



**Massachusetts Bay
Transportation Authority**

Unconstrained 10-year Capital Investment Framework

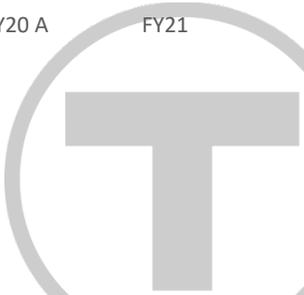
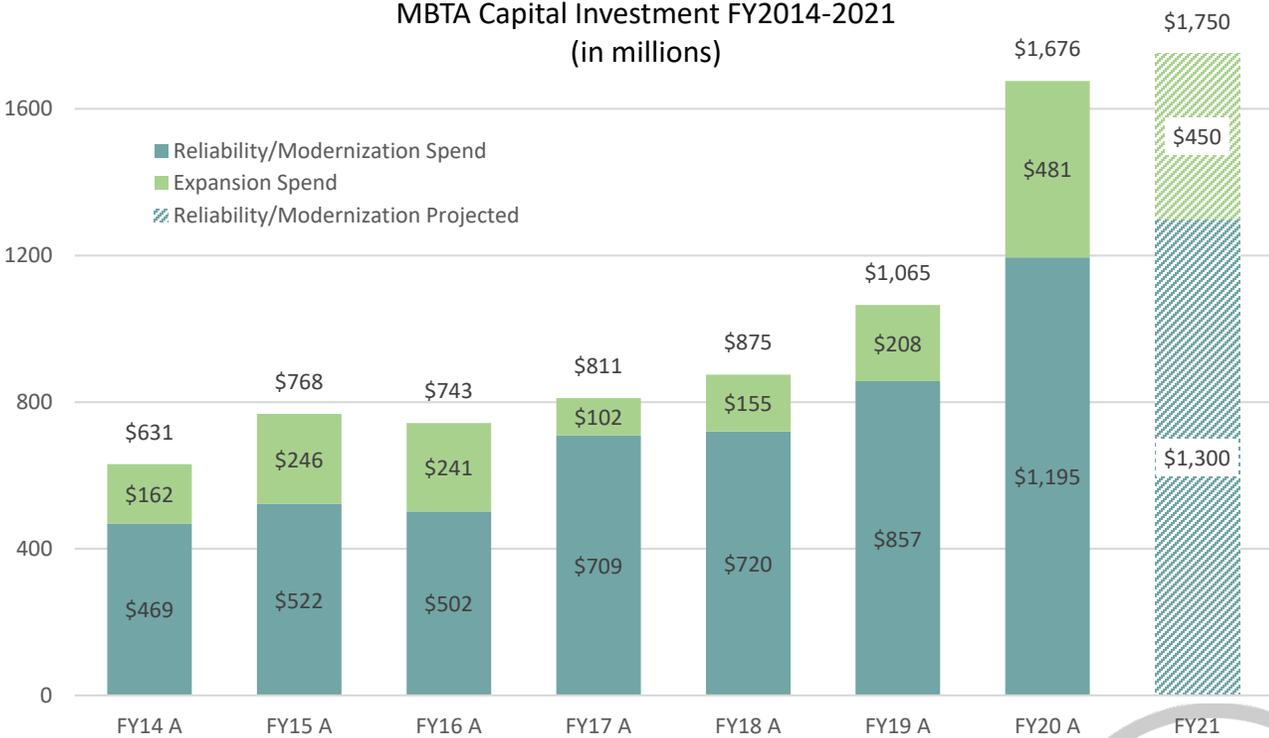
Fiscal and Management Control Board

June 7, 2021

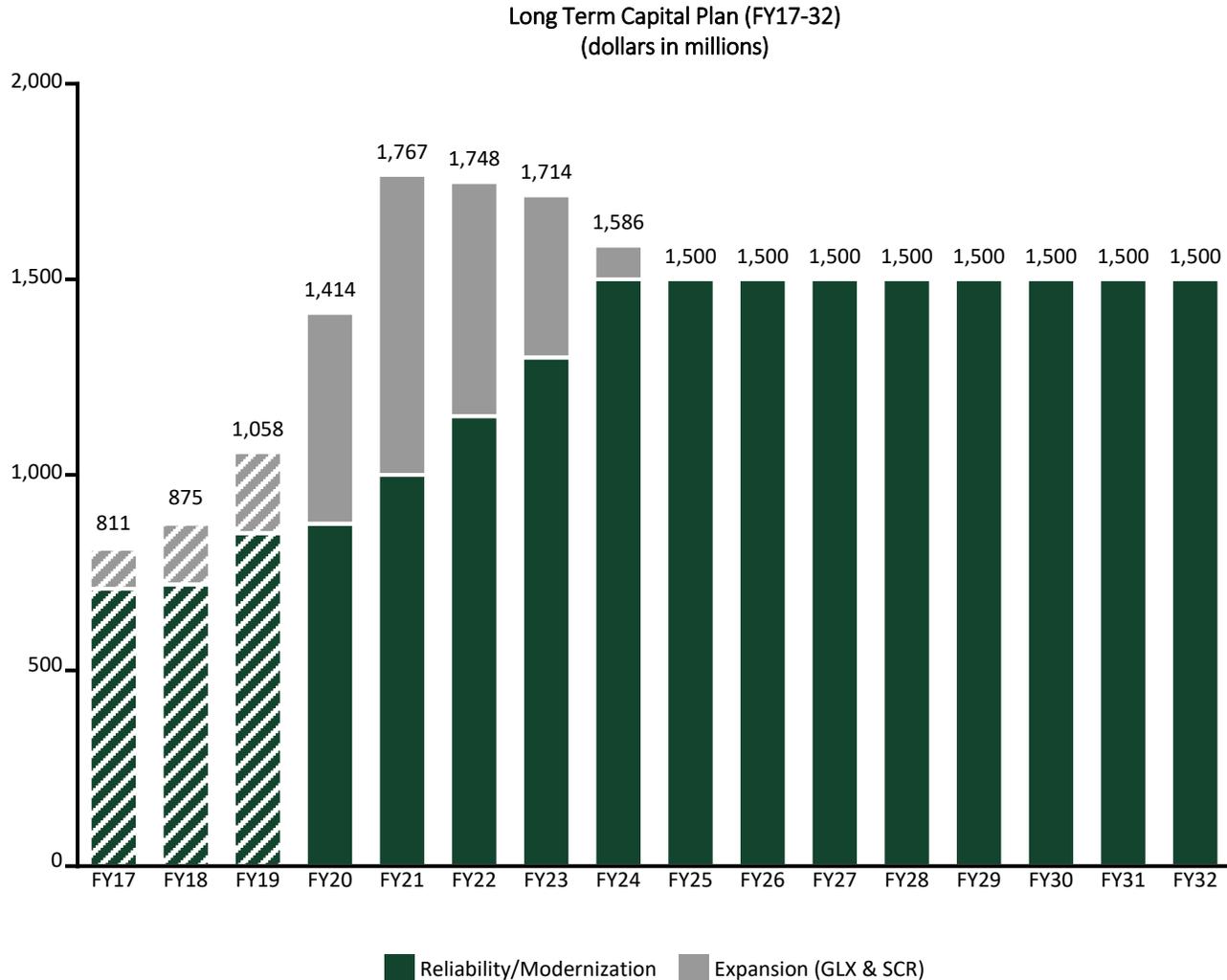
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Lookback: FY21 Capital Investments

- The MBTA has dramatically increased overall capital investment – FY21 output expected to hit a record \$1.75B
- A number of major capital programs are on a trajectory for success and major transformation programs are in flight
- Capital investments, in motion since 2015, have produced real improvements to the condition of the MBTA’s assets



Lookback: Long-Term Capital Plan



- The MBTA's Long-Term Capital Plan addressed current asset condition and modernization needs by 2032 - assumed \$10B capital needs estimate as baseline
- The plan included capital investment of more than \$1.5 billion per year to address reliability and modernization capital needs
- Included capital needs for asset condition, modernization, transformation, safety, capacity and expansion



Major Capital Program Goals and Future Funding Needs

Major Program	Public Long-term Goal	Type of Investments	Estimated Cost to Achieve Goals
Reliability/Asset Management	Address current asset condition and modernization needs by 2032	<ul style="list-style-type: none"> Safety, Reliability and modernization investments 	<ul style="list-style-type: none"> \$10B capital needs estimate*
Accessibility	Improve accessibility at MBTA commuter rail, subway and bus stations. Investments are necessary to meet the goals of the Authority's Plan for Accessible Transit Infrastructure ("PATI")	<ul style="list-style-type: none"> Safety, Reliability and modernization investments 	<ul style="list-style-type: none"> Current estimate is around \$6B to achieve a fully accessible system
Bridge and Tunnel	Reconstruct and replace MBTA commuter rail and transit bridges and tunnels system-wide	<ul style="list-style-type: none"> Safety, Reliability and Modernization 	<ul style="list-style-type: none"> \$1.5B capital need estimate for bridges, tunnels and culverts
Bus and Bus Facility	Rehabilitate and replace the MBTA revenue fleet and rehabilitate and upgrade maintenance and administrative facilities that support MBTA operations	<ul style="list-style-type: none"> Safety, Reliability and modernization investments 	<ul style="list-style-type: none"> \$100-130M annually to replace bus fleets \$4.5B to replace existing facilities to support phased introduction of BEBs
Power Program	Rehabilitate, replace and upgrade power assets across the commuter rail and transit system	<ul style="list-style-type: none"> Safety, Reliability and modernization investments 	<ul style="list-style-type: none"> \$1.7B in power needs identified in the Systemwide Power Assessment Report
Green Line Transformation	Improves the quality of service on the Green Line through fleet modernization and infrastructure/facilities upgrades, as well as improved capacity, accessibility and state-of-the-art technology.	<ul style="list-style-type: none"> Safety, Reliability, modernization and capacity investments 	<ul style="list-style-type: none"> Vehicles and infrastructure: \$940M Accessibility requirements and improvements: \$1.1B Capacity improvements: \$1.5B
Red Line/Orange Line Program	Includes the set of vehicle and infrastructure investments needed to fully modernize the fleet and achieve the service goal of 3 minute headways on the RL and 4.5 minute headways on the OL.	<ul style="list-style-type: none"> Safety, Reliability, modernization and capacity investments 	<ul style="list-style-type: none"> Sustain reliability targets: \$3.3B
Rail Vision/Rail Transformation Phase 1	Incorporate options for improving service on the Commuter Rail, which are the first steps identified in a larger Commuter Rail transformation as outlined in Rail Vision.	<ul style="list-style-type: none"> Safety, Reliability, modernization and capacity investments 	<ul style="list-style-type: none"> Alternatives ranging from \$1.7B - \$28.9B (not including baseline investments) Rail Transformation Phase I: \$3B - \$3.5B
Focus40	Long range investment plan to position the MBTA to meet the needs of the Greater Boston region in 2040.	<ul style="list-style-type: none"> Safety, reliability, modernization and expansion 	<ul style="list-style-type: none"> N/A

Unconstrained Capital Investment Framework

What this is

- A high level approximation of the capital cost of the MBTA's public commitments and plans over the next 10+ years
- Includes the Authority's current program, an estimate of funding needed to meet state of good repair and transformation program public commitments (many of which extend beyond the 10 year window), and initial estimates for a portfolio of future modernization and expansion efforts

What this isn't

- Constrained. This estimate is not constrained by either funding available or by the Authority's capacity to deliver a certain level of capital work
- Final. This is a high-level model and will be supported in the long term by detailed bottom up project estimates

Sources

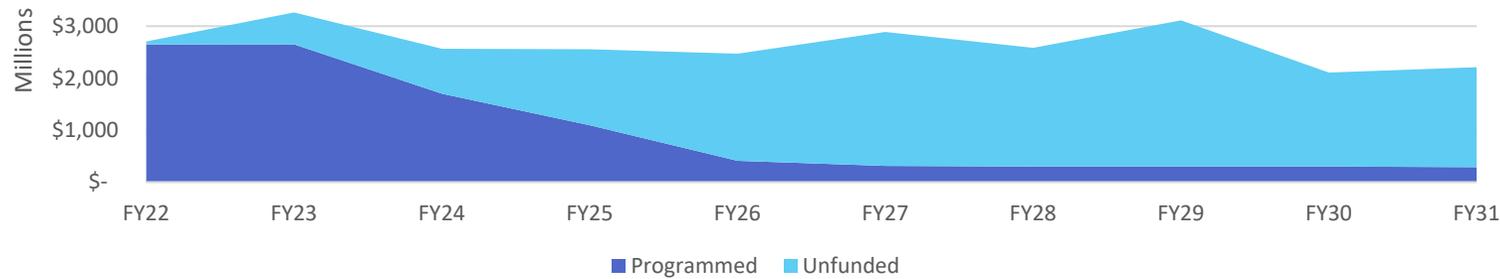
- Current program of projects included in the MBTA's existing capital program, identified programmatic costs associated with published plans and studies and high level program estimates included where a detailed estimate is not known



10 Year Unconstrained Capital Investment Framework

Resequencing of major programs will likely be needed to help level-out future unfunded needs, but additional funds are necessary to achieve basic state of good repair and modernization goals

Major Programs Programmed and Unfunded



MAJOR PROGRAMS: TOTAL FUNDING ESTIMATED NEEDS													
Mode	Program	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	TOTAL	Notes
Bus	Bus Transformation	\$181	\$422	\$445	\$374	\$310	\$350	\$444	\$287	\$430	\$430	\$3,674	Includes facilities and future fleet procurements
Rapid Transit	Red / Orange Line Transformation	\$364	\$636	\$428	\$280	\$139	\$347	\$333	\$333	\$229	\$229	\$3,314	Continued vehicle and SGR investments and vehicle acceptance
	Green Line Transformation	\$230	\$272	\$234	\$157	\$212	\$292	\$307	\$311	\$271	\$390	\$2,677	Includes accessibility, SGR, vehicle procurement, and future capacity investments
Rail	Rail Transformation	\$25	\$135	\$163	\$344	\$370	\$480	\$94	\$774	\$46	\$3	\$2,433	Planning, SGR, and future transformation investments
Systemwide	Bridge and Tunnel	\$202	\$202	\$202	\$202	\$202	\$202	\$202	\$202	\$202	\$202	\$2,022	
	Power	\$269	\$233	\$313	\$140	\$171	\$188	\$185	\$185	\$69	\$98	\$1,850	
	Accessibility	\$67	\$104	\$82	\$306	\$302	\$305	\$295	\$295	\$295	\$295	\$2,348	Includes rapid transit station, commuter rail and bus investments, Green Line work included in GLT
	Resiliency	\$0	\$50	\$50	\$50	\$100	\$100	\$100	\$100	\$100	\$100	\$750	Placeholder to reflect future resiliency work
	Other Assets*	\$749	\$626	\$464	\$464	\$464	\$464	\$464	\$464	\$464	\$464	\$5,086	Includes BL, Fare Transformation, Technology, Safety/Security, The RIDE, Ferry, and Mattapan Line, as well as SGR investments across all modes
Expansion	GLX, SCR, and Expansion Project Development	\$608	\$563	\$163	\$79	\$41	\$0	\$0	\$0	\$0	\$0	\$1,454	Includes funding currently programmed for expansion projects in the FY22 CIP
	Red-Blue Connector	\$10	\$21	\$21	\$158	\$160	\$160	\$160	\$160	\$0	\$0	\$850	Current total project cost, divided evenly across years included in the project timeline
Total		\$2,705	\$3,264	\$2,566	\$2,555	\$2,470	\$2,888	\$2,583	\$3,111	\$2,106	\$2,211	\$26,458	

What is included in this estimate?

Draft FY22 CIP Program of Projects

- Reflects currently programmed projects in the FY22 CIP

Deferred maintenance backlog and ongoing asset replacement

- At the mode and asset level, captures estimated on-going maintenance reliability and modernization work
- Plugs to ensure the MBTA maintains a capital investment level of more than \$1.5 billion per year to address reliability and modernization needs

Major program investments in line with public goals

- Plugs for future projects intended to capture additional scope and future program phases in line with published goals (timing of investments are estimates – they do not reflect funded commitments)



Where do we go from here?

Near term

- Complete annual Asset Management NTD Reporting: October 2021
- Continue to seek additional support, including discretionary funding and financing opportunities, to sustain the current level of investment in the MBTA capital program

Medium term

- Sequence the capital portfolio of projects and programs in line with available resources, utilizing the FY23-27 CIP process
- Capital Needs Inventory and Prioritization Report: Based on updated asset inventory data, update unconstrained inventory and develop prioritization report of capital needs over a 10-year horizon

Long term

- Continue to refine and integrate the MBTA asset management program with the annual update of the 5-year Capital Investment Plan
- Update the MBTA's Transit Asset Management Plan: October 2022



Appendix – Sequencing Illustration



Sequencing Illustration - Major Capital Investments

What this is

- A bottom-up illustration of existing and potential major capital investments over the next 10+ years
- Broken out by mode and/or transformation program, illustration indicates where certain projects are fully funded, partially funded or not yet funded
- A resource to help inform future decision-makers

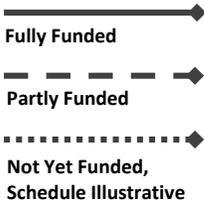
What this isn't

- Comprehensive. This illustration is not a comprehensive list of all projects included in the draft FY22 CIP or all of the investment ideas identified in Focus40
- Constrained. This illustration is not constrained by available funding or by the Authority's capacity to deliver a certain level of capital work
- Final. This presents a program of investment ideas which – taken together – are intended to broadly target the ways in which the MBTA can become more reliable, robust and resilient. The CIP process will continue to provide an avenue for ongoing engagement and updates on the capital program's progress.

Sources

- Identified capital project costs and high-level project (or program) estimates included where a detailed estimate is not known

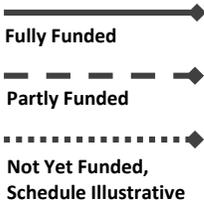




Transformation Programs: Programmed and Potential Future Phases

Program	Phase	Phase Description	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	Currently Programmed*	Estimated Additional Cost to Complete**	Future Decision Point		
Bus Fleet and Facility	Planning and Interim Improvements	Includes interim facility improvements plus 0-15% design and planning for the modernization of MBTA bus facilities to accommodate future battery electric fleets	Fully Funded											\$177.9M	-	Decision to procure battery electric (BEB) vs enhanced electric hybrid (EEH) buses for future fleet replacement will determine cost and timeline for facility modernization program, and influence the MBTA's decarbonization timeline.	
	First Phase: Quincy / North Cambridge	Construction of new Quincy bus facility and retrofit of North Cambridge to accommodate first battery electric bus (BEB) fleet. First BEBs are expected to come online in FY24	Fully Funded		Partly Funded	Partly Funded							\$371.9M	\$25.0M			
	Next Priorities: Arborway, Fellsway, Lynn	Includes 15-100% design, real estate acquisition, and construction of next tier of bus facilities targeted for replacement and continued investment in battery electric fleets		Not Yet Funded, Schedule Illustrative										-	\$1,075.4M		
	Future Priorities: Albany, Southampton, Cabot, Charlestown	15-100% design and construction for final four facilities required to transition to all-battery electric bus (BEB) fleet								Not Yet Funded, Schedule Illustrative					-		\$1,547.3M
Red Line / Orange Line	Vehicle Procurement	Procurement of new heavy rail passenger cars (252 Red Line, 152 Orange Line) to improve reliability and expand capacity	Fully Funded											\$1,073.5M	-	After vehicles are fully accepted, additional investment needed in track and power assets to bring both lines into a state of good repair and improve safety and reliability.	
	Vehicle Acceptance	Includes facilities improvements required to accept new fleet. Unprogrammed amount includes cost to complete work at Codman	Fully Funded		Partly Funded	Partly Funded							\$554.0M	\$44.0M			
	Infrastructure Reliability	State of good repair investments in track, signal, power, and facilities required to improve headways and reliability	Fully Funded		Partly Funded	Partly Funded	Not Yet Funded, Schedule Illustrative							\$661.8M	\$1,767.3M		
Green Line Transformation	Foundational Improvements	SGR investments to minimize service disruption, reduce speed restrictions, and improve condition of Green Line assets	Fully Funded				Partly Funded							\$612.9M	-	While the base order of Type 10s is fully funded in the CIP, significant investments in station accessibility and facilities are still required to accept vehicles.	
	Accessibility and Fleet Replacement	Bring stations into compliance with accessibility standards and bring new, fully accessible Type 10 vehicles online	Partly Funded												\$1,441.5M		\$1,167.2M
	Increased Capacity	Additional vehicles and infrastructure investments for "double" Type10 service, significantly increasing capacity of the Green Line	Fully Funded											\$12.9M	\$1,534.0M		Additional investment will be required for targeted capacity expansion associated with "double" Type 10 vehicles.
Regional Rail	Phase 1	Planning and fleet/infrastructure investments for first phase of electrification, providing (B)EMU service on the Providence Line, Fairmount Line, and Beverly/Lynn EJ Corridor	Fully Funded		Not Yet Funded, Schedule Illustrative									\$50.0M	\$1,329.0M	Current planning studies and Phase 1 of electrification will determine priorities for investment in next phase of Regional Rail.	
	Next Priorities	Next phase of Regional Rail program, focusing on Newburyport / Rockport, Worcester, Haverhill, Franklin, and Middleborough/Old Colony lines.													-		TBD

* Reflects total authorized budget as of the FY22 CIP
** Reflects portion of total investment cost that is unprogrammed as of the FY22 CIP



Other Major Programs: Programmed and Potential Future Phases

Program	Phase	Phase Description	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	Currently Programmed*	Estimated Additional Cost to Complete**	Future Decision Point
Blue Line	Stations and Infrastructure	Includes Harbor Tunnel assessment and rehabilitation, and future SGR improvements at Beachmont and Suffolk Downs	[Timeline: Solid blue line from FY22 to FY25, dotted blue line from FY25 to FY31]										\$88.4M	TBD	Ongoing station studies and harbor tunnel assessment will determine future needs.
	Expansion: Red-Blue Connector	Extension of Blue Line to Charles/MGH station to establish direct connection with Red Line	[Timeline: Solid blue line from FY22 to FY24, dotted blue line from FY24 to FY31]										\$15.0M	\$850.0M	Funding for full design and construction remains unprogrammed.
Mattapan	Vehicles and Infrastructure	Currently in planning, the Mattapan HSL Transformation project includes light rail vehicle replacement and associated infrastructure improvements	[Timeline: Solid red line from FY22 to FY26, dotted red line from FY26 to FY31]										\$118.0M	TBD	Further investment in infrastructure and vehicle strategy is required to complete this program.
Bridge and Tunnel	Bridge Inspection and Rating	Ongoing inspection and rating of bridges systemwide. Estimated cost to complete includes inspection and rating funding needed to continue program through FY31.	[Timeline: Solid black line from FY22 to FY28, dotted black line from FY28 to FY31]										\$83.4M	\$26.3M	The first 3 priority bridge replacement projects will require additional construction funding to complete. While there is ongoing design funding, construction for any future bridge replacement is not currently programmed in the CIP.
	Ongoing Bridge Design and Construction	Includes funding for ongoing design work to rehabilitate and replace bridges systemwide. Estimated cost to complete includes all identified unfunded bridge priorities	[Timeline: Solid black line from FY22 to FY24, dotted black line from FY24 to FY31]										\$568.6M	\$1,180.7M	
	Bridge Replacement	Currently includes rehabilitation of Longfellow Approach and associated infrastructure at Charles/MGH; rehabilitation and expansion of North Station Draw 1; and rehabilitation of Saugus Drawbridge	[Timeline: Solid black line from FY22 to FY23, dotted black line from FY23 to FY31]										\$342.4M	\$517.6M	
	Tunnel Inspection and Repairs	Ongoing inspection, design support, and on-call repairs for tunnel infrastructure. Cost to complete includes funding needed to continue program through FY31	[Timeline: Solid black line from FY22 to FY29, dotted black line from FY29 to FY31]										\$63.0M	\$18.0M	
Power	Ongoing Power Investments	Includes AC and DC Cable, duct banks, traction power, generators, high voltage yard work, and other power assets identified in the 2019 Systemwide Power Assessment	[Timeline: Solid black line from FY22 to FY23, dotted black line from FY23 to FY31]										\$637.5M	\$1,199.6M	Further investment is required to address all power needs identified in 2019 study.
Accessibility	Transit Station Accessibility / Elevator Program	Elevator replacement, addition of redundant elevators, and other station accessibility improvements. Excludes Green Line stations covered under the GLT accessibility phase.	[Timeline: Dotted black line from FY22 to FY31]										\$245.2M	\$1,574.8M	Significant additional investment will be needed to address elevator replacement, platform issues, path of travel, and other identified barriers to access.
	PATI Bus Stop Accessibility	Includes path of travel and other accessibility improvements at bus stops	[Timeline: Dotted black line from FY22 to FY31]										\$58.8M	\$25.5M	
	Commuter Rail Station Accessibility	Rehabilitation and accessibility improvements at Commuter Rail stations, including major projects at Attleboro, Winchester, Worcester Union, Natick Center, Mansfield, and Newton stations	[Timeline: Solid black line from FY22 to FY23, dotted black line from FY23 to FY31]										\$200.7M	\$2,319.3M	

* Reflects total authorized budget as of the FY22 CIP
 ** Reflects portion of total investment cost that is unprogrammed as of the FY22 CIP