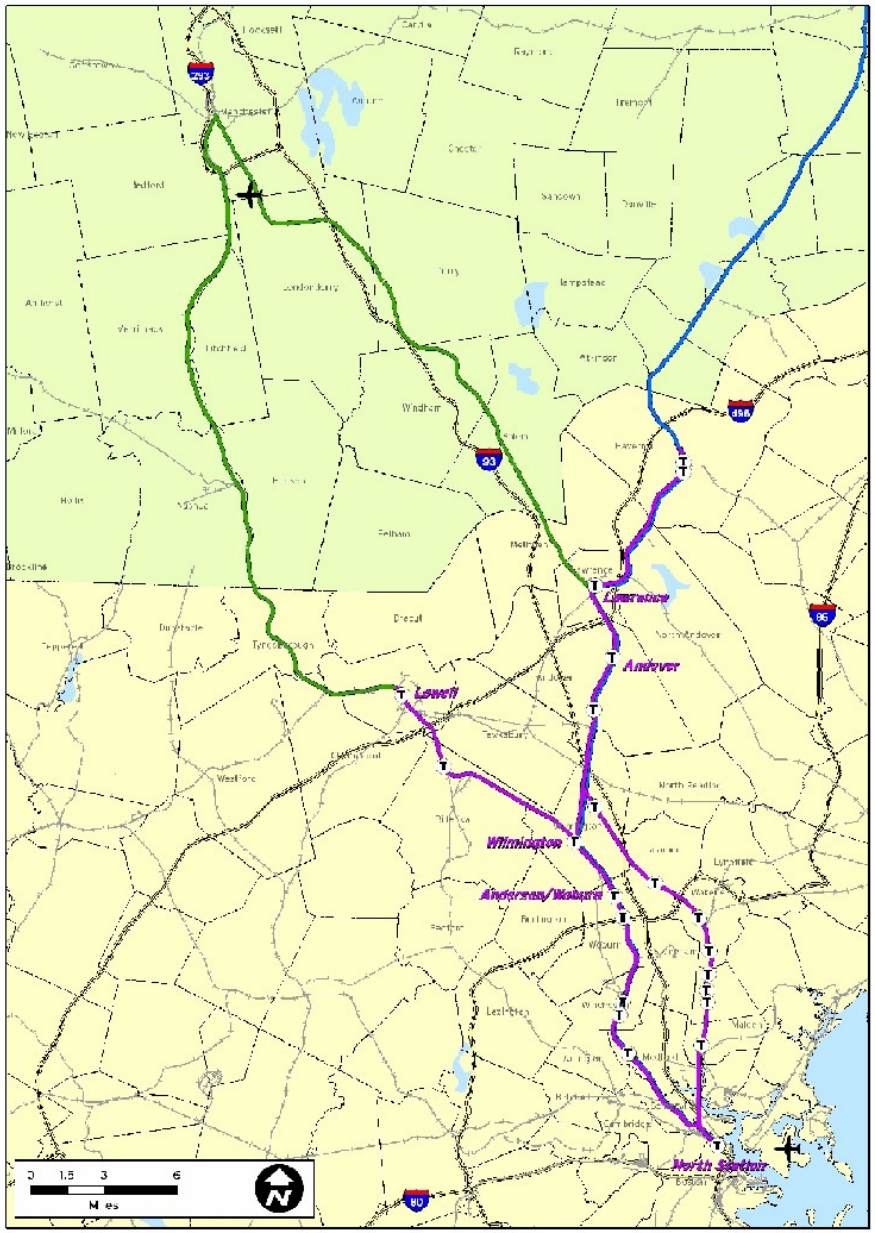
Manchester to Boston I-93 Transit Investment Study

Tier 1 Alternatives Analysis



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Summary and Agenda

- Fifteen conceptual alternatives
- Baseline alternative
- Eight Tier 1 alternatives
- Suburban transit connectivity
- Alternative analysis next steps
- Recommended evaluation criteria

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Fifteen Conceptual Alternatives

- Three Alignments
  - East
  - Highway
  - West
- Two Modes
  - Commuter Rail (possibly self powered cars)
  - Bus Rapid Transit (or express bus)

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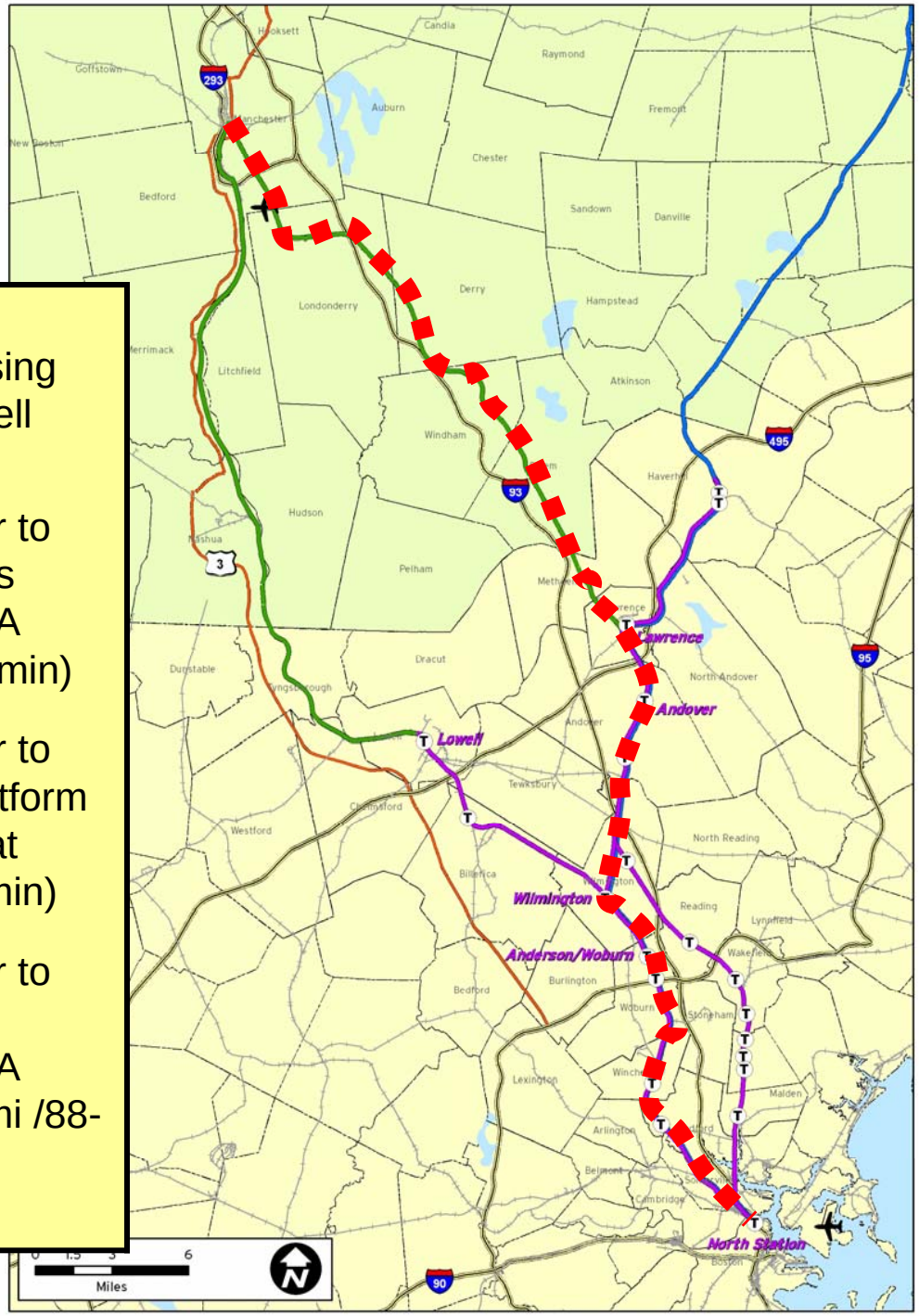
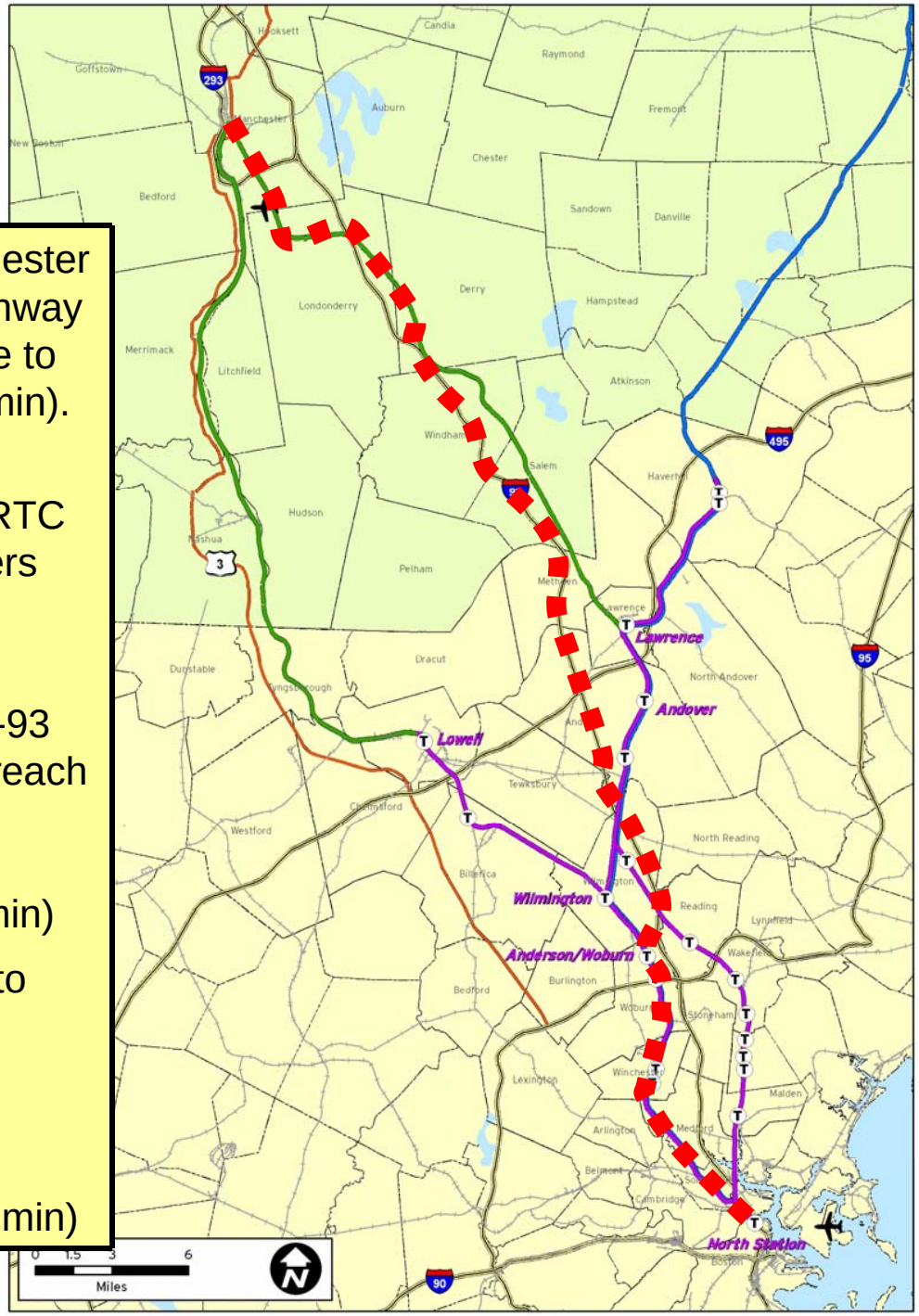
Eastern Alignment
(Rail Alternative)

E1	**Boston Service**	Direct service from Manchester to Boston using Wildcat Branch and Lowell Line. (50 mi /78 min)
E2	**Anderson Service**	Service from Manchester to Anderson RTC with cross platform transfer to MBTA Lowell trains. (51 mi /83 min)
E3	**Andover Service**	Service from Manchester to Andover with a cross platform transfer to MBTA trains at Andover. (53 mi /85-97 min)
E4	**Lawrence Service**	Service from Manchester to Lawrence with a cross platform transfer to MBTA trains at Lawrence. (54 mi /88-100 min)



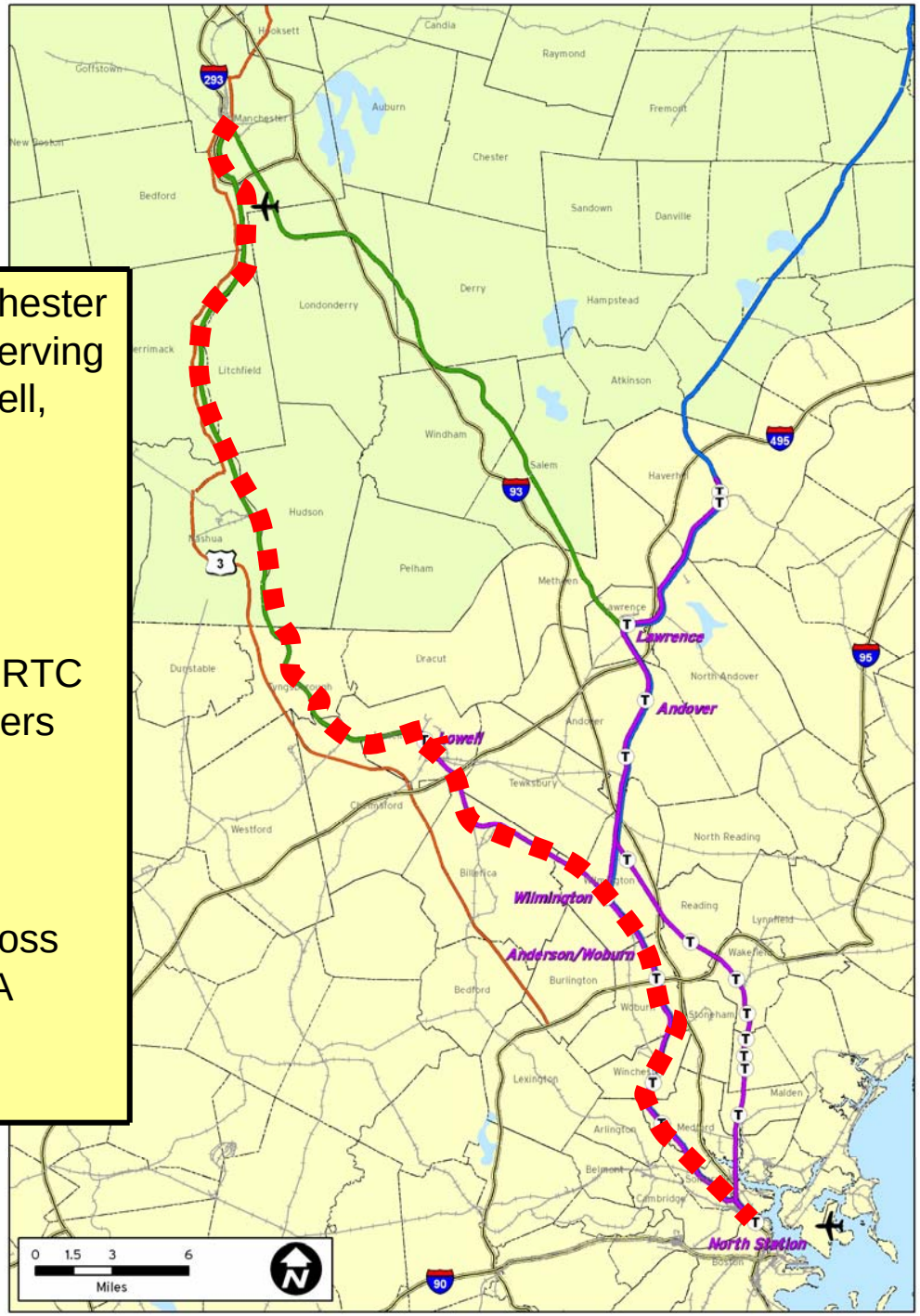
I-93 Alignment
(Rail Alternative)

H1	**Boston Service**	Direct service from Manchester to Anderson using the highway ROW and then Lowell Line to North Station. (56 mi /80 min).
H2	**Anderson Service**	Connecting service from Manchester to Anderson RTC with cross platform transfers possible. (56 mi /85 min)
H3	**Andover Service**	Connecting service from Manchester to Salem on I-93 before accessing M&L to reach Andover. Cross platform transfer to MBTA trains at Andover. (57 mi /94-106 min)
H4	**Lawrence Service**	Service from Manchester to Salem on I-93 before accessing M&L to reach Lawrence. Cross platform transfer to MBTA trains at Lawrence. (59 mi /99-111 min)



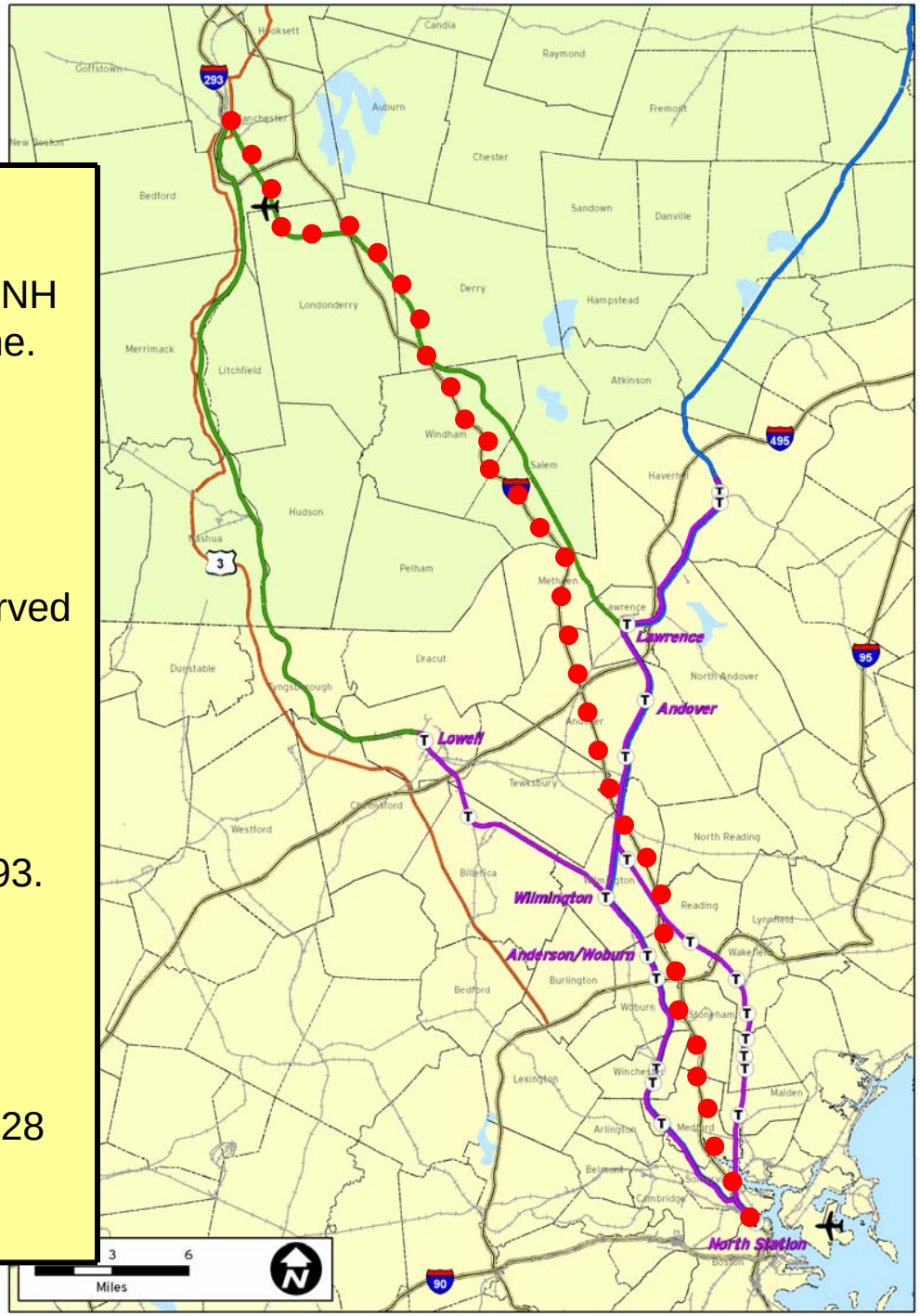
Western Alignment
(Rail Alternative)

W1	**Boston Service**	Direct service from Manchester to Boston using NHML, serving Merrimack, Nashua, Lowell, and Anderson stations (56 mi /75 min).
W2	**Anderson Service**	Connecting service from Manchester to Anderson RTC with cross platform transfers possible. (56 mi /80 min)
W3	**Lowell Service**	Connecting service from Manchester to Lowell. Cross platform transfer to MBTA trains at Lowell. (56 mi /84-91 min)



Bus Rapid Transit

B1A	**I-93 Alignment: Transit ROW**	Direct service from Manchester to Boston using I-93 on reserved NH transit ROW to state line. (56 mi /80 min).
B1B	**I-93 Alignment: No Transit ROW**	Direct service from Manchester to Boston using I-93 without reserved NH transit ROW. (56 mi /95 min).
B2	**Eastern Alignment**	Direct service from Manchester to Boston using M&L Branch + I-93. (56 mi /65 min).
B3	**Western Alignment**	Direct service from Manchester to Boston using Route 3, Route 128 and I-93 (61 mi /105 min).



Baseline (TSM)
Current Conditions

- Improved bus service from Exit 4 (Derry)
- Planned services from Exit 5 (Londonderry) and Exit 2 (Salem) commencing in 2008
  - Up to 46 weekday trips from each location
  - Half hourly peak service
  - Hourly off-peak service
  - Could offer combined service in off-peak
- NHDOT has committed to purchasing 14 commuter coaches

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Preliminary Evaluation Criteria

- Impact on I-93 Travel Demand
- Overall Travel Demand Potential
- Service Attributes and Connectivity
- Overall Feasibility
  - Operational
  - Physical
  - Institutional
- Order of Magnitude Capital Cost

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Evaluation Results

Screening 15 alternatives to 8

- Western Alignment eliminated from analysis
  - Minimal benefit for I-93 highway travel demand
  - Project of independent utility
  - Few physical obstacles to implementation

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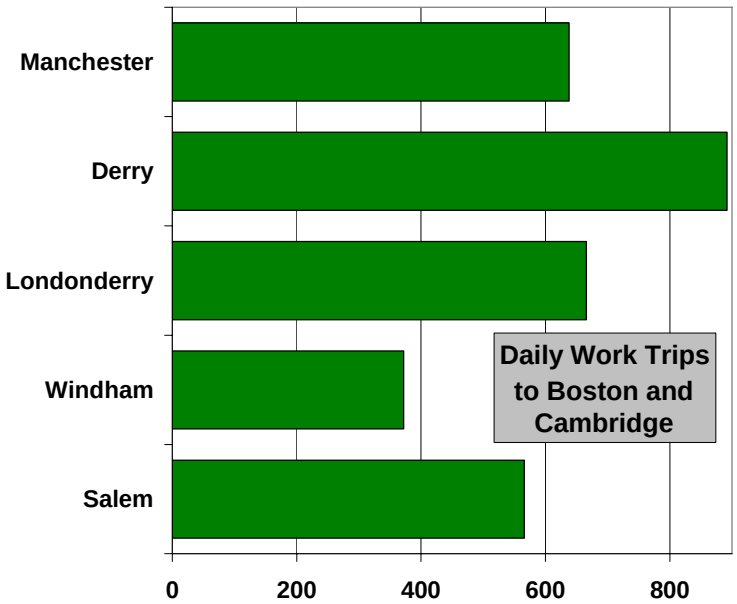
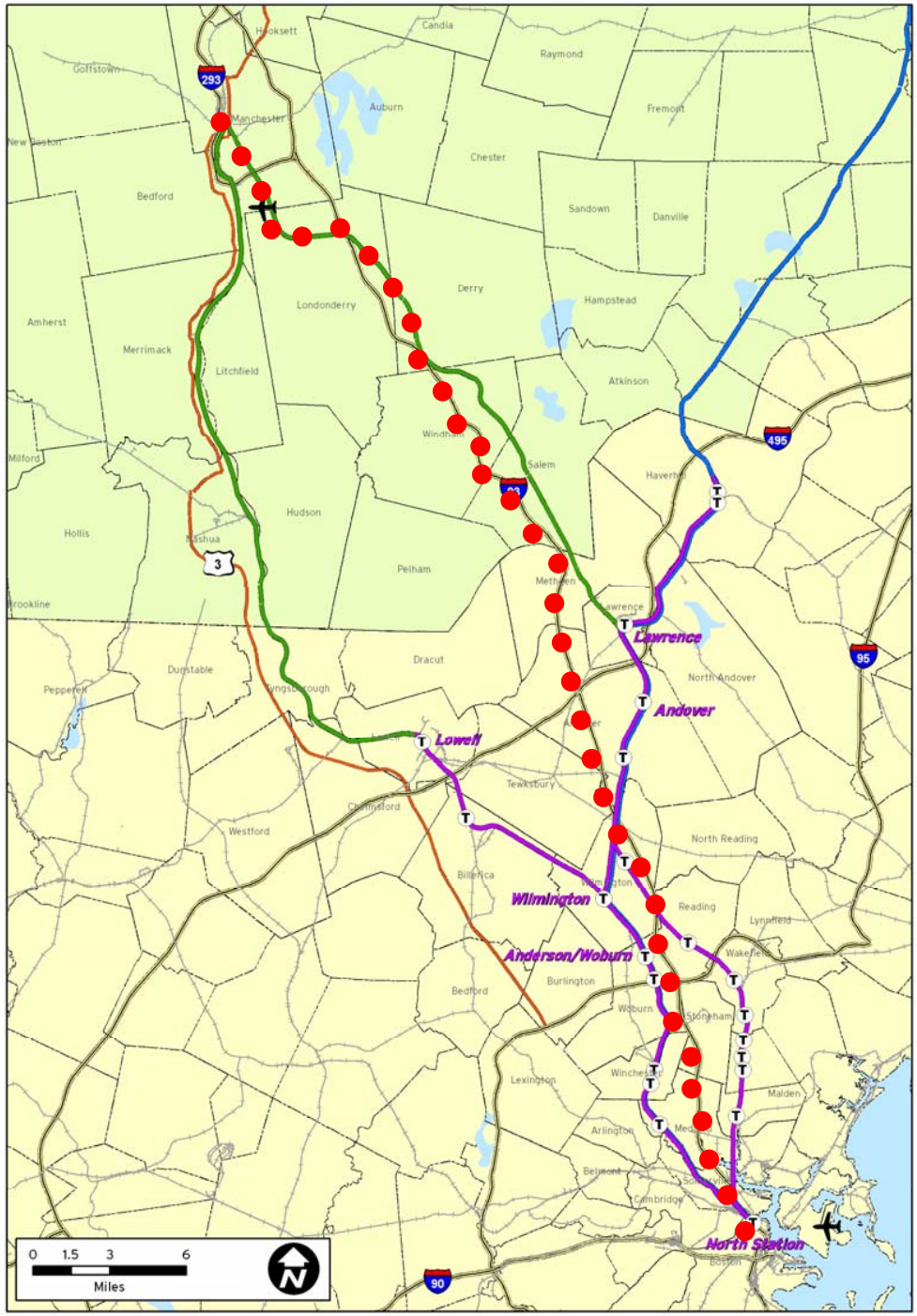
Western Alignment is remote from I-93

Direct shared travel market shared by the Western and Eastern Alignments is small





Evaluation Results

Screening 15 alternatives to 8

- Rail alternatives shortened from Manchester CBD
  - High capital cost to restore ROW across airport
  - Airport service options to be examined
- Eliminate Andover and Lawrence terminal options
  - Lawrence poor operational feasibility
  - Andover weaker service characteristics and connectivity compared with Anderson

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Eight Tier 1 Alternatives

- Rail Alternatives
  - Two Eastern Alignment
  - Two I-93 Alignment
- Bus Alternatives
  - Two Shoulder Alternatives
  - Two Dedicated Lane Alternatives

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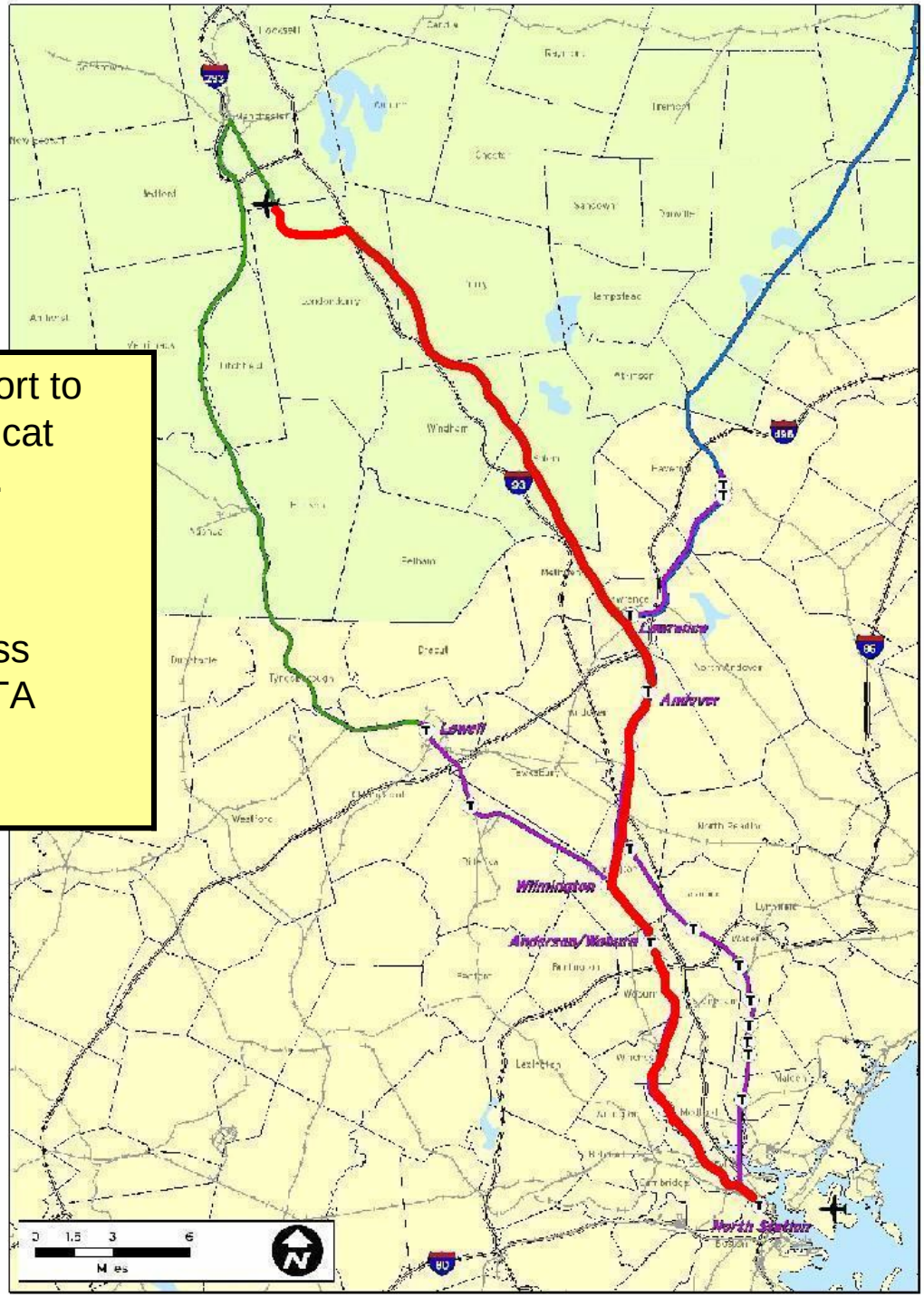
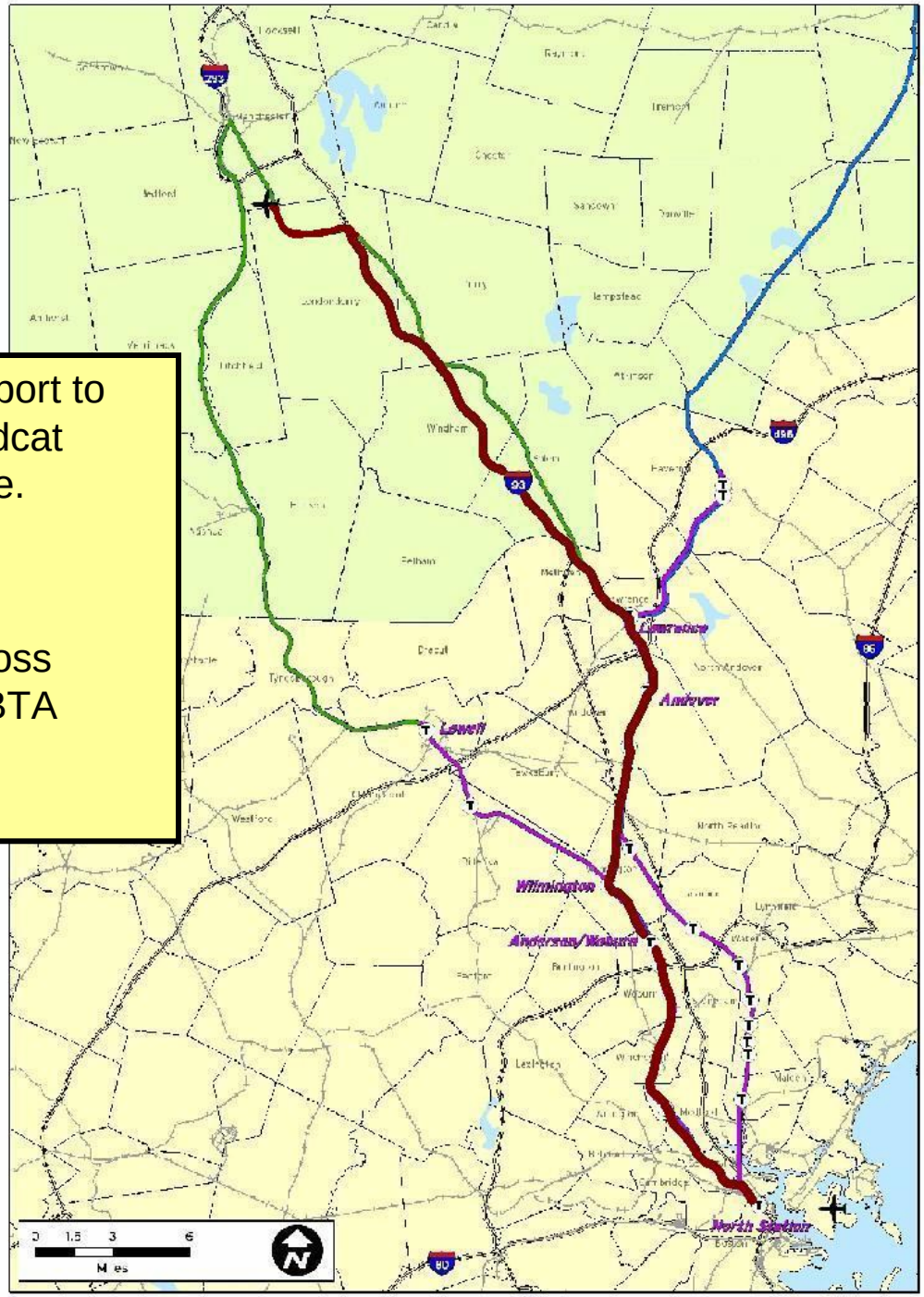
Tier 1: Eastern Rail Alignment

ER1	**Boston Service**	Direct service from Airport to Boston using M&L, Wildcat Branch and Lowell Line. (50 mi /76 min)
ER2	**Anderson Service**	Service from Airport to Anderson RTC with cross platform transfer to MBTA Lowell trains. (50 mi /87 min)



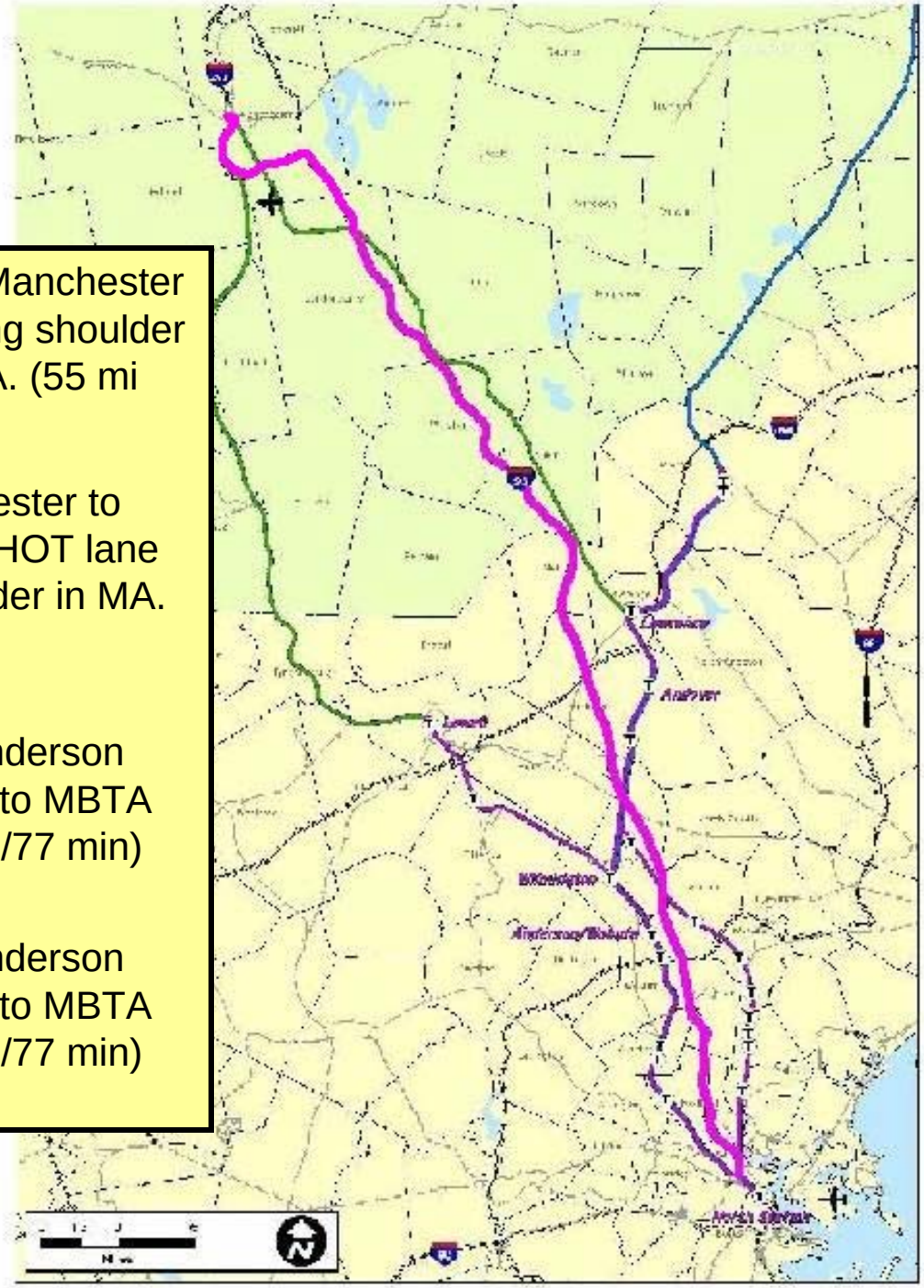
Tier 1: I-93 Rail Alignment

HR1	**Boston Service**	Direct service from Airport to Boston using I-93, Wildcat Branch and Lowell Line. (50 mi /76 min)
HR2	**Anderson Service**	Service from Airport to Anderson RTC with cross platform transfer to MBTA Lowell trains. (50 mi /87 min)



Tier 1: I-93 Bus Alternatives

HB1	**Boston Service**	Direct service from Manchester to South Station using shoulder of I-93 in NH and MA. (55 mi /65 min)
HB2	**Boston Service**	Service from Manchester to South Station using HOT lane on I-93 in NH, shoulder in MA. (55 mi /65 min)
HB3	**Anderson Service**	HB1 shortened to Anderson with transfer offered to MBTA Lowell trains. (55 mi /77 min)
HB4	**Anderson Service**	HB2 shortened to Anderson with transfer offered to MBTA Lowell trains. (55 mi /77 min)



FAQ on Bus Alternatives

Additional information on bus technologies and strategies

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About Bus Bypass Shoulder (BBS) Operations

- Transit vehicles use highway shoulders to bypass congestion
  - Queue jumper
  - Longer travel corridors
- Increased reliability and travel time savings for transit service

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Examples of BBS Operations

- Twin Cities, MN
  - 230 miles of shoulders
  - Buses travel at up to 35mph
  - Use of shoulders is by driver discretion
- Ottawa, CAN
  - 12 miles of highway shoulders in Transitway
  - Buses travel at posted speed limit (62mph)
- No serious safety concerns
  - MN experiences 20 annual minor accidents over 230 miles of highway

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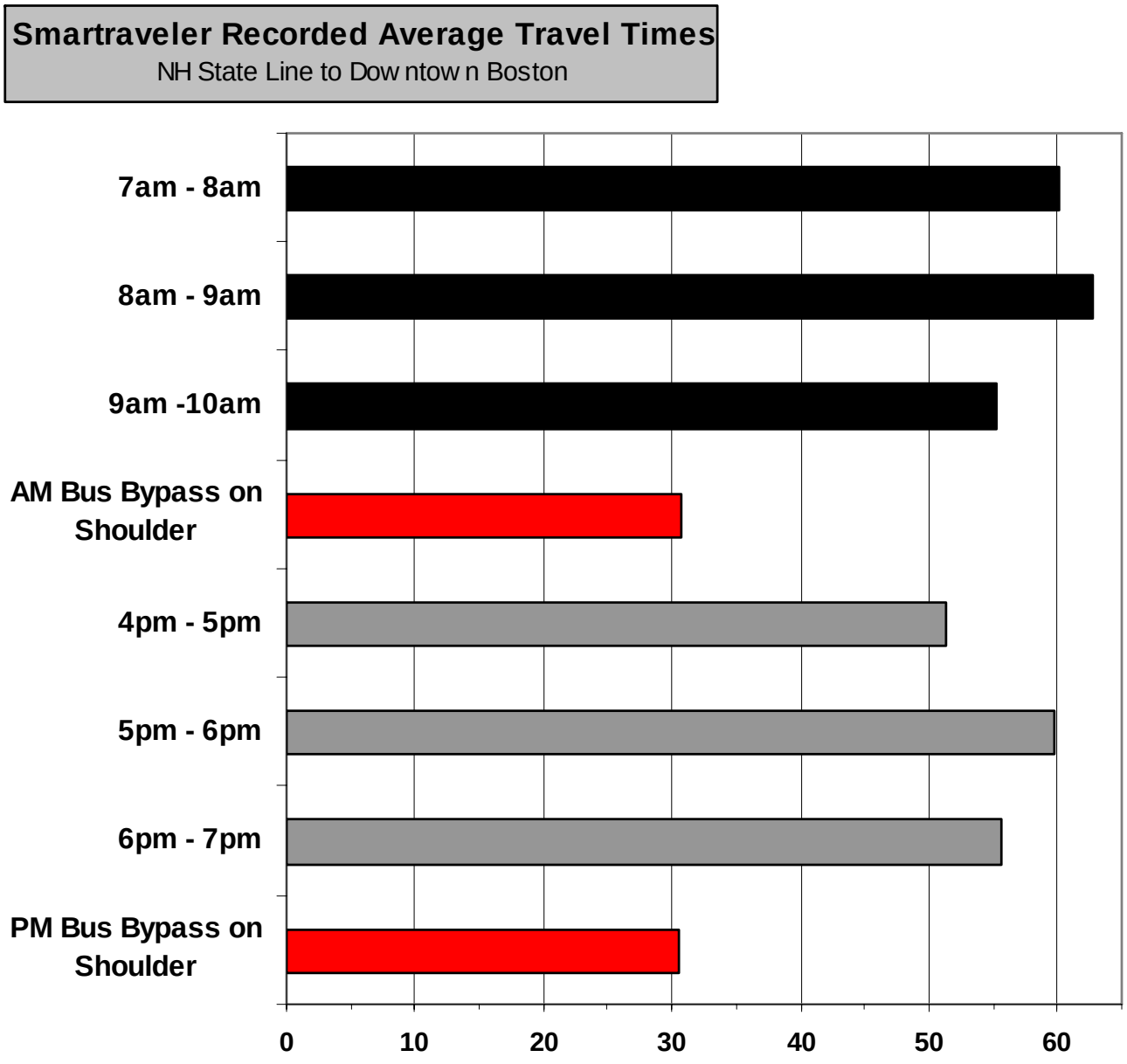

Bus Bypass On Shoulder would offer dramatic bus time savings over operations in general travel lanes.

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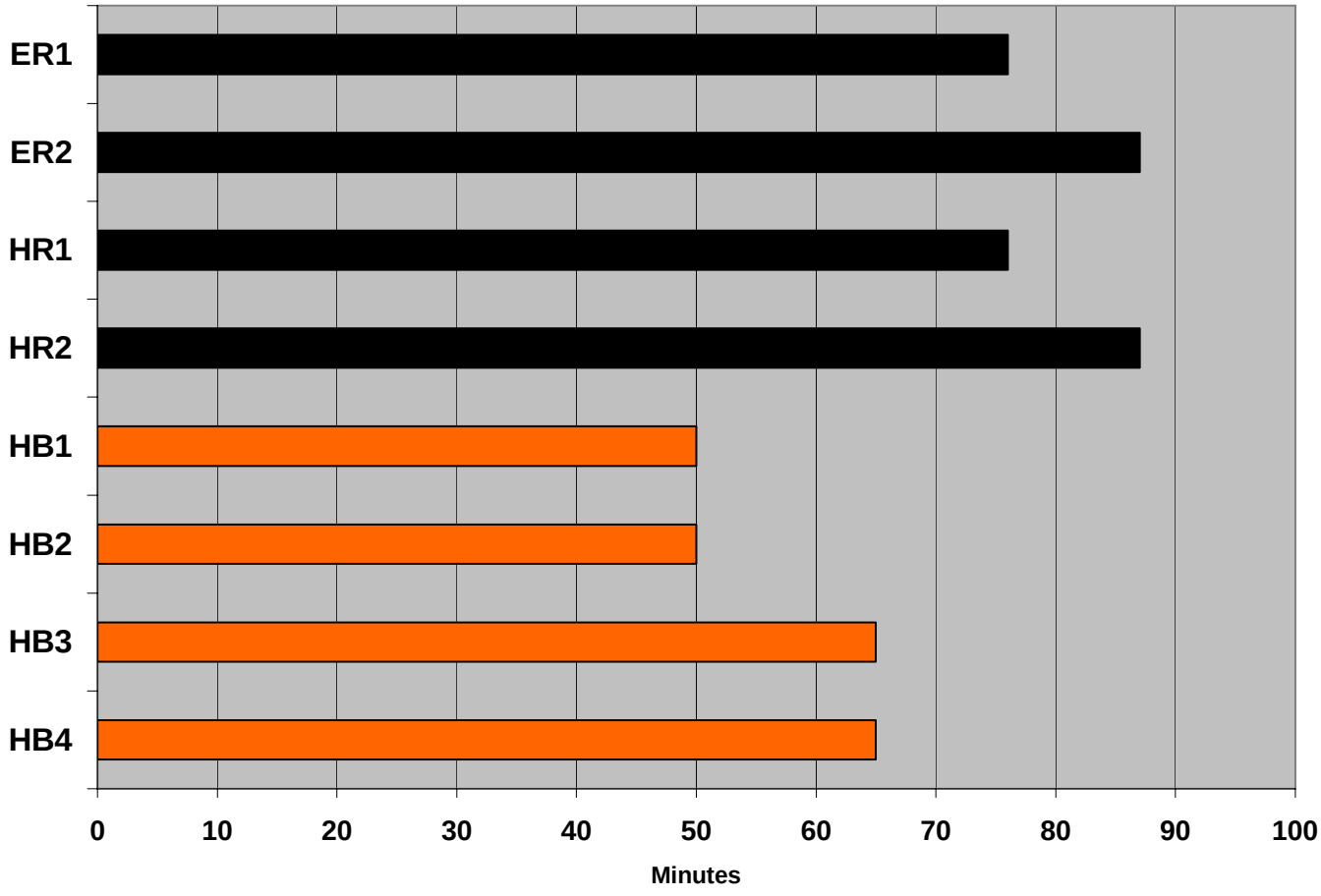
Comparison of Travel Times
I-93 Exit 5 to Boston

- ER1 and HR1 **seven stops** en route
- ER2 and HR2 **ten stops** en route
- HB1 and HB2 **non stop** to South Station
- HB3 and HB4 up to **three** stops between Anderson and Boston



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What is a HOT Lane?

- High Occupancy Toll (HOT) Lane combines
  - Small or no fare for High Occupancy Vehicles (HOV)
  - Tolls for single occupancy vehicles
- Price of toll is managed to ensure free flow of traffic in lane at all times
- Reliable travel time for transit vehicles and drivers willing to pay premium

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Advantages of HOT Lanes

- Generates revenue for transportation needs
- Improves efficiency of HOV facilities
- Expands mobility options in congested corridors
- Travel time savings and reduction in vehicle hours traveled
- Increased trip time reliability

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Examples of HOT Lanes

- SR91 Express Lanes in Orange County, CA
  - 4 new 10 mile long lanes built in median
  - Value pricing
  - Privately owned and operated since 1995
- I-15 in San Diego, CA
  - 8 miles of former HOV lane
  - FasTrak opened in December 1996
  - Toll varies based on congestion
- I-10 in Houston, TX
  - 13 mile former reversible HOV lane
  - Project QuickRide operations started in 1998

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Suburban Transit Connectivity

- Demand for destinations other than Boston will be evaluated
- Transit connection would offer free shuttle serving all employment within 3 mile radius of transit station
- Alternatives will be modeled with and without a transit connection to respond to travel market

Alternative Analysis Next Steps

- Develop detailed operating plans for Tier 1 alternatives
- Identify stations and park-and-ride locations
- Finalize evaluation measures for Tier 2 evaluation
- Employ evaluation measures
  - Reduce Eight Tier 1 alternatives to Four Tier 2 alternatives +TSM
- Present findings to Stakeholders
- Prepare full evaluation of Tier 2 alternatives (ridership, costs, etc.)

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Evaluation Criteria

Screening 8 alternatives to 4

- Capital cost
- Ridership forecasts
- Impact on I-93 travel conditions
- User benefits (travel time/cost savings)
- Mode shift
- Land use/ development impacts
- Environmental impacts
- Public support

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