsfield – direct rail service, no transfer
  - Springfield – direct rail service, no transfer
- **Maximum speed – 80 mph**
- **Travel times:**
  - Springfield – Boston 2:05 – 2:30
  - Pittsfield – Boston 3:15 – 3:50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PITTSFIELD
Vermonter
Springfield
SPRINGFIELD
CTRail & Amtrak Shuttle
WORCESTER
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South Station
BOSTON
Back Bay
Existing Conditions
Amtrak Lake Shore Limited
MBTA Commuter Rail Framingham/Worcester Line
Existing Single-Track Segments
Existing Double-Track Segments
Rail Station
Rail Service with Transfer
MAXIMUM ALLOWABLE SPEEDS
<= 20 mph
21 - 40 mph
41 - 60 mph
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111 - 150 mph
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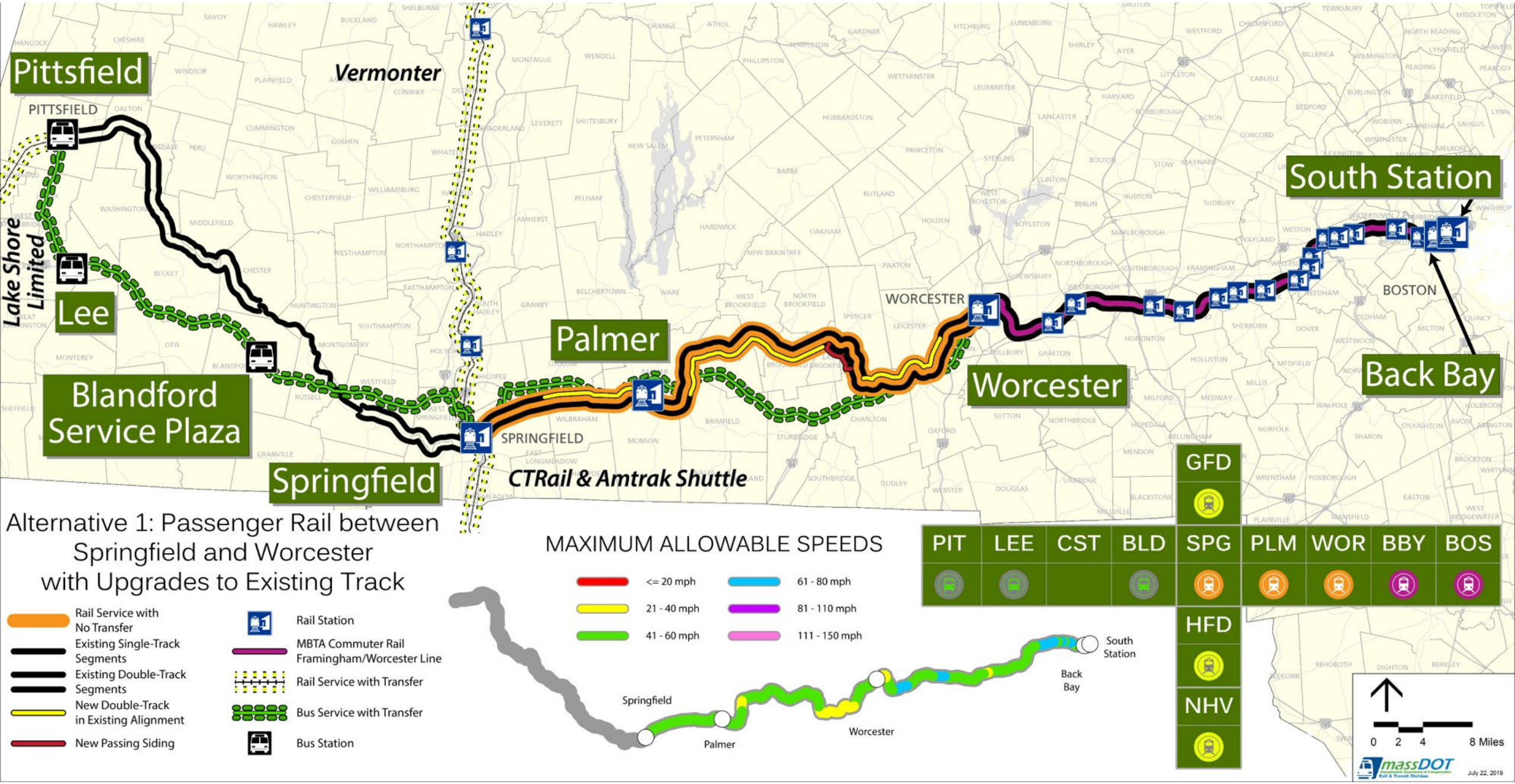
July 22, 2019

Alternative 1 – Worcester – Springfield Rail Service

- **Shared corridor on existing rail alignment**
  - Up to 6 round trip trains per day on E-W Corridor (SPG – WOR)
- **Infrastructure**
  - Restore double-track in missing sections
  - Upgrade tracks and signals
- **Direct rail connections from Boston – Worcester**
- **Rail-to-rail transfer required at Worcester – Palmer, Springfield**
- **Bus-to-rail transfer required at Springfield or Worcester – Pittsfield, Lee, Blandford Service Plaza**
- **Maximum speed – 80 mph**
- **Equipment – New diesel-powered trainsets**
- **Travel times:**
  - Springfield – Boston 2:05 – 2:50 (MBTA express v. local)
  - Pittsfield – Boston 3:15 – 4:10 (MBTA express v. local)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Lake Shore Limited
Lee
Blandford Service Plaza
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CTRail & Amtrak Shuttle
Palmer
WORCESTER
Worcester
South Station
BOSTON
Back Bay
Alternative 1: Passenger Rail between Springfield and Worcester with Upgrades to Existing Track
Rail Service with No Transfer
Existing Single-Track Segments
Existing Double-Track Segments
New Double-Track in Existing Alignment
New Passing Siding
Rail Station
MBTA Commuter Rail Framingham/Worcester Line
Rail Service with Transfer
Bus Service with Transfer
Bus Station
MAXIMUM ALLOWABLE SPEEDS
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massDOT
July 22, 2019

Alternative 2 – Boston – Springfield Rail Service

- **Shared corridor on existing rail alignment**
  - Up to 6 round trip trains per day on E-W Corridor (SPG – BOS)
- **Infrastructure**
  - Restore double-track in missing sections
  - Upgrade tracks and signals
- **Direct rail connections from Boston – Worcester, Palmer, Springfield**
- **Bus-to-rail transfer required – Pittsfield, Lee, Blandford Service Plaza**
- **Maximum speed – 80 mph**
- **Equipment – New diesel-powered trainsets**
- **Travel times:**
  - Springfield – Boston 1:55 – 2:20
  - Pittsfield – Boston 3:05 – 3:40


Pittsfield
PITTSFIELD
Vermonter
Lake Shore Limited
Lee
Blandford Service Plaza
Springfield
SPRINGFIELD
CTRail & Amtrak Shuttle
Palmer
WORCESTER
Worcester
South Station
BOSTON
Back Bay
Alternative 2: Passenger Rail to Springfield with Upgrades to Existing Track
Rail Service with No Transfer
Existing Single-Track Segments
Existing Double-Track Segments
New Double-Track in Existing Alignment
New Passing Siding
Rail Station
Rail Service with Transfer
Bus Service with Transfer
Bus Station
MAXIMUM ALLOWABLE SPEEDS
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61 - 80 mph
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Alternative 3 – Boston – Pittsfield Rail Service

- **Shared corridor on existing rail alignment**
  - Up to 6 round trip trains per day on E-W Corridor (PIT – BOS)
- **Infrastructure**
  - Restore double-track in missing sections
  - Upgrade tracks and signals
  - Straighten curvature and increase speeds in priority segments
- **Direct rail connections from Boston – Worcester, Palmer, Springfield, Chester, Pittsfield**
- **Maximum speed – 90 mph**
- **Equipment – New diesel-powered trainsets**
- **Travel times:**
  - Springfield – Boston 1:40 – 2:00
  - Pittsfield – Boston 2:40 – 3:10

EAST WEST

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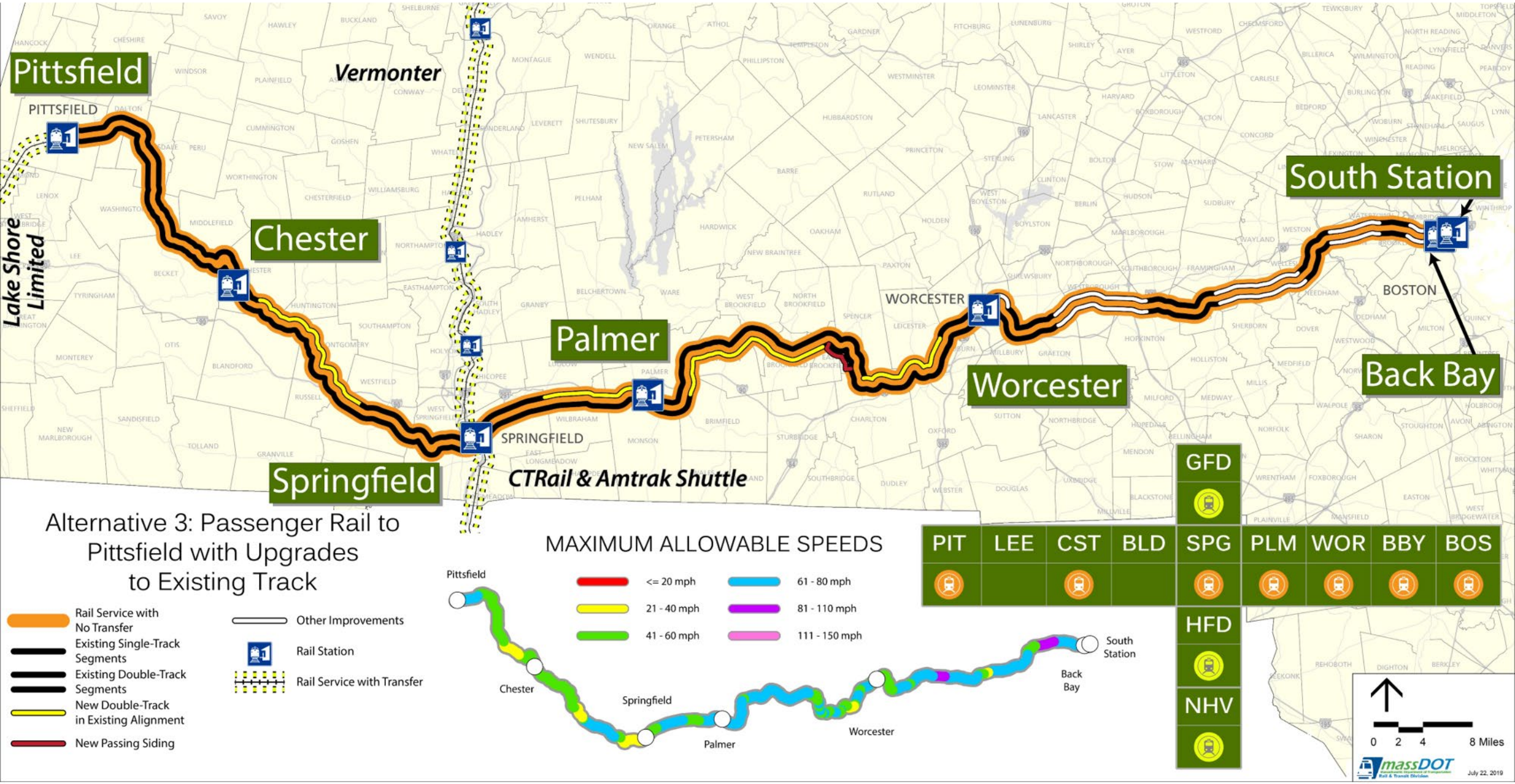
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Back Bay
Alternative 3: Passenger Rail to Pittsfield with Upgrades to Existing Track
Rail Service with No Transfer
Existing Single-Track Segments
Existing Double-Track Segments
New Double-Track in Existing Alignment
New Passing Siding
Other Improvements
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Rail Service with Transfer
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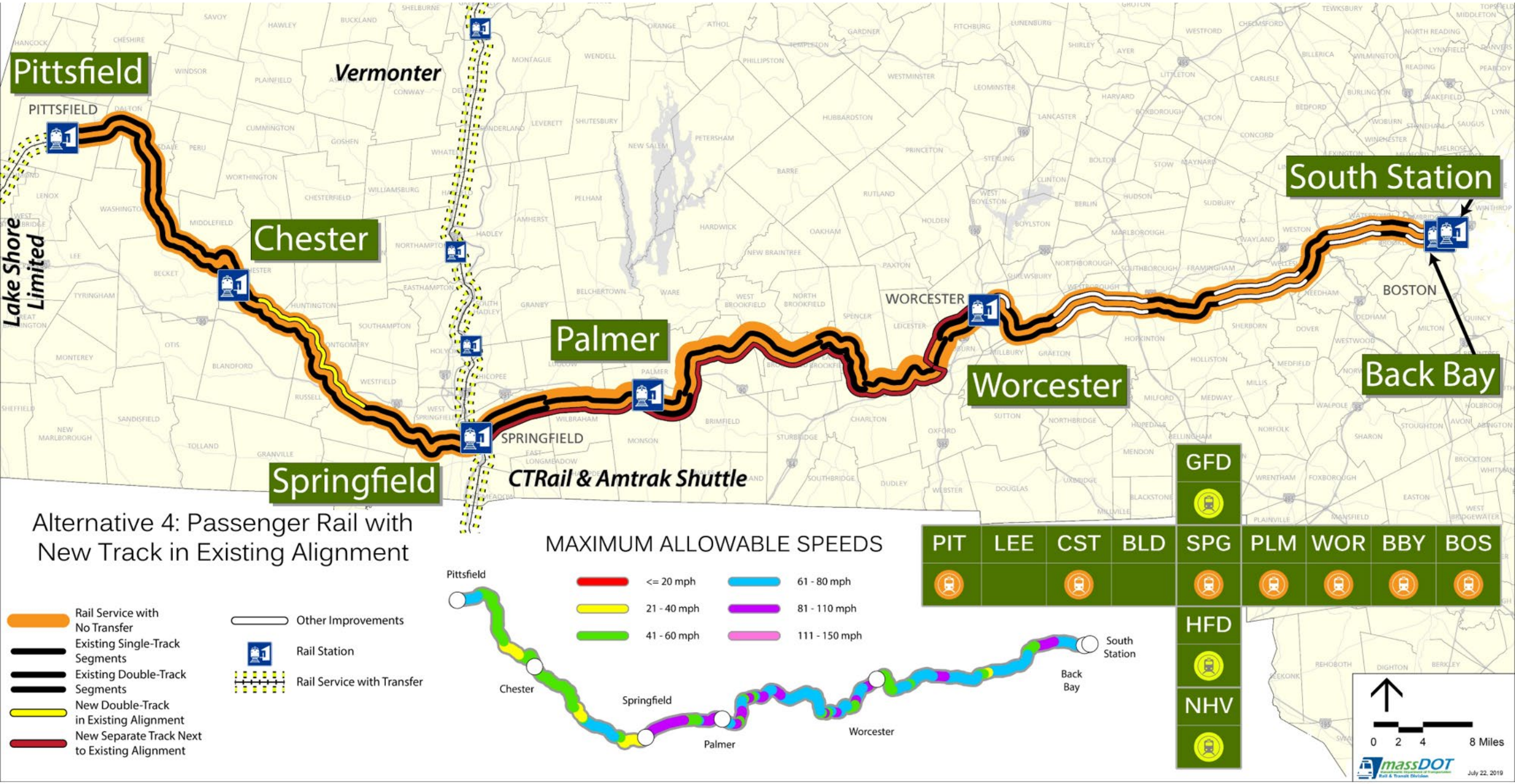
July 22, 2019

Alternative 4 – Boston – Pittsfield Rail Service

- **Shared corridor with new track in existing rail corridor**
  - Up to 10 round trip trains per day on E-W Corridor (PIT – BOS)
- **Infrastructure**
  - WOR – SPG
    - New track infrastructure and signal system
    - New alignment within existing CSX ROW (25' away from existing track)
  - PIT – WOR
    - Restore double-track in missing sections
    - Upgrade tracks and signals
- **Direct rail connections from Boston – Worcester, Palmer, Springfield, Chester, Pittsfield**
- **Maximum speed – 110 mph**
- **Equipment – New diesel-powered trainsets**
- **Travel times:**
  - Springfield – Boston 1:35 – 1:55
  - Pittsfield – Boston 2:35 – 3:05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Back Bay
Alternative 4: Passenger Rail with New Track in Existing Alignment
Rail Service with No Transfer
Existing Single-Track Segments
Existing Double-Track Segments
New Double-Track in Existing Alignment
New Separate Track Next to Existing Alignment
Other Improvements
Rail Station
Rail Service with Transfer
MAXIMUM ALLOWABLE SPEEDS
<= 20 mph
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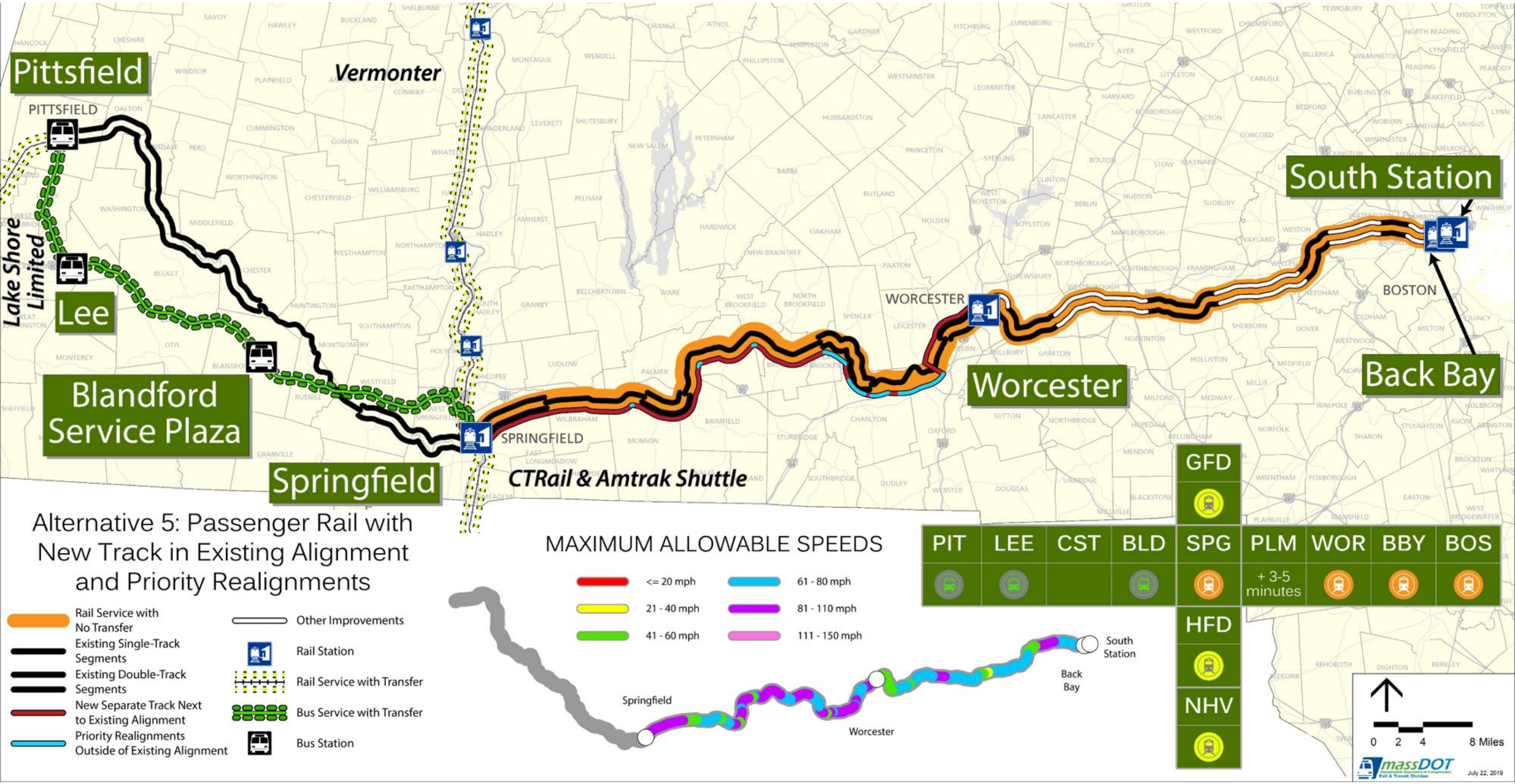
Alternative 5 – New Boston – Springfield Rail Service

- **Shared corridor with new track in existing rail corridor**
  - Up to 10 round trip trains per day on E-W Corridor (SPG – BOS)
- **Infrastructure**
  - New track infrastructure and signal system
  - New alignment mostly within existing CSX ROW (25' away from existing track)
  - Several segments of new track outside CSX ROW – straighter track, higher speeds
- **Direct rail connections from Boston – Worcester, Springfield**
- **Bus-to-rail transfer required – Pittsfield, Lee, Blandford Service Plaza**
- **Maximum speed – 110 mph**
- **Equipment – New diesel-powered trainsets**
- **Travel times:**
  - Springfield – Boston 1:25 – 1:45
  - Pittsfield – Boston 2:35 – 3:05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WORCESTER
Worcester
South Station
BOSTON
Back Bay
Alternative 5: Passenger Rail with New Track in Existing Alignment and Priority Realignments
Rail Service with No Transfer
Existing Single-Track Segments
Existing Double-Track Segments
New Separate Track Next to Existing Alignment
Priority Realignments Outside of Existing Alignment
Other Improvements
Rail Station
Rail Service with Transfer
Bus Service with Transfer
Bus Station
MAXIMUM ALLOWABLE SPEEDS
<= 20 mph
21 - 40 mph
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+ 3-5 minutes
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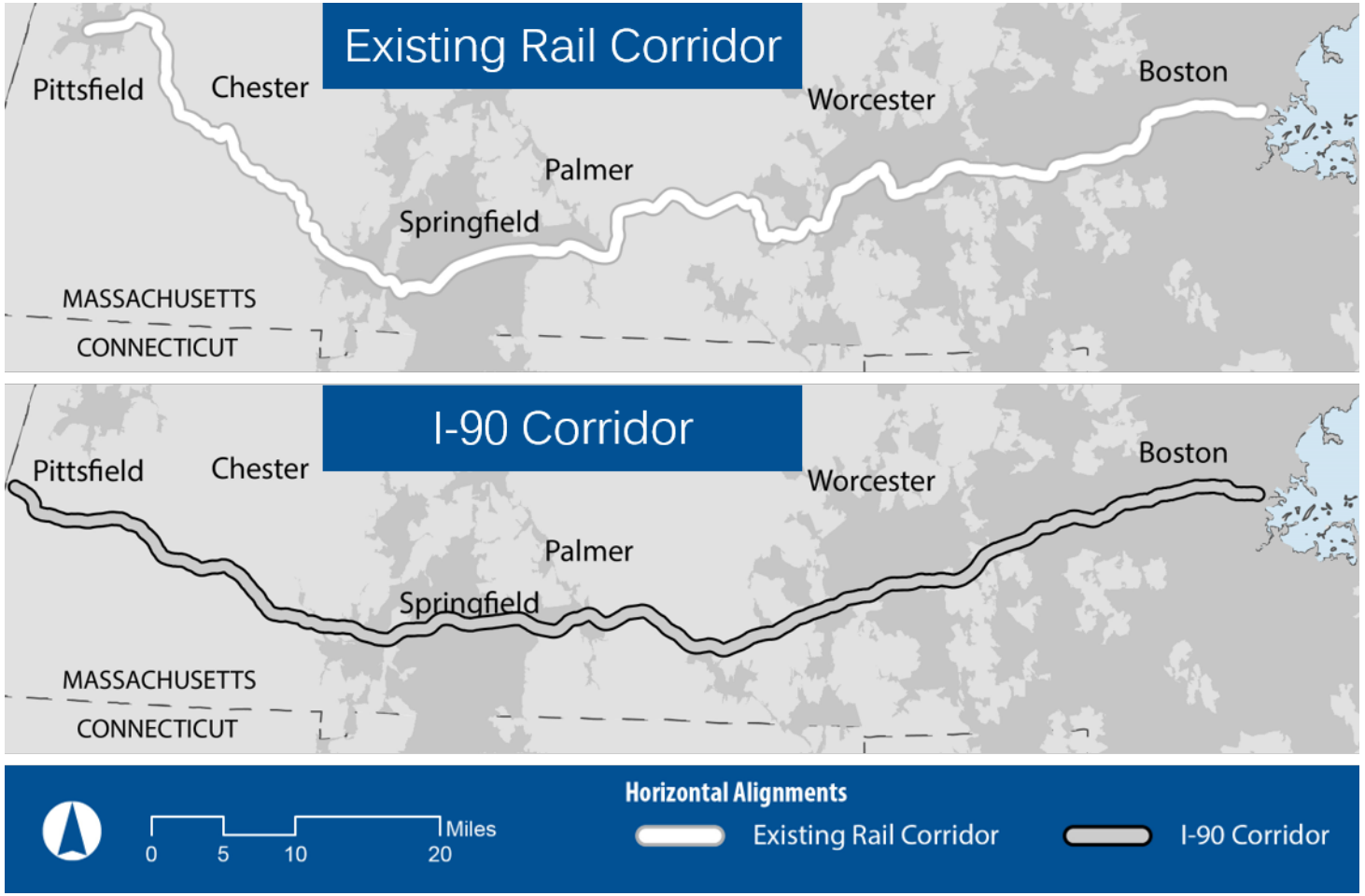
July 22, 2019

Alternative 6 – Boston – Pittsfield Rail Service

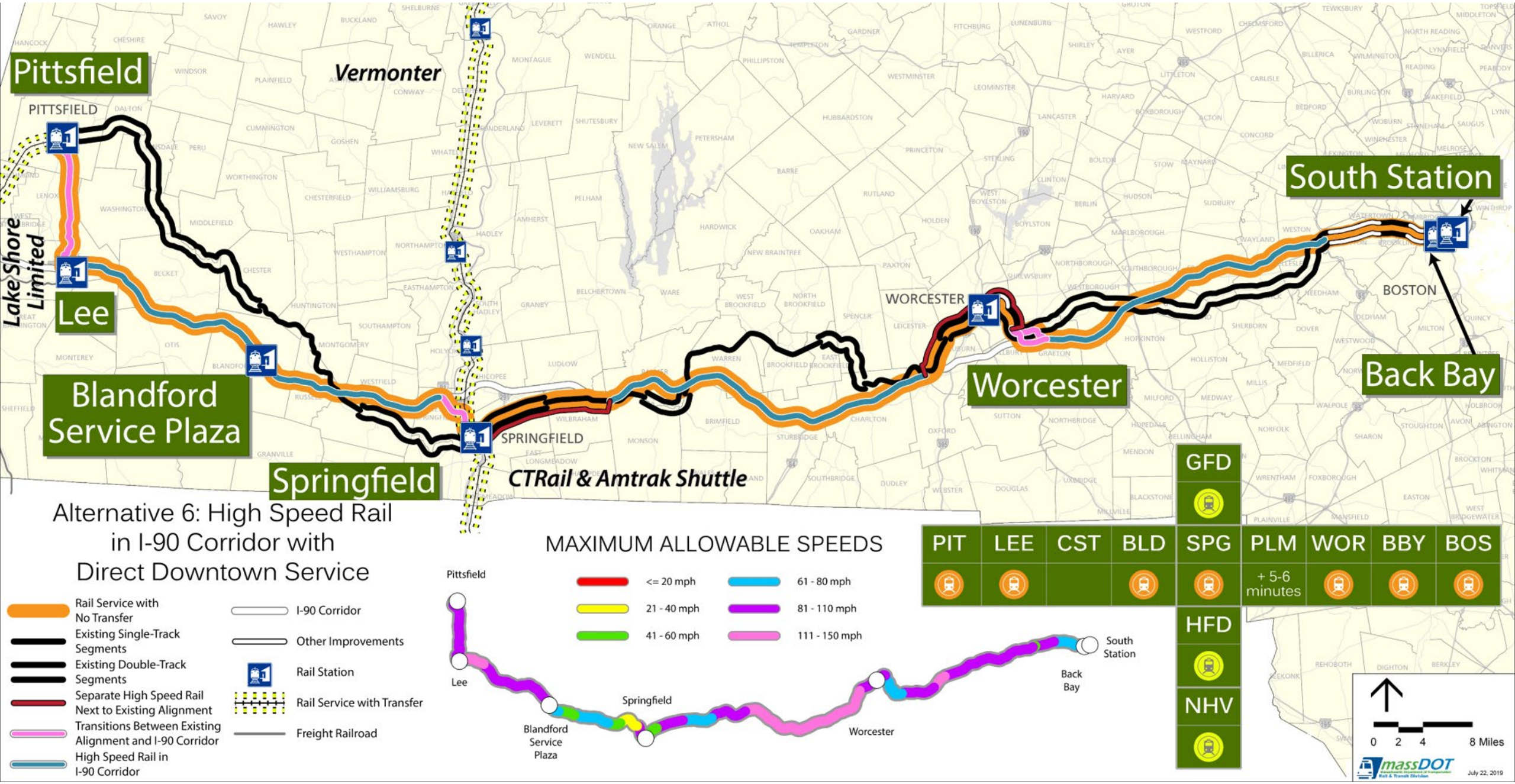
- **Separate corridor with new track in Interstate 90 corridor**
  - Up to 16 round trip trains per day on E-W Corridor (PIT – BOS)
- **Infrastructure**
  - New track infrastructure, signal system
  - New alignment mostly within existing I-90 ROW
  - Electrification of railroad to enable train speeds
  - Use of Housatonic RR corridor for connection from Pittsfield to I-90 corridor
- **Direct rail connections from Boston – Worcester, Palmer, Springfield, Blandford Service Plaza, Lee, Pittsfield**
- **Maximum speed – 150 mph**
- **Travel times:**
  - Springfield – Boston 1:20 – 1:40
  - Pittsfield – Boston 2:10 – 2:40

Alternative 6 – Separate Corridor

Difference in Curvatures between Existing Rail and Highway



- I-90 corridor has significantly fewer curves than existing rail corridor
- I-90 grades are steeper than existing rail corridor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BOSTON
Back Bay
Alternative 6: High Speed Rail in I-90 Corridor with Direct Downtown Service
Rail Service with No Transfer
Existing Single-Track Segments
Existing Double-Track Segments
Separate High Speed Rail Next to Existing Alignment
Transitions Between Existing Alignment and I-90 Corridor
High Speed Rail in I-90 Corridor
I-90 Corridor
Other Improvements
Rail Station
Rail Service with Transfer
Freight Railroad
MAXIMUM ALLOWABLE SPEEDS
<= 20 mph
21 - 40 mph
41 - 60 mph
61 - 80 mph
81 - 110 mph
111 - 150 mph
Pittsfield
Lee
Blandford Service Plaza
Springfield
Worcester
Back Bay
South Station
GFD
PIT
LEE
CST
BLD
SPG
PLM
+ 5-6 minutes
WOR
BBY
BOS
HFD
NHV
0 2 4 8 Miles
massDOT
July 22, 2019

Summary of Preliminary Alternatives

Corridor Type	Alternative	Frequency	Transfers for Pittsfield	Transfers for Springfield	Transfers for CTRail and Vermonter	Travel Time BOS-SPG	Travel Time BOS-PIT	Max Speed (mph)	Rail Stations Served
Shared Rail Corridor -- Existing Rail Alignment	No Build (Existing infrastructure, service)	1	Direct Rail (no transfer)	Direct Rail (no transfer)	Rail Transfer at SPG	2:05 – 2:30	3:15 – 3:50	80 mph	Pittsfield, Springfield, Worcester, Framingham, Back Bay, Boston
Shared Rail Corridor -- Existing Rail Alignment	Alt. 1 – WOR – SPG, Upgraded Track	up to 6	Bus Transfer at SPG	Rail Transfer at WOR	Rail Transfer at SPG	2:05 – 2:50	3:15 – 4:10	80 mph	SPG, PLM, WOR, BBY, BOS
Shared Rail Corridor -- Existing Rail Alignment	Alt. 2 – BOS – WOR, Upgraded Track	up to 6	Bus Transfer at SPG	Direct Rail (no transfer)	Rail Transfer at SPG	1:55 – 2:20	3:05 – 3:40	80 mph	SPG, PLM, WOR, BBY, BOS
Shared Rail Corridor -- Existing Rail Alignment	Alt 3 – BOS – PIT, Upgraded Track & Alignment	up to 6	Direct Rail (no transfer)	Direct Rail (no transfer)	Rail Transfer at SPG	1:40 – 2:00	2:40 – 3:10	90 mph	PIT, CST, SPG, PLM, WOR, BBY, BOS
Shared Rail Corridor – New Track in Existing Rail Corridor	Alt. 4 – BOS – PIT, New Track in Existing Rail Corridor	up to 10	Direct Rail (no transfer)	Direct Rail (no transfer)	Rail Transfer at SPG	1:35 – 1:55	2:35 – 3:05	110 mph	PIT, CST, SPG, PLM, WOR, BBY, BOS
Shared Rail Corridor – New Track in Existing Rail Corridor	Alt. 5 – BOS – SPG, New Track in Existing Rail Corridor, w/ Realignments	up to 10	Bus Transfer at SPG	Direct Rail (no transfer)	Rail Transfer at SPG	1:25 – 1:45	2:35 – 3:05	110 mph	SPG, WOR, BBY, BOS
Separate Corridor (I-90)	Alt. 6 – BOS – PIT, New High Speed Rail Line in I-90 Corridor	up to 16	Direct Rail (no transfer)	Direct Rail (no transfer)	Rail Transfer at SPG	1:20 – 1:40	2:10 – 2:40	150 mph	PIT, LEE, BLD, SPG, WOR, BBY, BOS

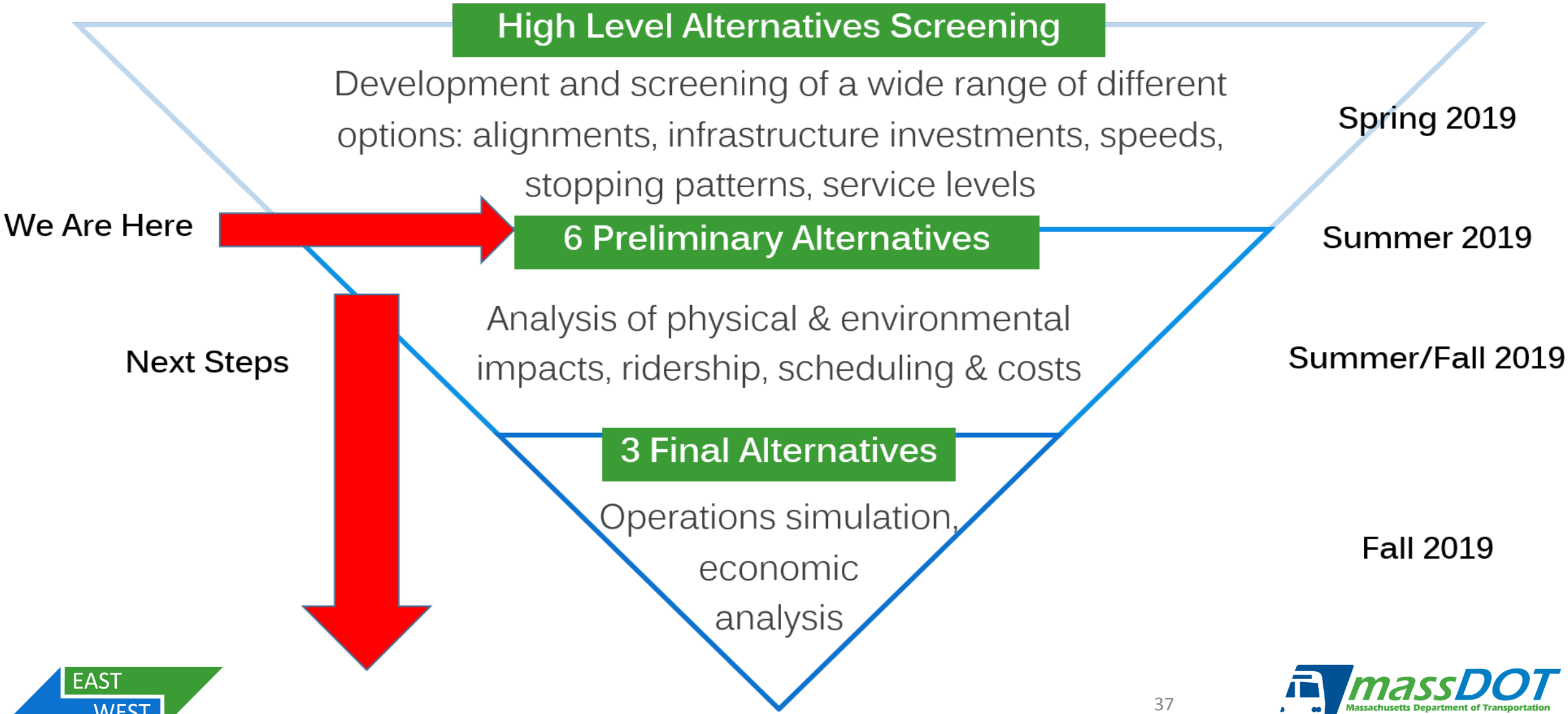
All Time, Speed, Frequency and Station Stops are approximate, pending detailed analysis

Next Steps

Preliminary Alternatives Analysis: Benefits, Impacts, Costs, and Tradeoffs

Project Schedule

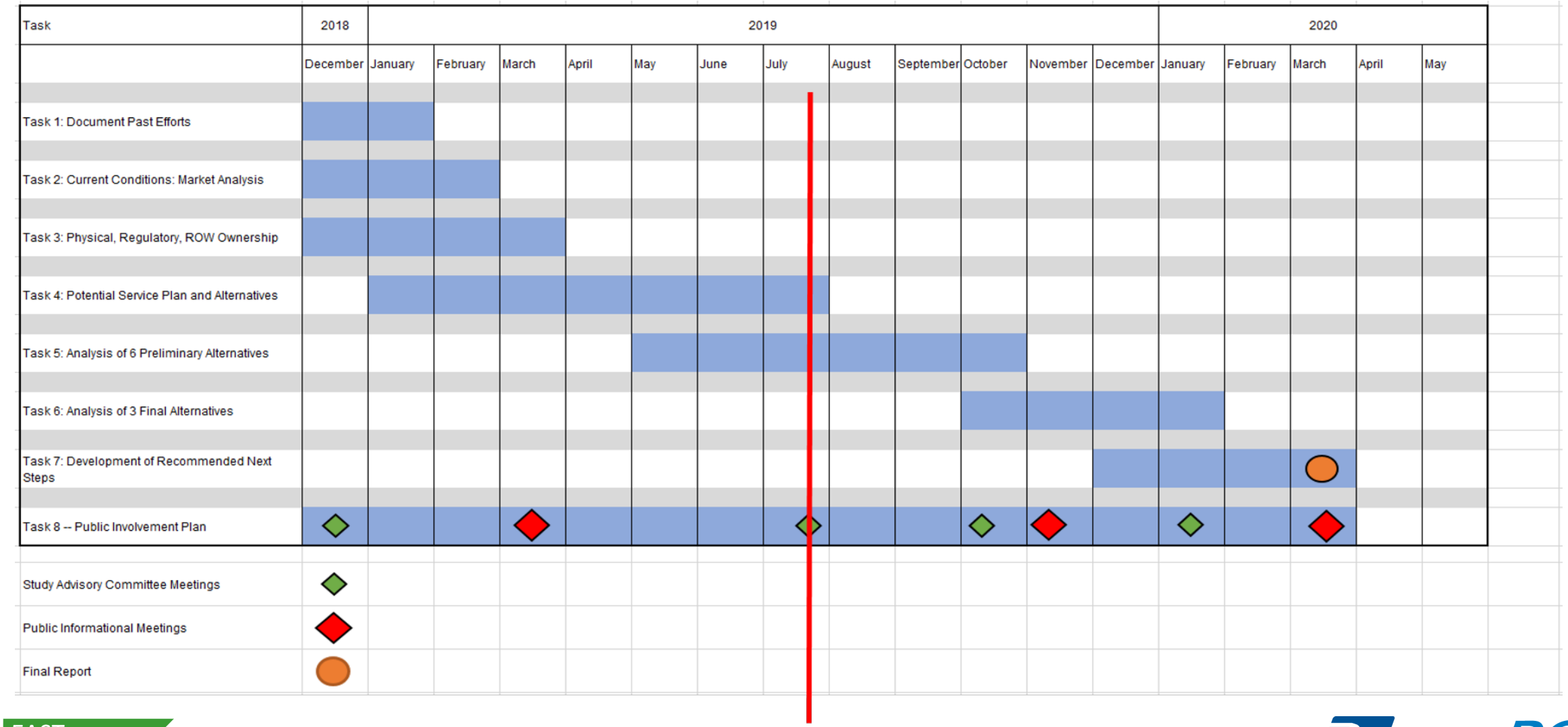
Alternatives Development & Analysis Process



Analysis of the 6 Preliminary Alternatives

- **Ridership**
  - Computer model
  - Based on demographics (residents & jobs) and key service parameters (speed, frequency, stations served, and direct service v. transfers)
- **Physical impacts**
  - Property impacts
  - Wetlands and natural resources impacts
  - Surrounding infrastructure – bridges, roads, utilities
- **Environmental and community impacts**
  - Permitting
  - Noise
  - Air quality
  - Additional impacts
- **Cost**
  - Capital costs – railroad construction, surrounding infrastructure, trains
  - Operating & maintenance

Study Schedule



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