FOCUS 40

The 2040 Investment Plan for the MBTA

STATE OF THE SYSTEM REPORT: COMMUTER RAIL

December 2015

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ABOUT THE STATE OF THE SYSTEM REPORTS

These State of the System reports lay the foundation for the development of *Focus40*, a financially responsible 25-year capital plan for the MBTA, to be released in 2016. Planning for the future requires a clear understanding of the present. These reports describe that present: the condition, use, and performance of the MBTA bus, rapid transit, commuter rail, ferry, and paratransit systems. In addition, these reports describe how asset condition and age influence service performance and customer experience.

The next phase of *Focus40* will consider how a range of factors – including technological innovation, demographic shifts, and climate change – will require the MBTA to operate differently in 2040 than it does today. With the benefit of the information provided in these State of the Systems reports, the *Focus40* team will work with the general public and transportation stakeholders to develop and evaluate various strategies for investing in and improving the MBTA system in order to prepare it for the future.

SUMMARY OF STATE OF THE SYSTEM: COMMUTER RAIL

The MBTA Commuter Rail system is currently operated by an outside contractor, Keolis Commuter Services. Together, Keolis and the MBTA are taking steps to resolve delays and other operational problems that were exacerbated during the winter of 2015. But aging track and signal infrastructure and inadequate maintenance and layover facilities limit current capacity and future growth.

COMMUTER RAIL OVERVIEW

The Commuter Rail system primarily serves Boston's geographically dispersed suburbs and outlying urban centers, by connecting them to downtown Boston.

OVERVIEW OF MBTA COMMUTER RAIL SYSTEM

The MBTA service area is comprised of 175 cities and towns. Some of those municipalities host MBTA stations; others are neighboring cities and towns. Commuter rail is the only MBTA mode that serves most of these communities. While representing approximately 10% of MBTA trips, the commuter rail mode is responsible for nearly 30% of fare revenues, 26% of the system's operation budget, and 40% of total passenger miles.

Unlike most MBTA bus service and rapid transit, the MBTA commuter rail is operated by an outside contractor. In March 2014, MBTA awarded an eight-year, $2.6 billion contract to Keolis Commuter Services to operate its commuter rail service. Keolis is responsible for providing the staff to run commuter rail service, maintaining on-time performance, station and train cleanliness, and performing routine inspections and maintenance.

MBTA Annual Metrics by Mode - 2013

	Operating Expenses (%)	Fare Revenues (%)	Passenger Miles (%)	Passenger Trips (%)
Bus	29.8	17.8	15.4	29.8
Commuter Rail	**26.4**	**29.9**	**40.4**	**8.9**
Rapid Transit	35.1	49.9	42.8	60.4
Ferry	0.8	1.1	0.6	0.3
Paratransit	7.9	1.3	0.8	0.5

Source: 2013 NTD Transit Profile

SERVICE MAP

The MBTA operates commuter rail service in two geographic sections:

North Side – 4 lines, 57 stations, and 160 route miles

Includes the Fitchburg, Haverhill, Lowell, and Newburyport/Rockport lines that operate out of North Station.

South Side – 9 lines, 81 stations, and 233 route miles

Includes the Fairmount, Framingham/Worcester, Franklin, Greenbush, Kingston/Plymouth, Middleborough/Lakeville, Needham, Providence, and Stoughton lines that operate out of South Station.

RIDERSHIP

Commuter rail ridership estimates have been based on counts by conductors or partner agencies, which may not be fully reliable due to the challenges in making consistent observations in multiple coaches during rush hour conditions and balancing fare collection responsibilities with ridership counts. MassDOT is soliciting bids for an Automated Passenger Count (APC) system to improve ridership data.

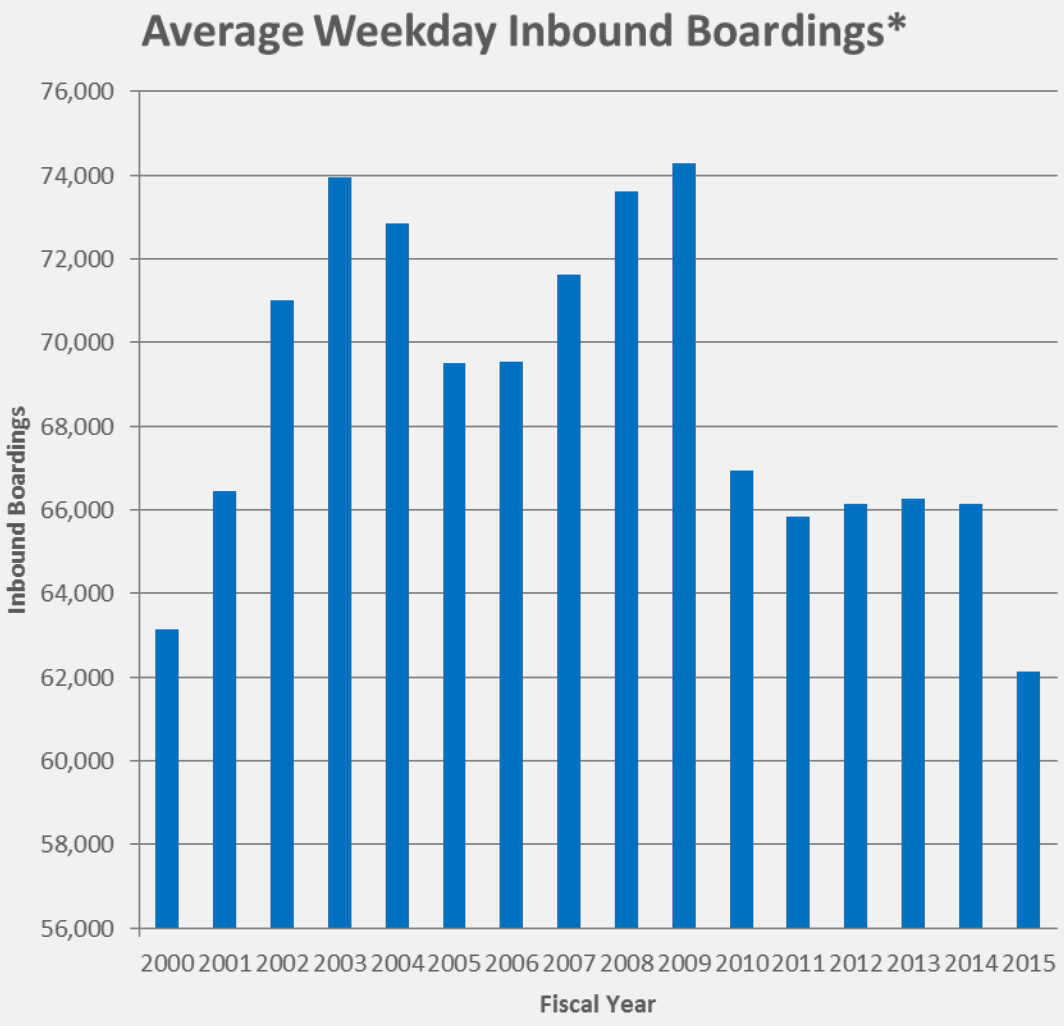
Based on current estimates, MBTA commuter rail ridership is the sixth highest in the United States:

- **Estimated 121,700 riders per average weekday FY2015 (inbound + outbound boardings)**
  - 22,900 per Saturday
  - 17,400 per Sunday

- **North Side Ridership = 46,100 per weekday**
- **South Side Ridership = 75,600 per weekday**

Source: MBTA; Note: Ridership figures are FY2015 rounded to nearest 100

RIDERSHIP: INBOUND BOARDINGS



- Although available data suggests ridership has been stagnant or declining, the MBTA is not confident in the systems used to measure ridership (both historically and currently) for reasons discussed on the previous page. The MBTA is working to develop a better way to count commuter rail ridership.
- Commuter rail revenue is on the rise and customer concerns about crowding are frequent, suggesting that ridership declines may be overstated.

*Inbound boardings is the measure of ridership for this longitudinal chart as that was the only type of data collected prior to 2009.

Source: MBTA

COMMUTER RAIL RIDERSHIP* BY LINE

FY2015 Annual Average

COMMUTER RAIL LINE	WEEKDAY RIDERSHIP	SATURDAY RIDERSHIP	SUNDAY RIDERSHIP
Providence	17,240	3,381	2,125
Framingham/Worcester	14,617	2,721	2,194
Franklin	11,719	1,503	1,139
Lowell	11,485	3,515	2,423
Newburyport	9,492	2,870	2,301
Fitchburg	9,325	1,139	955
Haverhill	9,314	2,456	2,270
Middleborough	6,630	1,143	1,125
Rockport	6,523	3,698	2,586
Kingston/Plymouth	6,324	150	110
Needham	6,228	86	N/A
Stoughton	6,056	N/A	N/A
Greenbush	5,383	156	95
Fairmount	1,326	85	75

*Ridership: Total number of boardings, both inbound and outbound

Source: MBTA

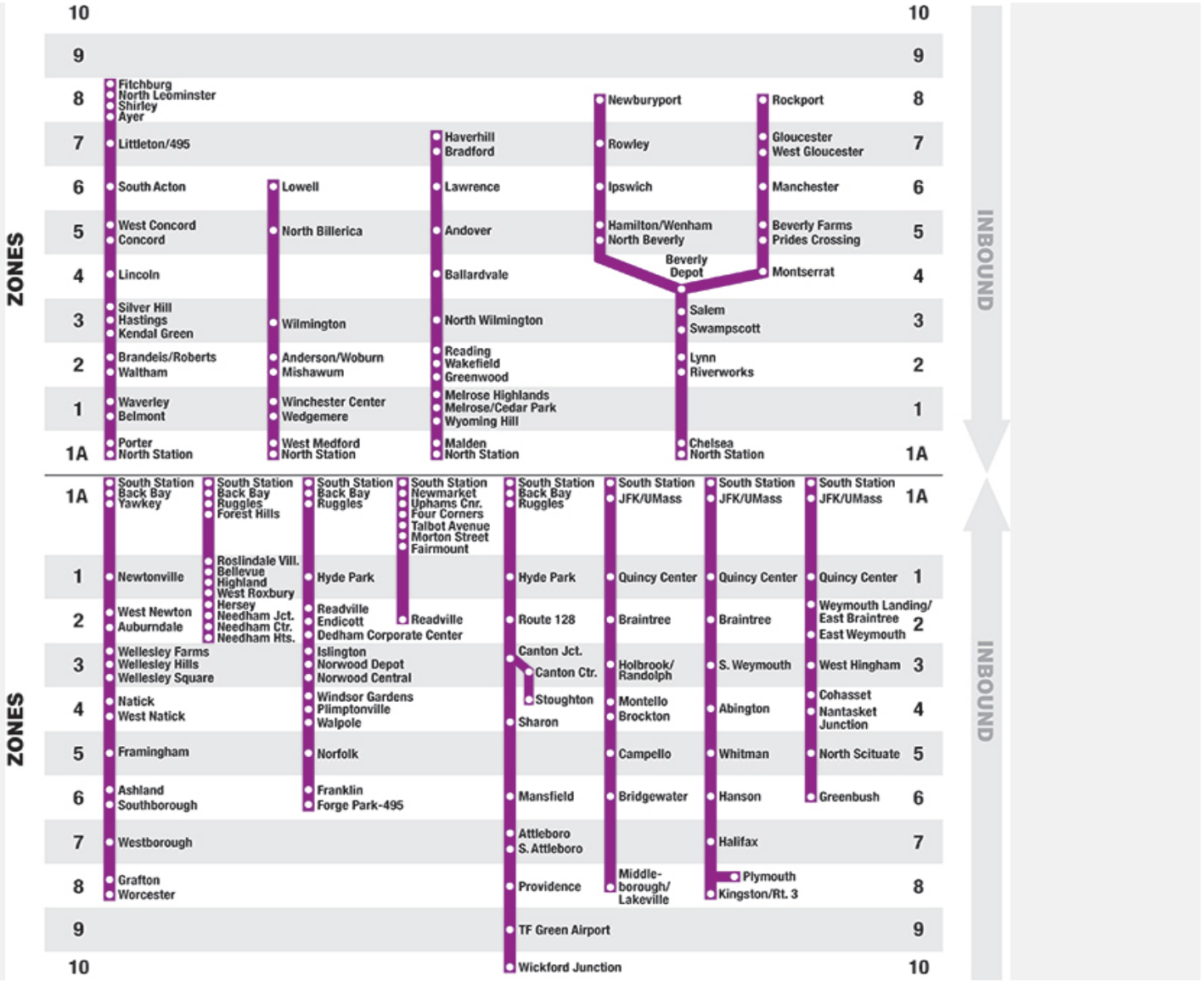
RIDERSHIP DEMOGRAPHICS

Commuter rail ridership is primarily non-minority and higher income than other MBTA modes. Travel distances and fares are significantly higher than other modes.

	Minority	Low-income
COMMUTER RAIL	**13.9%**	**7.2%**
Bus	46.5%	41.5%
Rapid Transit	27.5%	24.1%
Ferry	5.7%	4.5%
Total	33.0%	28.5%

Source: 2008-2009 MBTA Systemwide Passenger Survey (the MBTA is currently updating its systemwide survey)

COMMUTER RAIL FARES - ZONE MAP



COMMUTER RAIL FARES

Daily commuter rail fares are structured as a sliding scale of distance based zones

- Fares for single rides vary from $2.10 (Zone 1A) to $8.50 (Zone 5) to $11.50 (Zone 10)

Monthly pass fares vary based on whether travel is within the urban core, to the urban core, or between suburban stations:

- Within Zone 1A: $75
- To Zone 1A: From $182 for Zone 1 to $362 for Zone 10
- Interzone (for travel outside of Zone 1A): From $86 for Interzone 1 to $229 for Interzone 10
  - All CharlieCard monthly passes include unlimited access to subway, local bus, express bus, and Inner Harbor ferry service
  - Interzone monthly passes include unlimited travel between selected zones as well as travel on Local Bus
  - A mobile ticket application provides monthly passes at a $10 discount, but cannot be used on other modes
  - Monthly pass holders “break even” after 16 round trips.

Parking Payment:

- Commuter rail lots transitioned in June 2015 from honor box payment systems to PayByPhone.
- For customers who choose not to sign up for PayByPhone, the MBTA will mail a monthly invoice to the address listed on the vehicle owner's registration for a 50 cent surcharge.
- Monthly parking permits are offered at most locations at a discount from the daily fee.
- With a few exceptions, commuter rail surface lots and garages have a daily parking rate of $4 and monthly rates of $70.

OWNERSHIP/OPERATIONS AND MAINTENANCE

While the MBTA owns most of the commuter rail assets, operational and maintenance responsibilities are split between the MBTA and Keolis. Activities that are more capital in nature are typically the responsibility of the MBTA.

Asset Category	Responsible Party for Maintenance
Elevators /Escalators	MBTA elevator contract
Bridges	Keolis
Maintenance Facilities	Keolis
Facilities	Keolis
Stations	Keolis
Revenue vehicles	Keolis
Non-Revenue Vehicles	Keolis operates 333 non-revenue vehicles
Rolling Stock	Keolis
Track and ROW	Majority of track maintenance by Keolis
Signals	Keolis
Communication	Keolis/MBTA
Parking	MBTA (fee collection by LAZ Parking)
Power	Keolis

MBTA's contract requires Keolis to adhere to strict lifecycle maintenance and inspection requirements for locomotives and coaches. The contract also ties half of the financial disincentives to elements of customer satisfaction.

ROLE OF AMTRAK IN OPERATIONS AND MAINTENANCE

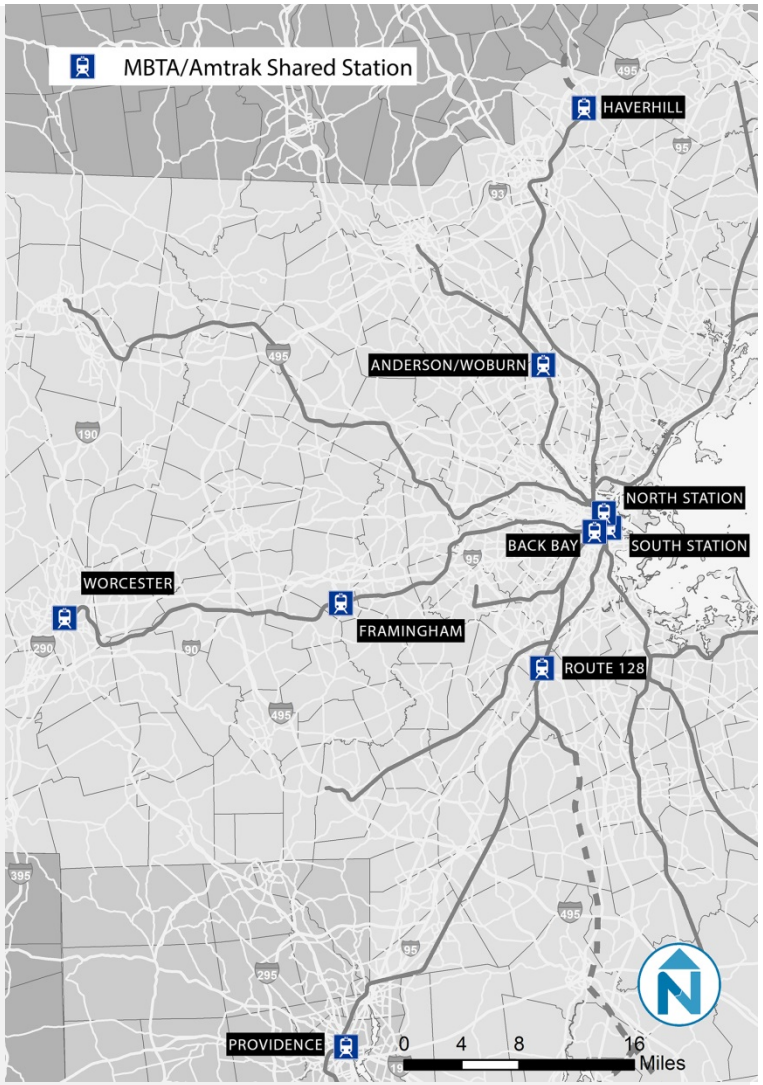
Amtrak is the primary owner of the Northeast Corridor (NEC) outside of Massachusetts, including the right of way used by MBTA commuter rail in Rhode Island.

The MBTA owns the all of NEC right of way in Massachusetts, and MBTA contracts with Amtrak in order to make Amtrak responsible for operating and maintaining the right of way, structures, and supporting facilities.

Amtrak provides maintenance of the infrastructure over the entire 88-mile Massachusetts/Rhode Island in exchange for the right to control train dispatching over the entire rail segment.

Amtrak also owns and operates Southampton Street Yard in Boston, which is Amtrak's primary train storage and layover facility in Boston. MBTA has deeded right that allow midday storage of trains.

Nine stations offer both MBTA commuter rail and Amtrak passenger rail service: Route 128 (which is jointly owned with Amtrak), and Worcester, Framingham, Back Bay, South Station, North Station, Anderson/Woburn, and Haverhill. MBTA uses the Amtrak-owned Providence Station.



COMMUTER RAIL ASSETS

With the greatest geographic coverage of all of the MBTA modes, the Commuter Rail asset base is broad and capital-intensive.

COMMUTER RAIL FLEET

Commuter rail service is provided using a fleet of 100 locomotives and 393 coaches.

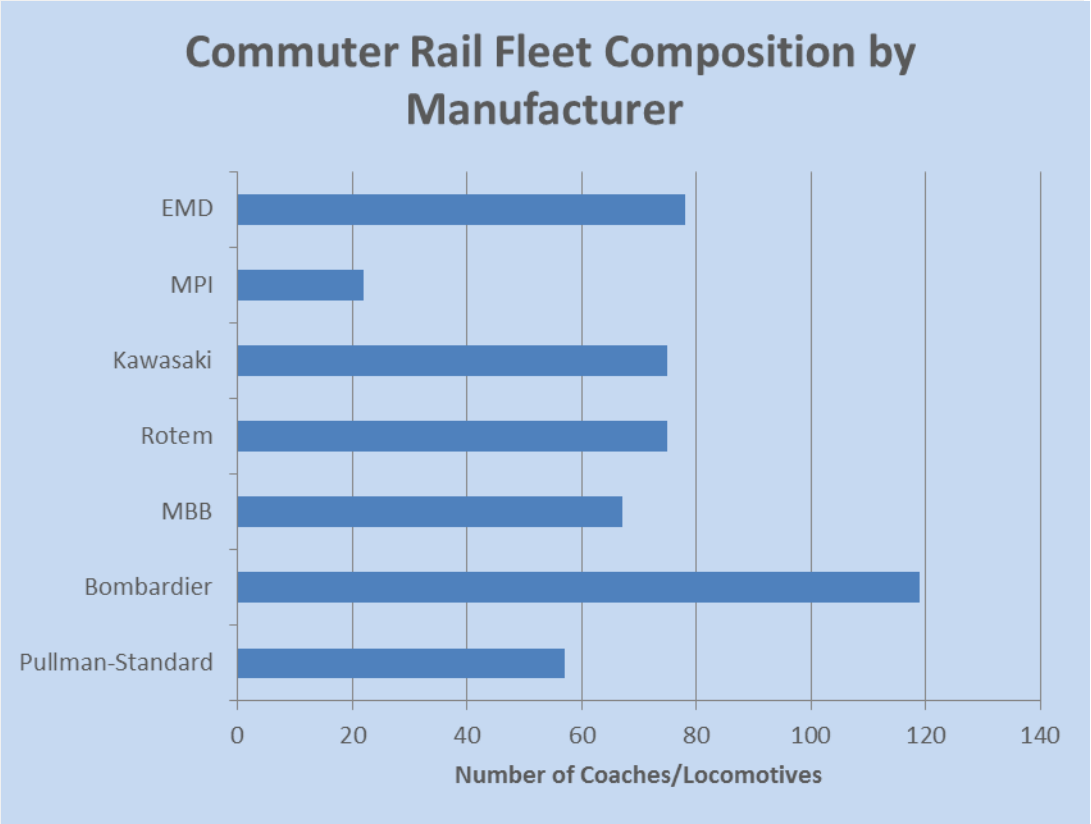
Most MBTA-owned locomotives were built by General Motors Electro-Motive Division (EMD), with Bombardier being the largest manufacturer of coaches.

Locomotives:

- EMD
- MotivePower, Inc. (MPI)

Coaches:

- Bombardier
- Kawasaki
- Rotem75
- Messerschmitt-Bölkow -Blohm (MBB)
- Pullman-Standard



Source: MBTA State of Good Repair (SGR) draft report August 10, 2015

COMMUTER RAIL INFRASTRUCTURE

In addition to the fleet, an extensive network of capital assets supports commuter rail service:

- 138 commuter rail stations
- 655 revenue miles of track
- 2 maintenance facilities
- 12 MBTA-owned layover facilities
- 290 bridges
- 495 signals

3 major rail stations in Boston:

- North Station
- South Station
- Back Bay Station

SOUTH STATION

- Opened in 1899 and rebuilt in 1989, South Station is the largest of the two MBTA terminal stations, with nearly 300 MBTA passenger trains/day. South Station serves all south side commuter rail lines, the Red Line, the Silver Line, intercity buses, and Amtrak. The MBTA owns the station but contracts out for its operation and maintenance; those services are currently provided by Equity Office through a long-term agreement.
- South Station is the northern terminus of the Amtrak Northeast Corridor service that links Boston to New York and other points south.
- Existing layover capacity shortfalls results in restrictive scheduling of trains in and out of South Station.
- The proposed South Station Expansion project would increase the number of passenger tracks from 13 to 20, but additional layover space outside of South Station is necessary to address all layover constraints, particularly in the midday.

- Approximately 60 percent of all south side trips begin or end at South Station.

NORTH STATION

- North Station, opened at its current location in 1893 and rebuilt in 1995, is the smaller of the MBTA's two terminal stations, with nearly 200 MBTA revenue trains/day. It serves all north side commuter rail lines, the Green and Orange Lines, and Amtrak. MBTA owns and maintains the station. The MBTA has a management contract with Delaware North for maintenance and vendor leasing at the station.
- It is the southern terminus of Amtrak's Downeaster service linking Boston with points north into Maine.

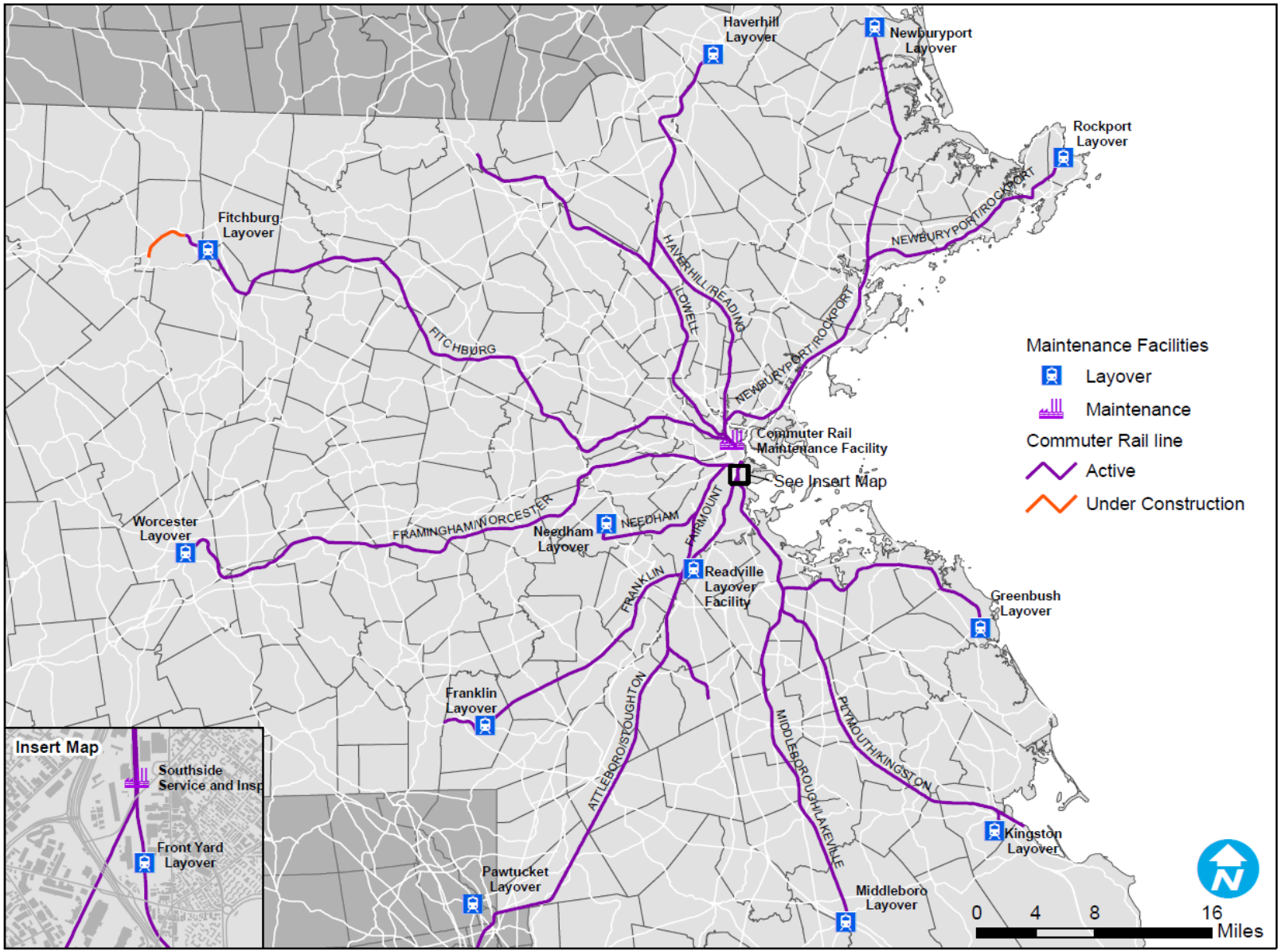
  - North Station has a total of 12 tracks and six high-level center platforms, but due to the alignment of the Charles River moveable bridge, only ten tracks and five platforms are operational, leading to capacity constraints.
  - Based on passenger counts conducted over the years, approximately 95 percent of all north side trips begin or end at North Station.

BACK BAY STATION

- Back Bay Station is owned and operated by the MBTA, although the MBTA is entering into a management contract with Boston Properties for maintenance and vendor leases. The station serves as a major commuter rail, Orange line, and Amtrak station.
    - Back Bay Station has seven tracks: three serving Northeast Corridor trains, two serving Orange Line trains, and another two handling trains to Worcester.
    - Back Bay Station has a total of four platforms, one serving two Orange Line tracks, and three serving the five MBTA commuter rail tracks (shared with Amtrak).

Approximately 35 percent of south side commuter rail trips end at Back Bay.

MAINTENANCE AND LAYOVER FACILITIES



Note: A Wachusett layover facility is under construction. Readville is both a layover and a maintenance location

TRACKAGE/RIGHT-OF-WAY

The 655 miles of the commuter rail system is comprised of 1,400 miles of rail.

Most commuter rail track maintenance is performed under the MBTA's commuter rail operating contract with Keolis and is primarily funded through the MBTA operating budget.

There are more than 1.8 million wooden ties in the commuter rail track.

MBTA Commuter Main Tracks	
Commuter Rail Line	**Track Miles**
Needham	13
Greenbush	17
Fairmount	19
Plymouth/Kingston	32
Franklin	34
Middleborough/Lakeville	47
Lowell	51
Haverhill	55
Worcester	89
Fitchburg	90
Newburyport/Rockport	92
Attleboro/Stoughton	116
Rail Line Total	655

SIGNALS

Line	Service Year	Quantity
Fitchburg/South Acton	1950	48
Haverhill	1955-2013	71
Lowell	1950-1999	33
Newburyport/Rockport	1950-1990	110
Total North Side Lines		**262**
Fairmount	1970-1976	8
Framingham/Worcester	1980	22
Franklin	1980-1988	36
Greenbush	2007	18
Kingston/Plymouth	1996	64
Middleborough/Lakeville	1996	51
Needham	1985-1987	22
Providence/Stoughton	1993-1999	12
Total South Side Lines		**233**
Multiple Lines	1989-1998	10

South side signals are generally newer and of more consistent age and type than north side signals. This is largely due to most recent commuter rail extensions being on the south side.

Some of the rail lines are still using 1930s technology, which causes some interoperability issues with newer systems in place.

The MBTA commuter rail system utilizes three different signal units:

- Automatic Block System (ABS) using wayside equipment
- Centralized Traffic Control system (CTC)
- A cab signal system displayed in the locomotive cab

- The Worcester Line has a mix of wayside signals, which frequently malfunction, causing delays.
- Old Colony Lines utilize cab signal equipment, which is working well.

COMMUTER RAIL PARKING

MBTA-owned Parking Spaces by Line	
Newburyport/Rockport	3,934
Plymouth/Kingston	3,836
Franklin	3,517
Middleborough/Lakeville	3,185
Greenbush	3,023
Framingham/Worcester	2,449
Providence	2,285
Stoughton	2,265
Needham	1,275
Haverhill	1,145
Fairmount	228
Fitchburg	224
Lowell	191
Total	**27,557**

Commuter rail parking represents almost 60% of all parking owned by the MBTA.

Source: FY15 MBTA Parking Revenues and Utilization & T Parking

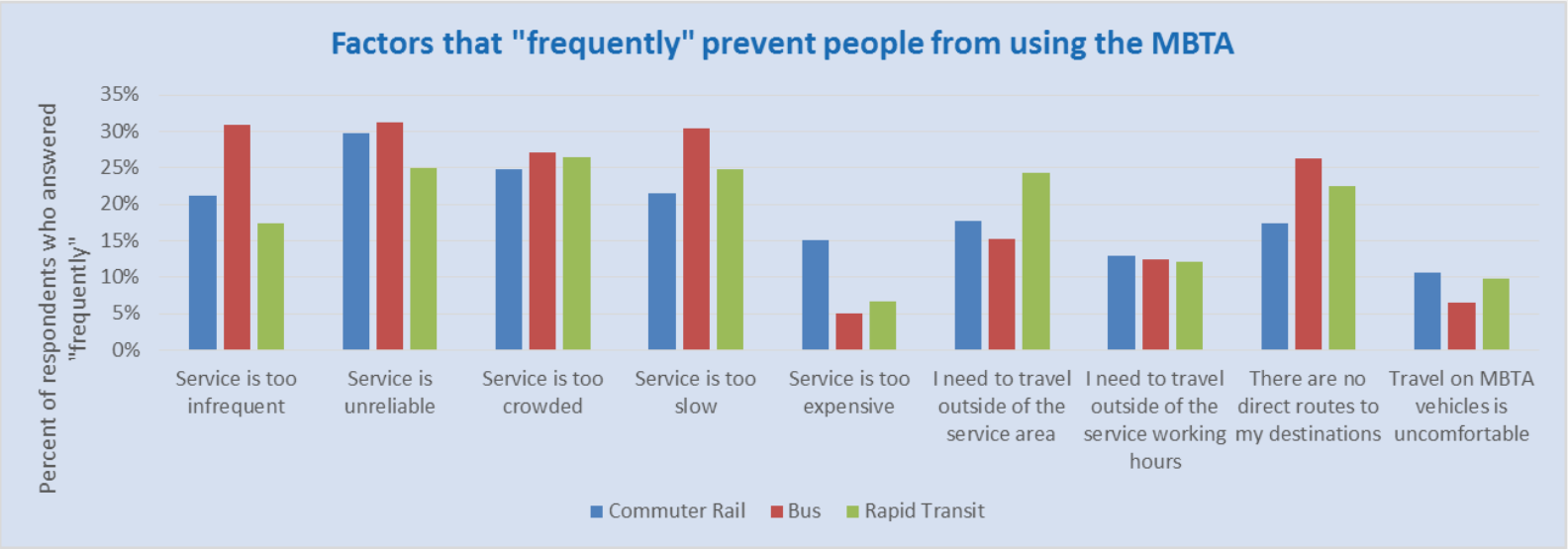
COMMUTER RAIL SERVICE PERFORMANCE

Winter 2015 failures revealed multiple points of system vulnerability.

CUSTOMER VOICE

The MBTA surveyed 6,000 customers across all modes in the summer of 2015.

Commuter rail riders were dissatisfied with unreliable service, crowding, cost, and the limited hours of service.



These service characteristics are affected by a combination of:

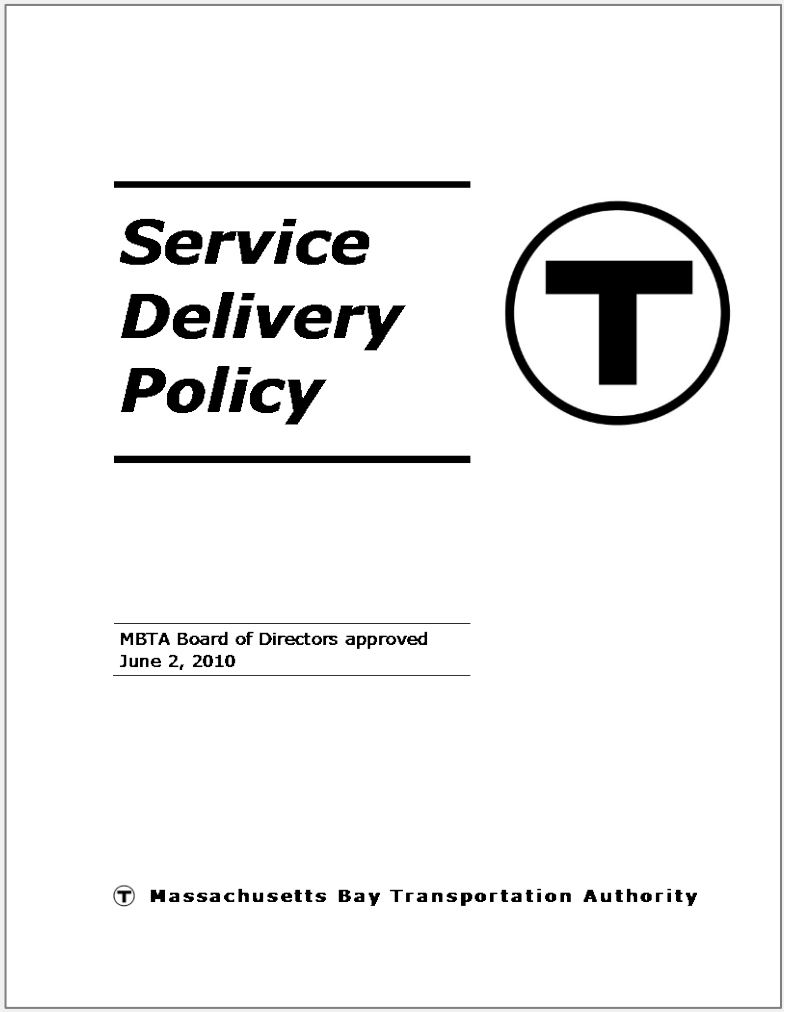
- Asset Condition: The condition of rolling stock, stations, and other assets
- Asset Quantity: Lack of maintenance and layover capacity
- Internal Operations: Labor practices and budget constraints
- External factors: Real-world conditions that are beyond the control of the MBTA

MBTA SERVICE GUIDELINES

The MBTA's Service Delivery Policy* articulates the type of service it should provide in terms of:

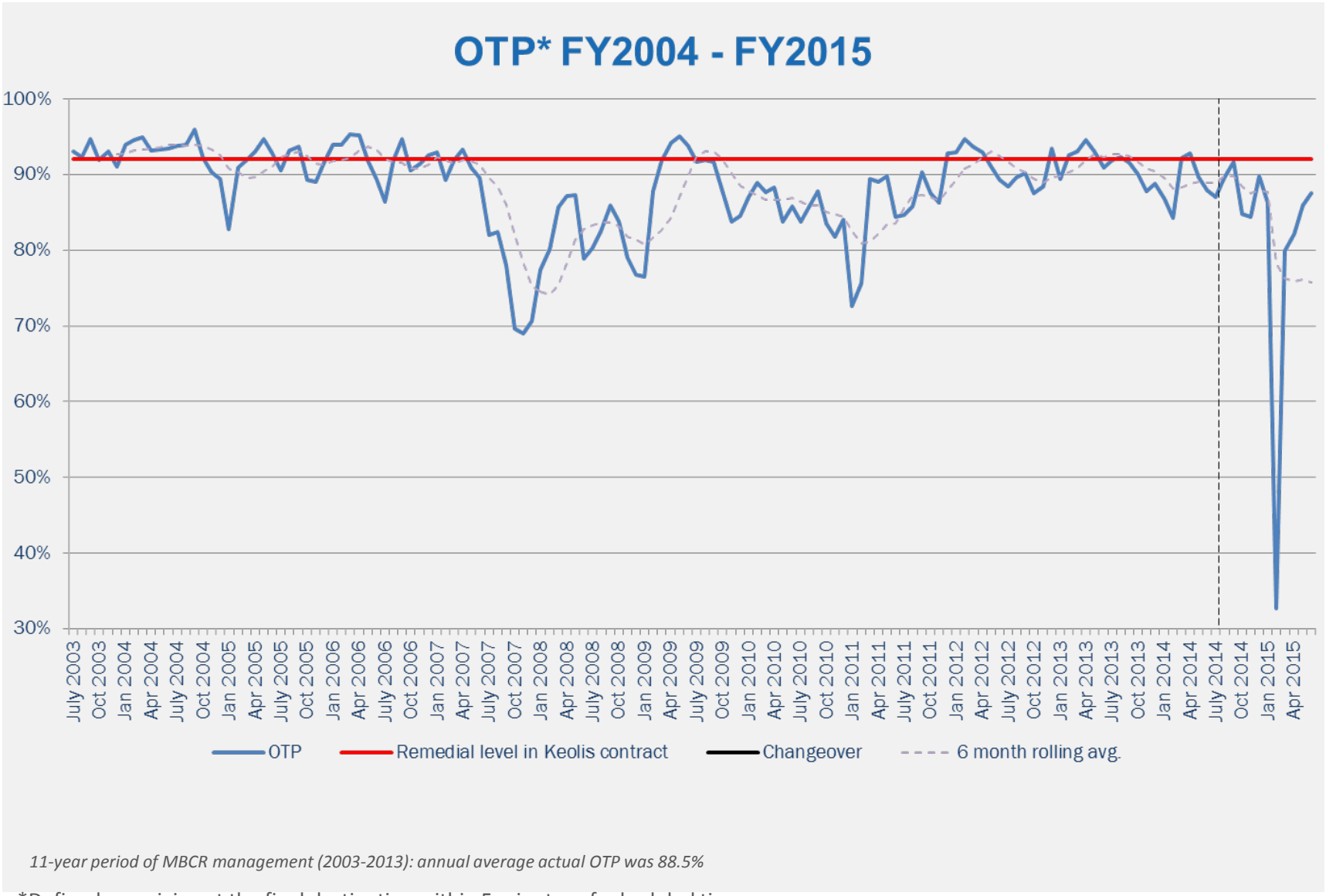
- Service coverage
- Minimum spans of service
- Cost-effectiveness
- Minimum service frequencies
- On-time performance
- Maximum crowding levels

While commuter rail meets most current MBTA Service Delivery Policy standards, it has struggled with on-time performance.



The MBTA is currently in the process of updating its service standards.

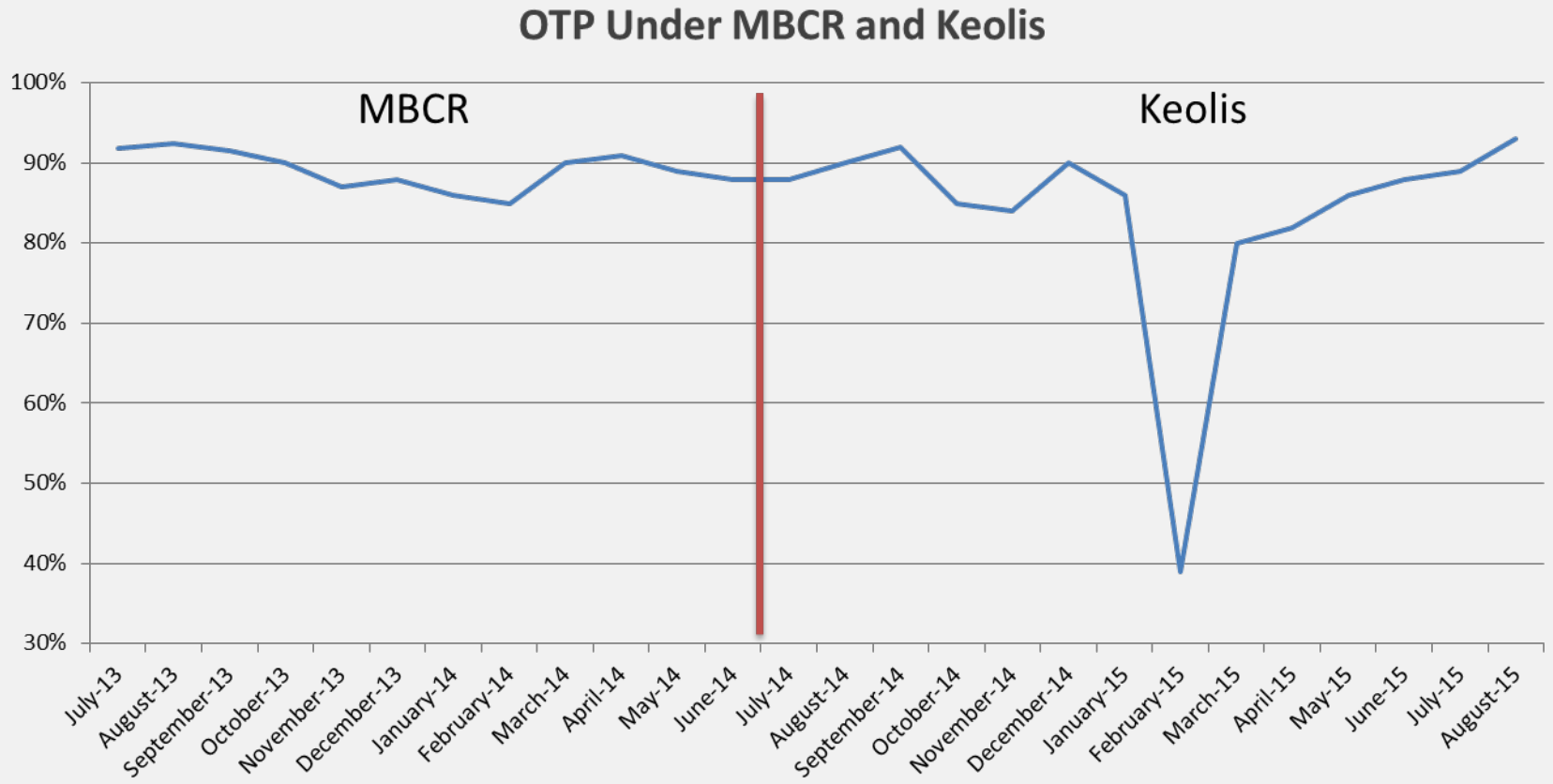
ON-TIME PERFORMANCE (OTP)



11-year period of MBCR management (2003-2013): annual average actual OTP was 88.5%

*Defined as arriving at the final destination within 5 minutes of scheduled time.

ON-TIME PERFORMANCE (OTP)

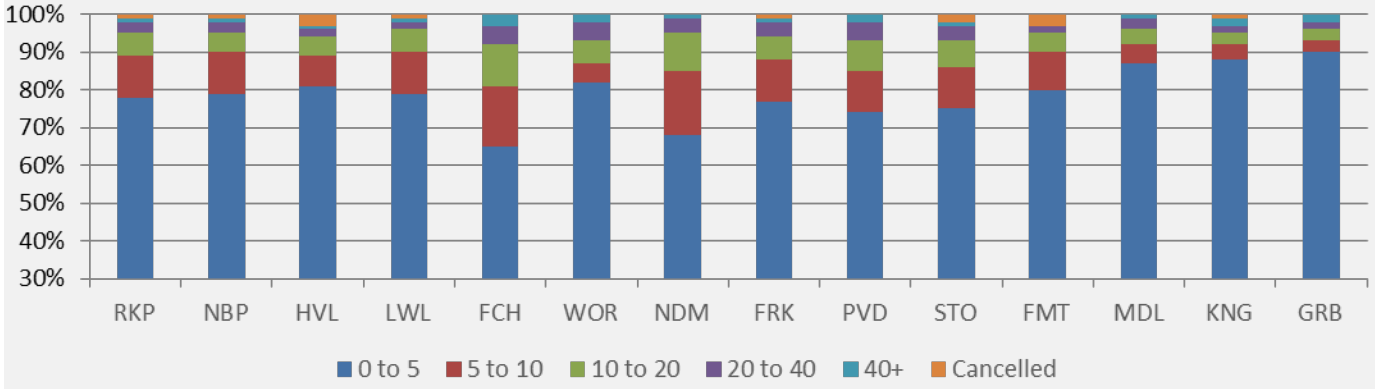


- OTP under MBCR was consistently above 85% final year as operator.
- OTP under Keolis has been similar to MBCR with the exception of February and March 2015 and has improved steadily since.
- As part of the MBTA and Keolis' Commuter Rail Service Improvement Plan signed in August 2015, Keolis is being held to meeting 92% OTP, adjusted to remove delays that Keolis could not prevent.

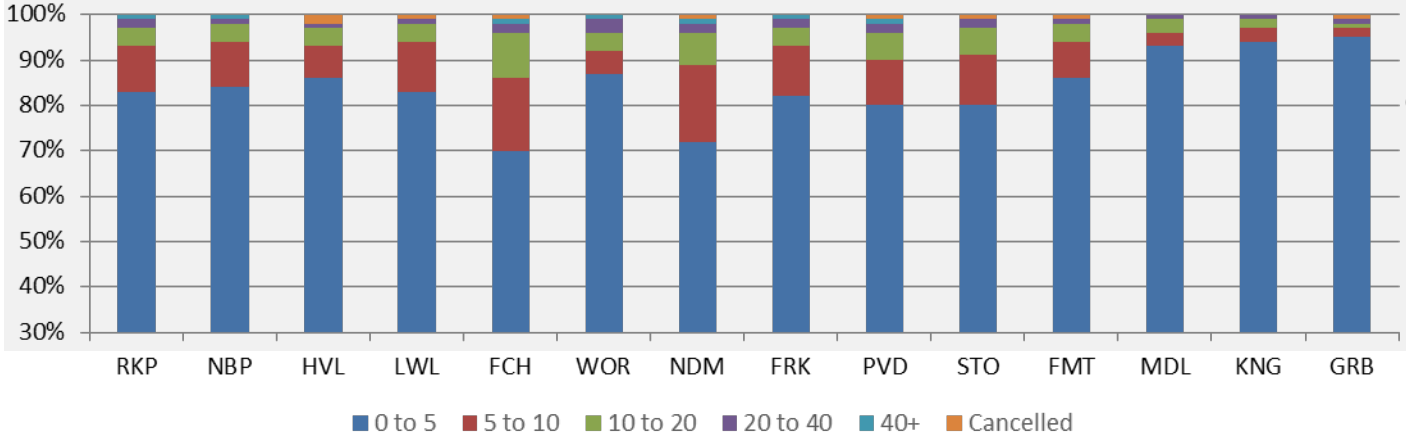
PEAK PERIOD OTP BY LINE

Though the winter of 2015 adversely affected most schedules, OTP varies widely, from about 70% on the Fitchburg (which is undergoing major construction) and Needham lines (which continues to be effected by major fire on Amtrak) to 95% on Greenbush. Most delays are 5-10 minutes, though 10-20 minute delays are not uncommon.

Peak Actual OTP by Line, FY15



Peak OTP by Line, FY15 (excluding winter 2015)



Line	Abbreviation
Rockport	RKP
Newburyport	NBP
Haverhill	HVL
Lowell	LWL
Fitchburg	FCH
Worcester	WOR
Needham	NDM
Franklin	FRK
Providence	PVD
Stoughton	STO
Fairmount	FMT
Middleborough	MDL
Kingston	KNG
Greenbush	GRB

SERVICE FREQUENCY/CROWDING

Current MBTA frequency standards call for at least three trains during peak, and off-peak trains at least every 180 minutes in each direction.

- All lines meet the frequency standards with the exception of the Haverhill Line, where some off-peak runs are more than 195 minutes apart.
- The Haverhill Line does not meet the frequency standard due to a significant length of single track, which is currently under construction to re-install the second track.

Current MBTA passenger load standards for commuter rail call for a maximum of 110% of seated capacity during peak hours or 100% of seated capacity during off-peak hours.

Good data is not available, but crowding is common complaint on certain trains, due to a variety of issues:

- Winter 2015 disrupted scheduled maintenance of coaches and while the system catches up, there are fewer coaches available (e.g. single level coaches used while bi-levels are serviced).
- Often, the middle seat in the three-across seating is empty while passengers stand, worsening the perception of crowding.

FARE COLLECTION

Consistent reports from passengers and MBTA staff indicate uneven fare collection.

Little concrete data is available because:

- Commuter rail is the only mode where payment is not required before accessing the vehicle and/or station (this reduces the capital assets needed for fare collection)
- Pass sales (but not usage) recorded automatically
- Platform access not controlled as with subway
- Passes checked visually only
- 10-ride tickets punched manually only

MBTA has decided to:

- Dedicate portion of penalties assessed in Year 1 to fund improvements for passengers – Keolis will hire new fare agents to help with boarding process and fare collection.
- Deploy “Mystery Shoppers” on trains to monitor fare collection.
- Invest in Automatic Passenger Counters which would accurately measure ridership, trip patterns, and station boarding and alighting locations.

COMMUTER RAIL ASSET PERFORMANCE

Age of equipment, condition of infrastructure, and capacity of support facilities affect service and operating costs.

ASSET PERFORMANCE

State of Good Repair (SGR):

The MBTA maintains a current inventory of capital assets in its State of Good Repair (SGR) Database.

The Database generates scores for each asset, based on **age, condition and performance.** 1 = low, 5 = high, >2.5 = SGR.

When referencing SGR scores, it is important to note:

- **Summary scores at the asset/modal level represent the average of all assets in the category**, and are a less precise tool for understanding condition of the individual assets within the category.
- Since SGR scores are blended evaluations of age and condition/performance, **relatively new assets that perform poorly may have better SGR scores than their condition alone would suggest.**
- **Assets that are within their useful life and performing as intended will have good SGR scores, even if the assets are inadequate to meet current or future needs of the system.**
- **The SGR backlog will continue to change** – as assets age and are replaced, the backlog decreases; conversely as assets age and do not get replaced, the backlog increases.

The MBTA has conducted extensive work to define the condition of its major capital assets through the SGR database, and will continue to update the SGR database each year. The next organizational step is to begin collecting data for the Maintenance Management System (MMS), a more granular asset management tool that will help the MBTA to implement lifecycle management processes and track asset condition down to the smallest replaceable component. The MBTA also needs to regularly update its existing asset management plan – a policy/strategy document for implementing asset management across the MBTA – for all asset classes. A continuous, predictable capital funding program, including funding for these tasks, is essential to maintaining an effective asset management program.

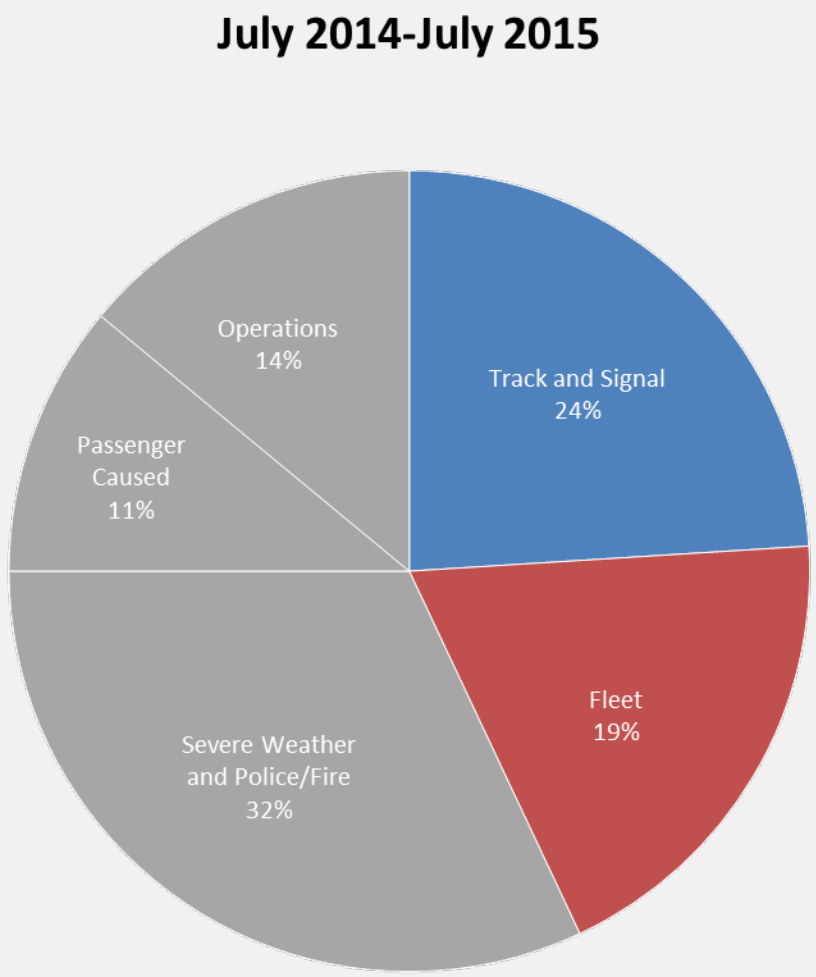
COMMUTER RAIL STATE OF GOOD REPAIR (SGR)

Commuter rail assets have an SGR backlog of **$3.04 billion** and a replacement value of **$9.62 billion.**

Asset Category	Average SGR Rating (0 to 5 Scale)	Backlog ($millions)	Compared to Other MBTA Modes
Revenue vehicles	2.86	$1,049.9	Similar
Track/Right-of-Way	2.70	$1,039.6	Best
Signals	2.70	$481.1	Worst
Communications	2.55	$15.9	Worst
Fare Equipment	4.22	$0	Best
Power	2.10	$43.4	Worst
Stations	2.87	$80.3	Worse
Elevators /Escalators	3.25	$0	Similar
Parking	2.43	$35.8	Similar
Facilities	3.12	$49.6	Similar
Bridges	3.23	$245.8	Similar
Tunnels	3.87	$0	Best
Total		**$3,041.4**	

Source: Draft SGR report 8/10/15; *Green = Excellent to Good*; *Yellow = Fair to Marginal*; *Red = Substandard to Poor*

TRAIN DELAYS BY CAUSE



Winter of 2015 was cause for Severe Weather type of delays being largest as measured in total minutes.

Excluding weather, the top two causes of delays were Track and Signal, and Fleet.

Operations delays are caused by train congestion.

Passenger-caused delays are generally the result of slow boarding, which is impacted by crowding and station accessibility.

Source: MBTA Commuter Rail Data Files, August 2015

COMMUTER RAIL FLEET

COMMUTER RAIL FLEET IS RELATIVELY OLD

493 active locomotives and coaches:

- 81 locomotives with average age of 23 years
- 410 coaches with average age of 22 years
- Desirable average age is 12.5 years
- Typical useful life is 25 - 30 years

Many coaches and locomotives are long overdue for replacement or rebuild, and many others will be due within the next six years.

Rail Fleet Age (Years)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Coaches		75									33														42	79		107									57				
Locomotives		20						2																12				25									16				25

Most coaches and a little less than half locomotives are within industry expected lifespan

57 coaches and 41 locomotives are beyond useful life

Source: MBTA (2015)

COMMUTER RAIL FLEET

MODERNIZATION IS UNDERWAY

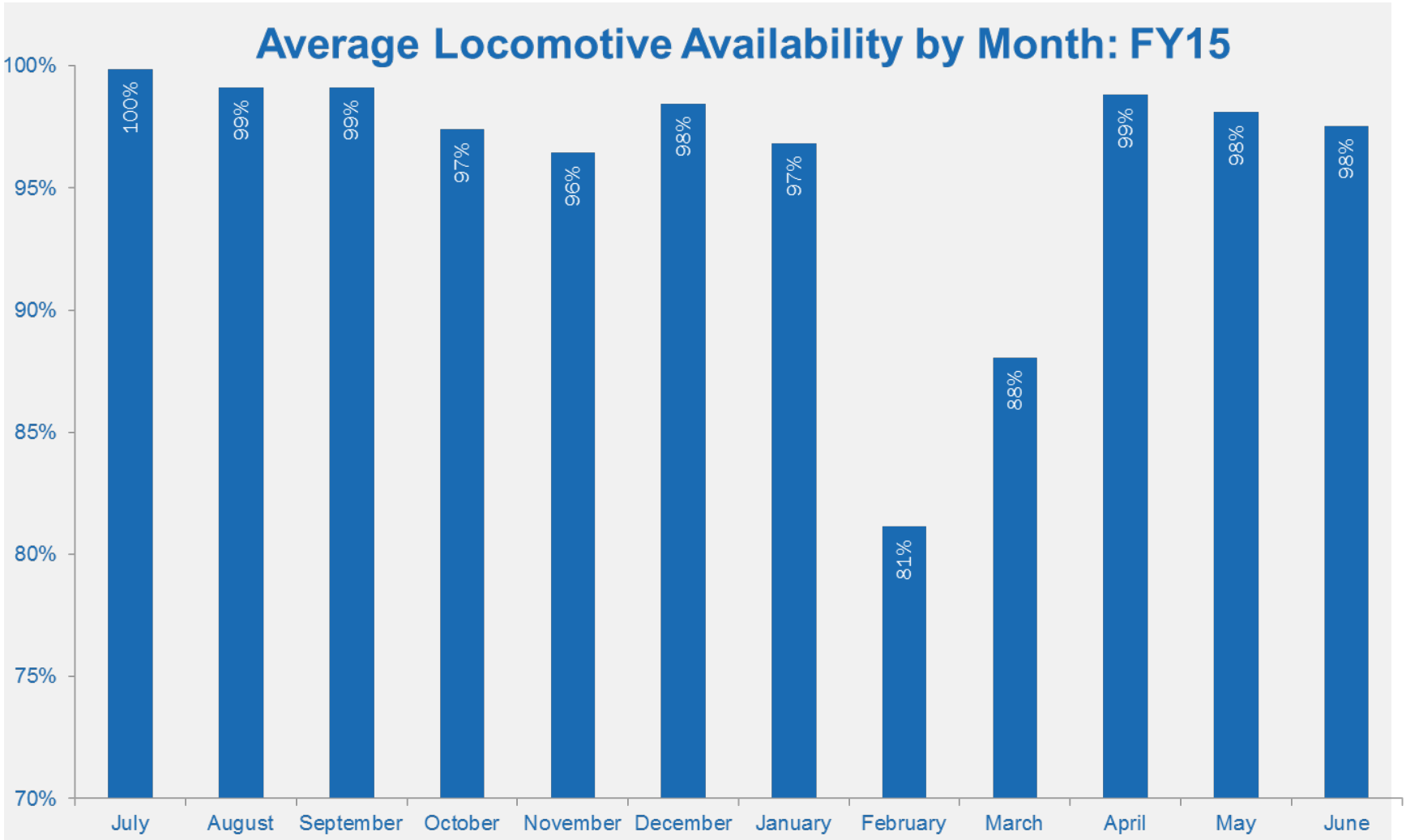
Major program of new and overhauled locomotives and coaches included in the 2016 Capital Investment Program (CIP):

- 40 new locomotives and 25 top deck overhauls
- 75 new bi-level coaches and 75 bi-level overhauls

SOME ISSUES REMAIN:

- The modernization program will not address the full backlog of need.
- Older coaches will still not be in compliance with Federal accessibility requirements relative to vestibule and door width, and customer communication.

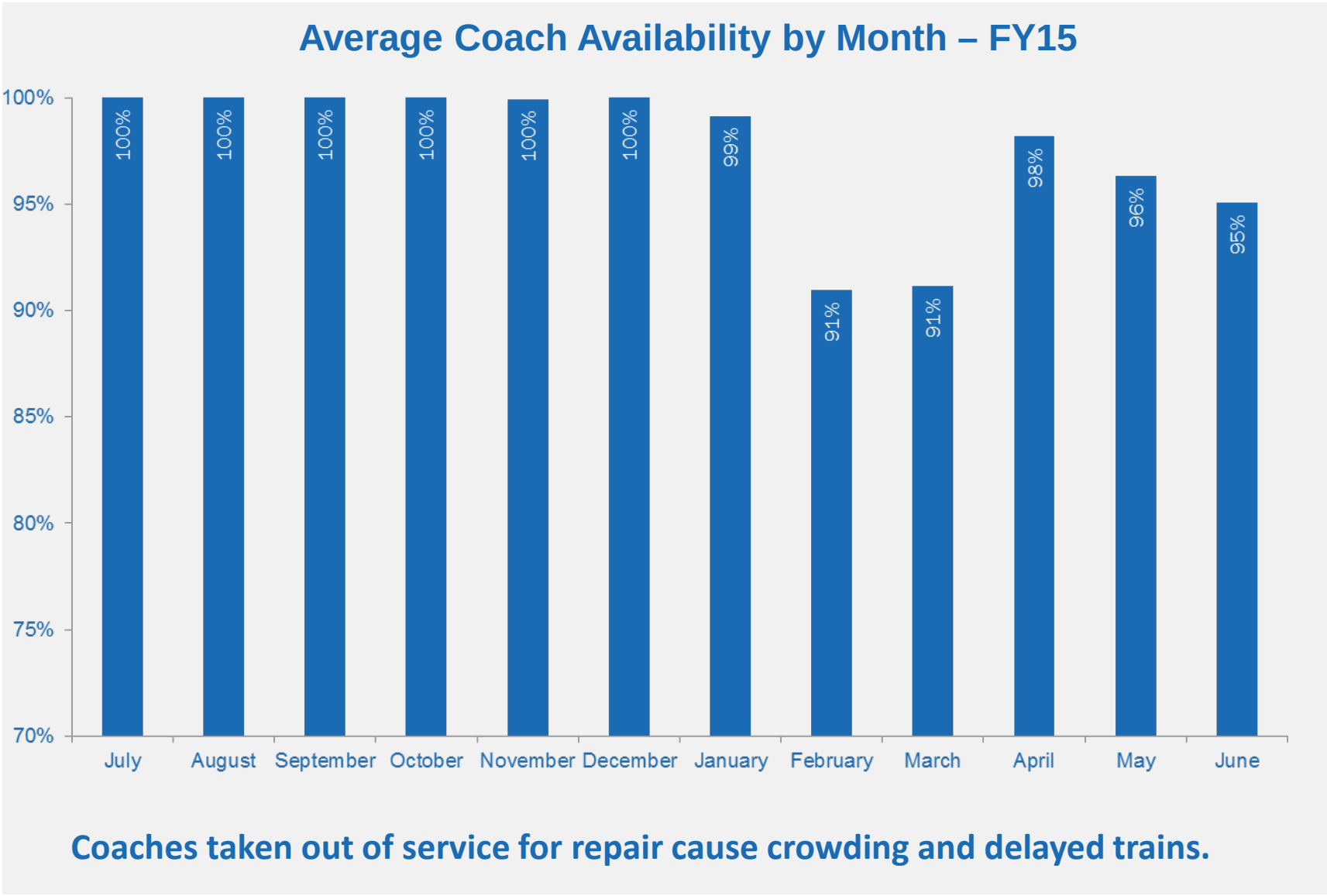
FLEET: LOCOMOTIVE AVAILABILITY



Locomotives taken out of service for repairs cause trip cancelations and delays.

Source: MBTA-Keolis Commuter Rail Contract: Report on Year 1, July 2015

FLEET: COACH AVAILABILITY



Coaches taken out of service for repair cause crowding and delayed trains.

Source: MBTA-Keolis Commuter Rail Contract: Report on Year 1, July 2015

STATIONS

COMMUTER RAIL STATIONS

Waiting for the train is a major part of the customer experience.

Features and amenities provided vary widely by station.

- Newer stations typically have full high-level platforms or mini-high platforms, and include canopies, lighting, benches, signage, and electronic passenger information board.
- Many older non-compliant stations lack even basic features such as lights or benches.

STATIONS: PLATFORM TYPE

Accessible full high-level platform

- Provides for level boarding at all cars and are the standard for new or altered stations.

Semi-accessible, mini high-level platform

- Allows for level boarding at two cars, typically at the rear of the train, represents segregated access and is generally no longer permitted unless full high-level platform is not technically feasible.

Inaccessible low-level platform

- Does not provide any level boarding.

Accessible full high-level platform at Uphams Corner on Fairmount Line

Semi-accessible mini high-level platform at Wedgemere Station on Lowell Line

Inaccessible low-level platform at Concord Station on Fitchburg Line

STATIONS: PLATFORM TYPE

Type of Platform	Number of CR Stations	Percentage of CR Stations	Percentage of CR Ridership
Accessible Full High-Level Platforms	49	36%	29%
Semi-Accessible Mini High-Level Platforms	50	38%	52%
Inaccessible Low-Level Platforms	34	26%	19%

Rail Line With Non-Accessible Stations	Number of Non-Accessible Stations*	Total Average Weekday Inbound Boardings At Non-Accessible Stations
Fitchburg	10	3,141
Haverhill	5	1,484
Newburyport/Rockport	3	255
Lowell	3	2,120
Framingham/Worcester	7	3,930
Franklin	6	3,652

*Deferred maintenance has resulted in accessibility barriers at once-compliant stations.

Source : MBTA Office of Systemwide Accessibility and 2014 Blue Book (2013 Ridership Figures)

STATIONS: HIGHEST AND LOWEST RIDERSHIP – ADA NON-COMPLIANT STATIONS

Highest Ridership		Lowest Ridership	
Station	Weekday Inbound Boardings	Station	Weekday Inbound Boardings
Natick	1,077	Greenwood	146
Walpole	945	Wyoming Hill	123
Franklin	876	Waverley	117
Islington	844	Riverworks	56
West Medford	819	Hastings	44
Wellesley Square	804	Prides Crossing	20
Wakefield	682	Silver Hill	15
Windsor Gardens	624	Plimptonville	13

Islington

West Medford

Silver Hill

Source: MBTA 2014 Blue Book (2013 Ridership Figures)

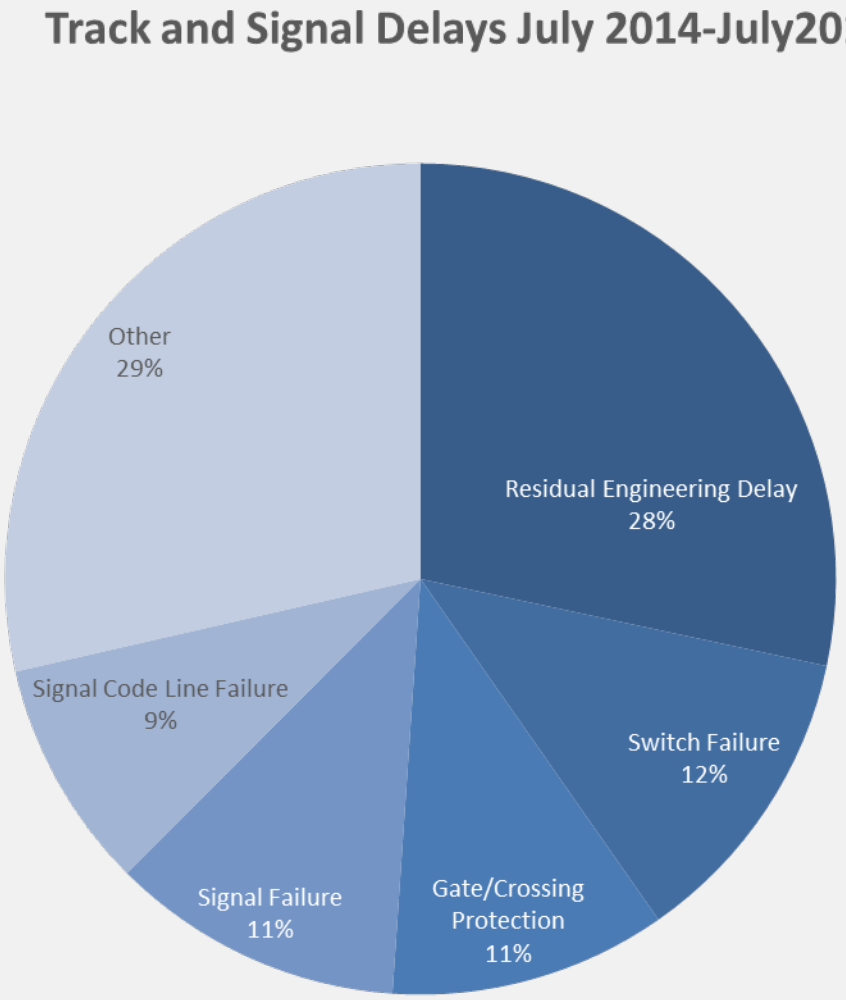
LAYOVER FACILITIES: LINES WITH LAYOVER CAPACITY CONSTRAINTS

Line Terminus	Non-Revenue One-Way Trips	Early AM Outbound Scheduled Low Revenue Trips	Layover Facility	Layover Capacity (Trains)	Miles per Trip	Non-Revenue Miles	Low Revenue Miles
Lowell	6	0	N/A	-	25	150	0
Haverhill	2	0	Bradford	4	32	64	0
Worcester	2	1	Worcester	5	44	88	44
Forge Park	2	1	Franklin	2	27	54	27
Wickford Junction	1	3	Pawtucket	-	23	23	69
Stoughton	0	2	N/A	-	19	0	38
TOTAL	**13**	**7**				**379**	**178**

Note: Franklin Line deadhead trip is two trains together, which later split and become two inbound trips. Also at the Franklin layover there is a third track that can fit 1 locomotive and 6 coaches, but it "is not used for layover purposes due to lack of power station, residential and lighting issues."

- **Inadequate capacity to lay over trains in the evening near outer terminus of some lines necessitates moving empty (non-revenue) trains and scheduling very early (low-revenue) outbound trains in order to position the trains for AM inbound service.**
- **Non-revenue and scheduled low-revenue trains total about 3-4% of the systemwide revenue train miles operated each weekday.**
- **Lack of layover facility in Lowell is largest source of non-revenue miles.**

TRACK AND SIGNAL DELAYS – TOP CAUSES



The "Other" category includes construction, drawbridge failure, high water/flooding, speed restrictions, among other issues.

"Residual" indicates delay minutes to subsequent trains caused by the primary delay.

Source: MBTA Commuter Rail Data Files, August 2015

SIGNALS & POSITIVE TRAIN CONTROL

In 2008, the Federal Railroad Administration mandated that a significant portion of the United States rail network implement Positive Train Control (PTC) by the end of 2015.

- PTC is a form of train control technology that helps prevent train collisions, speeding derailments, and unauthorized entry into work zones by ensuring that the locomotive engineer is complying with the signal system.

The MBTA is working toward implementation of federally mandated PTC as quickly as it can within funding constraints and identifies it as both signals and communication:

- Authorized budget spending on PTC is estimated at approximately $451M including contingency:
  - PTC Systems Integrator (~$338.5M)
  - Professional Consulting Services (~$25M)
  - Keolis Program Implementation Support (~$25M)
  - MBTA Program Mgmt. Support (~$4M)
  - 15% Contingency (~$58.8M).
- PTC Systems Integrator Contract – Approximately $338.5M includes a deferred payment schedule:
  - No MBTA contract payments for the first 19 months after contract notice to proceed (NTP), approximately December 2015 – June 2017.
  - Deferred payments are at 0% interest and total value is approximately $47M.
  - Repayment of deferred payments start 20 months after NTP.
  - The deferred payments are equally spread over a 12 month timeline with the last repayment value in month 31.

RIGHTS OF WAY: BRIDGES

Commuter rail represents largest portion of the MBTA's bridge inventory and an even higher percentage of the MBTA's SGR bridge backlog.

	MBTA	Commuter Rail	Percent
Total Bridges*	1,068	917	86%
Replacement Value	$5.15 B	$3.72 B	72%
SGR Backlog	$800 M	$724 M	91%

- $295 million is authorized in the FY16 CIP for repair or replacement of priority commuter rail bridges, including:
  - Beverly Drawbridge (Newburyport/Rockport Line)
  - Concord, Main Street Bridge (Fitchburg Line)
  - Gloucester Drawbridge (Newburyport/Rockport Line)
  - LaGrange Street Bridge (Needham Line)
  - Merrimack River Bridge (Haverhill Line)
  - Shoreline Bridge (Franklin Line)
  - Amtrak Corridor Spandrel Beam
  - Design and remediation of selected commuter rail bridges
- FY16 CIP does not fully address the commuter rail bridge backlog.

*In SGR Report culverts are counted as bridges. Excluding culverts the number of bridges would be 448 MBTA of which 301 are Commuter Rail (67%)
Sources: FY16 MBTA CIP; Draft 2015 SGR (August 10, 2015)

RIGHTS OF WAY:
STRUCTURALLY DEFICIENT BRIDGES

Bacon Street Bridge, Wellesley
(Framingham/Worcester Line)

Guild Street Bridge, Norwood
(Franklin Line)

LaGrange Street Bridge, Boston
(Needham Line)

Shore Line Bridge, Readville, Boston
(Franklin and Fairmount Lines)

PARKING

Commuter Rail Stations with Least Parking Availability (FY15)	
Station	**Total Spaces and Percentage Availability**
Malden Center	188 spaces (<1% availability)
Littleton	200 spaces (<1% availability)
Forest Hills	206 spaces (<1% availability)
Braintree	1,322 spaces (<1% availability)
Route 128	2,589 spaces (<1% availability)
W. Newton (Washington St. lot)	45 spaces (6% availability)
South Attleboro	568 spaces (9% availability)
Swampscott	131 spaces (11% availability)
Southborough	364 spaces (14% availability)
East Weymouth	335 spaces (15% availability)

Source: FY15 (June2014-June2015) MBTA Parking Revenues and Utilization

SUMMARY

SUMMARY: CUSTOMER EXPERIENCE

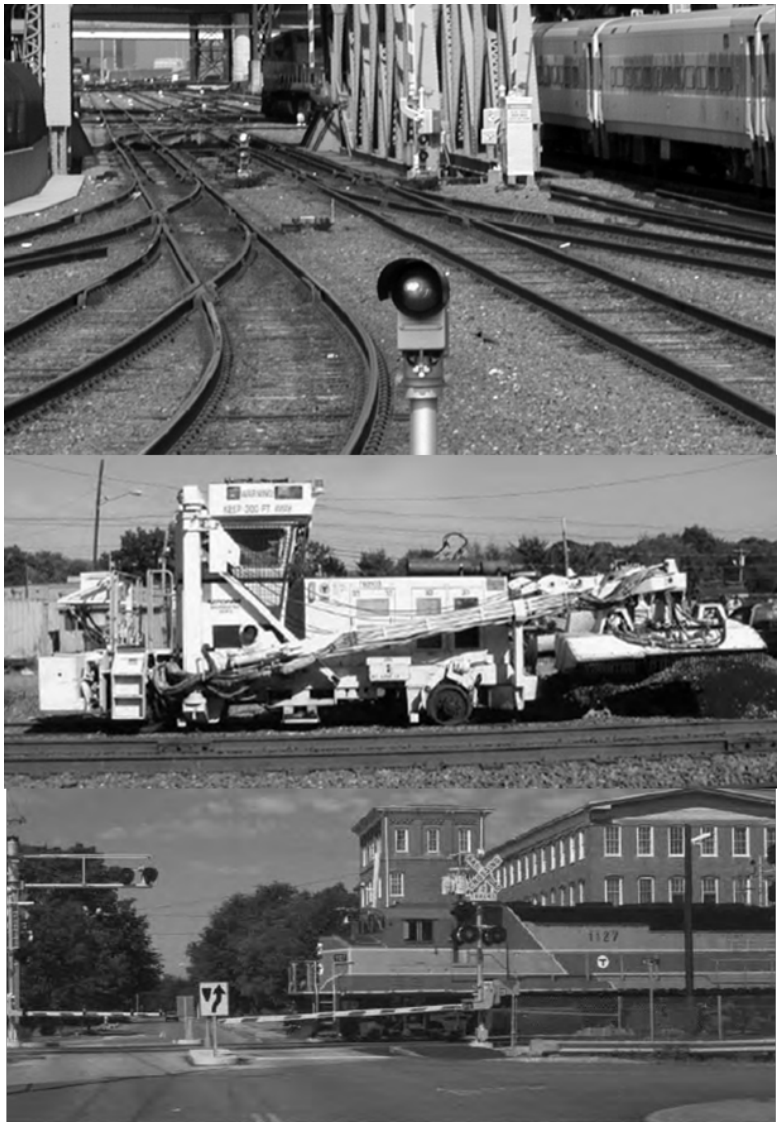
The commuter rail customer experience varies widely in the system:

- Station condition, amenities, cleanliness, crowding levels, and accessibility varies by location.
- Shared responsibility among MBTA, Keolis, and other entities undermines clear accountability.
- Large geographic size and number of political jurisdictions across the system add to the challenge.

SUMMARY: TRACK AND SIGNALS

Next to severe weather, track and signal-related problems accounted for the most total delay over the past year.

- Failures are generally related to asset age and condition.



SUMMARY: ACCESSIBILITY

A significant portion of the commuter rail system is only semi-accessible or entirely inaccessible to customers with disabilities.

- **Although less than 20% of system ridership occurs at inaccessible stations, several high ridership stations on the Franklin and Worcester Line are inaccessible.**
- **The high cost associated with making stations fully-accessible has delayed some needed investments in station state of good repair.**
  - Deferred maintenance has resulted in accessibility barriers at once-compliant stations
- **A number of trains are not compliant due to small vestibule size and lack of dual-mode announcement technology.**

SUMMARY: MAINTENANCE AND LAYOVER

The current size and location of layover facilities available to care for the commuter rail system inhibits future growth in commuter rail service, particularly on the south side. This problem may be addressed by the South Station Expansion project.

- South side layover capacity currently exists for 25 trainsets, below the 28 needed to meet today's demand, not including future growth.
- The commuter rail maintenance facility's location on the north side in Somerville creates logistical challenges for maintaining rolling stock, the majority of which operates on the south side.
- Layovers at Rockport, Bradford, Worcester, Needham, Pawtucket and Franklin are too small for their current activity. Lowell has no facility.