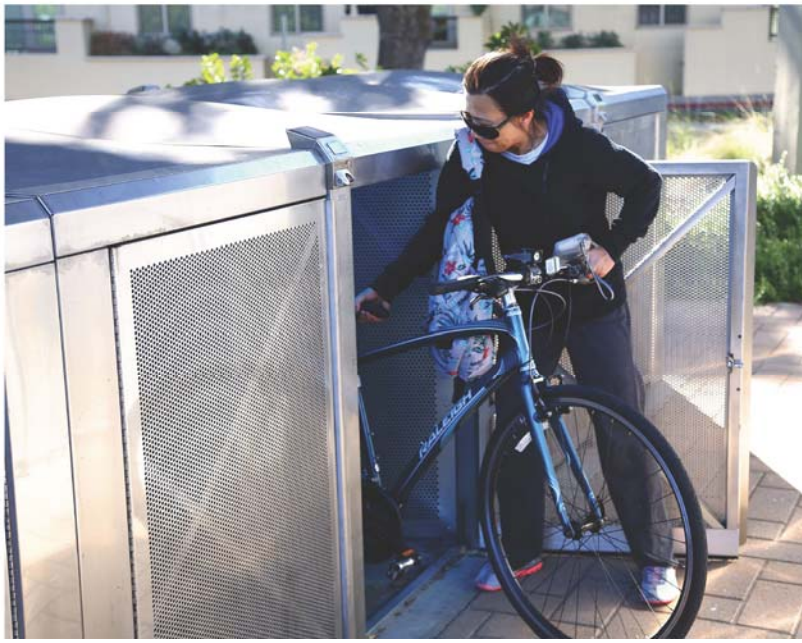
BART FISCAL YEAR 2017

SHORT RANGE TRANSIT PLAN AND CAPITAL IMPROVEMENT PROGRAM

July 2017



Short Range Transit Plan and Capital Improvement Program

Federal transportation statutes require that the Metropolitan Transportation Commission (MTC), in partnership with state and local agencies, develop and periodically update a long-range Regional Transportation Plan (RTP) and a Transportation Improvement Program (TIP) that implements the RTP by programming federal funds to transportation projects contained in the RTP. To effectively execute these planning and programming responsibilities, MTC requires that each transit operator in its region that receives federal funding through the TIP prepare, adopt, and submit to MTC a Short Range Transit Plan (SRTP) that includes a Capital Improvement Program (CIP).

Schedule, cost, and performance data used to generate this SRTP/CIP were based upon the most current information available as of June 2017.

Table of Contents

Page

Table of Figures

1 INTRODUCTION

This Fiscal Year 2017 Short Range Transit Plan/Capital Improvement Program (covering FY17-FY26 for the SRTP and FY17-FY31 for the CIP) forecasts BART's operating and capital needs, including reinvestment and upgrades to its aging system and new investments to modernize and expand the system. This SRTP/CIP is presented in compliance with the requirements of the Metropolitan Transportation Commission (MTC). The purpose of the SRTP/CIP is to:

- → Serve as a management and policy document for BART.
- → Provide the Federal Transit Administration (FTA) and MTC with required information to meet regional fund programming and planning criteria.
- → Describe and validate BART's capital and operating budgets.
- → Inform requests for federal, state, and regional funds.
- → Assess BART's financial capacity to carry out proposed levels of service and the associated capital improvement program.
- → Provide MTC with regular information on projects and programs of regional significance.
- → Articulate goals, objectives, and standards by which BART assesses the system's performance (also part of the MTC Triennial Performance Audit of the operator).

BART is increasingly transforming its management practices to correspond with its Strategic Plan Framework, as adopted by the Board of Directors in October 2015. Per Board direction, the agency has committed to advancing the Vision statement: "BART supports a sustainable and prosperous Bay Area by connecting communities with seamless mobility." The programs and projects described in this SRTP/CIP reflect the Strategic Plan Framework's Mission Statement, goals and strategies. Specifically, over the next two years, BART will integrate the annual budget process, strategy-based four-year work plans, enhanced performance management, and an annual report under the umbrella of the Strategic Plan Framework.

The SRTP/CIP is a forecasting tool that allows BART to identify potential financial challenges to its future operating budgets and capital project portfolio. BART's financial capacity to carry out proposed levels of service and the associated capital improvement program is an important component of the SRTP/CIP. The financial forecast shows BART facing challenges in its operating program over the 10 years: BART must fund critical capital renovations and infrastructure upgrades while maintaining high service levels to meet ridership demands and operating new system extensions when they come on line.

The forecast in the SRTP/CIP is based on the best available assumptions at the time of publication and outlines a financial scenario based on those assumptions. The assumptions that drive the forecast are constantly changing, so the forecast represents just one of many possible future scenarios. The SRTP/CIP forecast allows regional transportation partners, the BART Board of Directors, and BART staff to formulate strategies in advance of the potential financial challenges. The SRTP/CIP does not provide a detailed plan of response to identified challenges as the responses will be borne from the identified strategies and reflected in future operating and capital budgets. Thus, the assumptions reflected in the SRTP/CIP will be updated as new data become available and the resulting operating plans, revenue,

expenses, allocations, and the capital project portfolio reflected in the SRTP/CIP will be revised accordingly.

The previous BART FY15-FY24 SRTP/CIP identified future operating shortfalls driven, in part, by BART's need to fund critical capital infrastructure. BART's capital funding could not keep pace with the degradation of its aging infrastructure. As a response strategy, BART proposed increasing capital funding through the issuance of general obligation bonds. The passage of Measure RR in November 2016 authorizes BART to issue $3.5 billion in general obligation bonds to fund critical system reinvestment projects, including track replacement; tunnel and power infrastructure repair; mechanical and electrical system upgrades; and capacity enhancements, including replacement of BART's legacy train control system. The projects funded by Measure RR will allow BART to more quickly address the most critical safety-sensitive projects, improve system performance, and allow more frequent and reliable service. However, even with this infusion of capital funding, the forecast anticipates capital funding shortfalls for BART in the coming years. As a result, BART will continue to implement financial initiatives that will allow it to balance service levels with its operating budgets and capital needs.

2 OVERVIEW OF THE BART SYSTEM

For more than 40 years, BART has provided reliable rapid transit service in the Bay Area. Over that time, the system has grown to accommodate the needs of a more densely populated and expanding region, where economic activity and employment have transcended the suburb-to-city commute markets for which BART was originally designed. This chapter discusses the key milestones in BART's history and introduces BART's governance and organizational structures. It also describes the service BART provides, the areas it serves, its fare structure, and the extensive physical infrastructure that is required to ensure that BART runs smoothly and safely. Figure 2-1 below sets out key milestones in BART's history.

Figure 2-1 Milestones in BART History

1957	California State Legislature creates BART in response to Bay Area growth and transportation needs
1962	Voters approve $792 million general obligation bond issue in San Francisco, Alameda, and Contra Costa counties that provides funding to construct original 71-mile system (bond fully paid off in 2000)
1972	BART begins service 12 stations open from MacArthur to Fremont
1973	20 stations open Richmond to Ashby: 6 stations Concord to Rockridge: 6 stations Montgomery Street to Daly City: 8 stations
1974	Transbay service begins
1976	Embarcadero station opens
1995	North Concord/Martinez station opens
1996	Colma and Pittsburg/Bay Point stations open
1997	Castro Valley and Dublin/Pleasanton stations open
2003	Four San Francisco International Airport (SFO) extension stations begin service: South San Francisco, San Bruno, San Francisco International Airport (SFO), and Millbrae
2004	$980 million bond approved by voters for BART earthquake safety projects
2007	BART and SamTrans, with the aid of MTC, agree to turn SFO extension operations over to BART
2011	West Dublin/Pleasanton station opens
2012	BART celebrates 40 years of service and, on the day of the Giants' World Series victory parade, carries the most riders ever, nearly 570,000
2014	BART-to-Oakland International Airport service opens
2016	$3.5 billion general obligation bond approved by voters to fund critical BART capital needs
2017	Warm Springs/South Fremont station opens
2017/2018	Two Santa Clara County stations to open: Milpitas and Berryessa Two eastern Contra Costa County stations to open: Pittsburg Center and Antioch

2.1 Governance

Nine publicly elected directors form BART's governing board. A member of the BART Board:

- → Serves a four-year term.
- → Represents approximately 374,000 residents in one of nine election districts that comprise the three-county District.
- → Provides strategic and policy guidance to achieve BART's mission to "provide safe, reliable, clean, quality transit service for riders."
- → Represents diverse constituencies, taking a leadership role by working with a broad range of stakeholders in the region, state, and nation to promote effective transit policies and political support for regional transit initiatives.

Figure 2-2 BART Board of Directors

BART Board of Directors	Counties Represented	Term Ends in December
Rebecca Saltzman, President	Alameda/Contra Costa	2020
Robert Raburn, Ph.D, Vice President	Alameda	2018
Debora Ann Allen	Contra Costa	2020
Thomas M. Blalock, P.E.	Alameda	2018
Bevan Dufty	San Francisco	2020
Nick Josefowitz	San Francisco	2018
Joel Keller	Contra Costa	2018
John McPartland	Alameda	2020
Lateefah Simon	Alameda/Contra Costa/San Francisco	2020

2.2 Organizational Structure

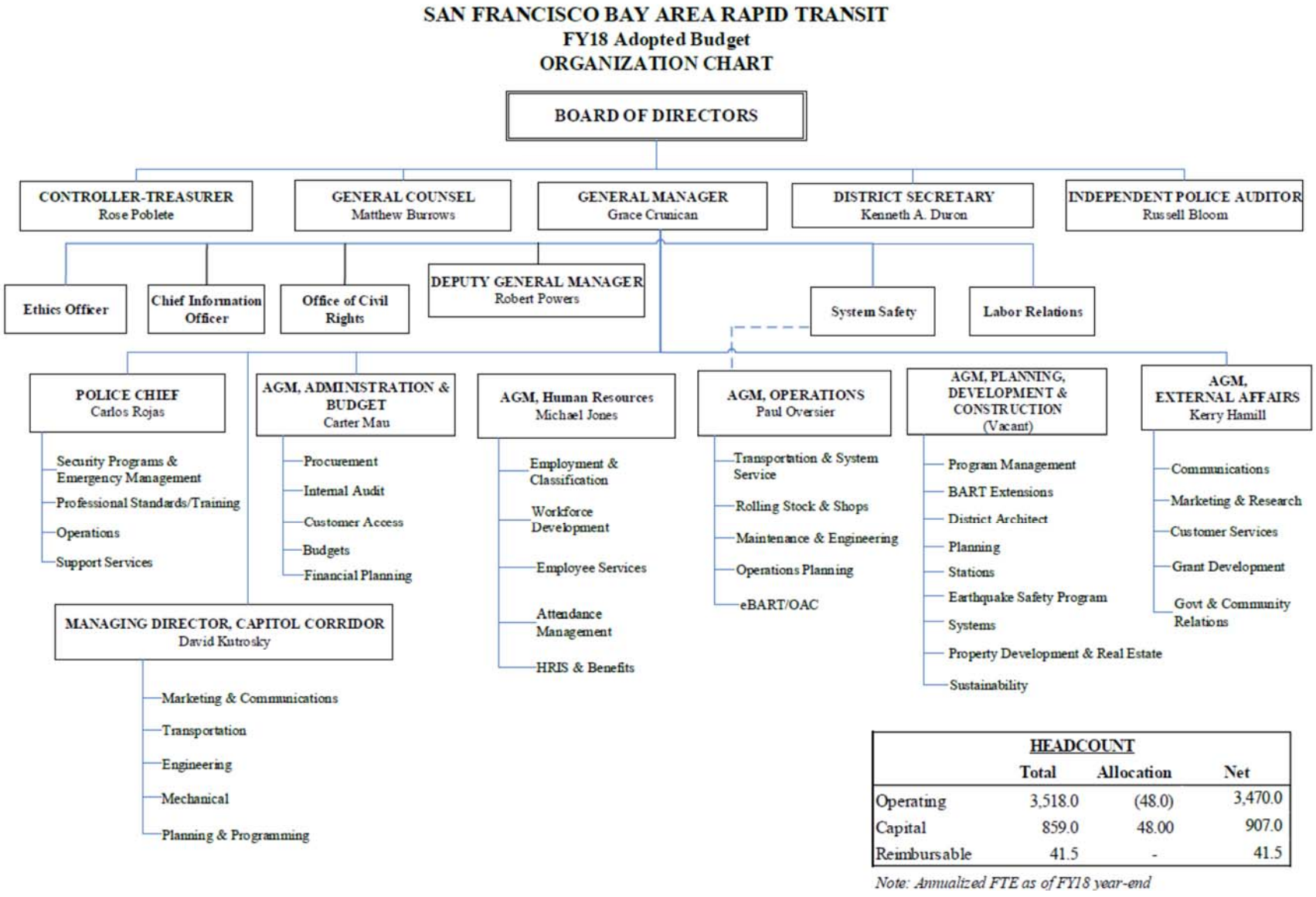
BART has five employee unions and collective bargaining agreements, covering 85% of BART's workforce. The labor agreements for Service Employees International Union 1021, Amalgamated Transit Union Local 1555, and American Federation of State, County and Municipal Employees Local 3993 expire in FY21; the agreements for the two police unions expire in FY18. Union membership, based upon positions budgeted for FY18, is shown in Figure 2-3. The remainder of BART staff is non-represented.

Figure 2-3 Union Membership

Union	Membership
Service Employees International Union 1021	2,020
Amalgamated Transit Union Local 1555	961
American Federation of State, County and Municipal Employees Local 3993	366
BART Police Officers Association	291
BART Police Managers Association	50

Figure 2-4 shows BART's organizational structure for the FY18 Adopted Budget. BART has five Board-appointed positions: General Manager, General Counsel, Controller-Treasurer, District Secretary, and Independent Police Auditor. BART is the only transit district in California with a dedicated police department. BART Police provide a full range of law enforcement services within its jurisdiction.

Figure 2-4 BART Organizational Chart



2.3 Services Provided and Areas Served

2.3.1 Fixed-Route Service

BART operates five lines providing service in Alameda, Contra Costa, San Francisco, and San Mateo counties. Each line is identified by color (yellow, blue, red, orange, and green), as shown in the map (Figure 2-7) on the next page. The current lines and hours of service are given in Figure 2-5 below.

Figure 2-5 BART Routes and Hours of Service

Route	Hours of Service		
	Weekday	Saturday	Sunday
YELLOW: Pittsburg/Bay Point—SFO/Millbrae[1]	4 a.m.–12 a.m.	6 a.m. –12 a.m.	8 a.m. –12 a.m.
BLUE: Dublin/Pleasanton—Daly City	4 a.m. –12 a.m.	6 a.m. –12 a.m.	8 a.m. –12 a.m.
RED: Richmond—Millbrae[2]	4 a.m. –9 p.m.	9 a.m. –7 p.m.	Not in service
ORANGE: Richmond—Warm Springs/South Fremont[3]	4 a.m. –12 a.m.	6 a.m. –12 a.m.	8 a.m. –12 a.m.
GREEN: Warm Springs/South Fremont[3]—Daly City[4]	4 a.m. –6 p.m.	9 a.m. –7 p.m.	Not in service

[1] Service extended to Millbrae during evenings and weekends

[2] Service terminates at Daly City during evenings and weekends

[3] Service terminates at Fremont during weekdays

[4] Service terminates at Fremont during evenings and weekends

The system's headways (minutes between trains) are shown in Figure 2-6.

Figure 2-6 BART Headways

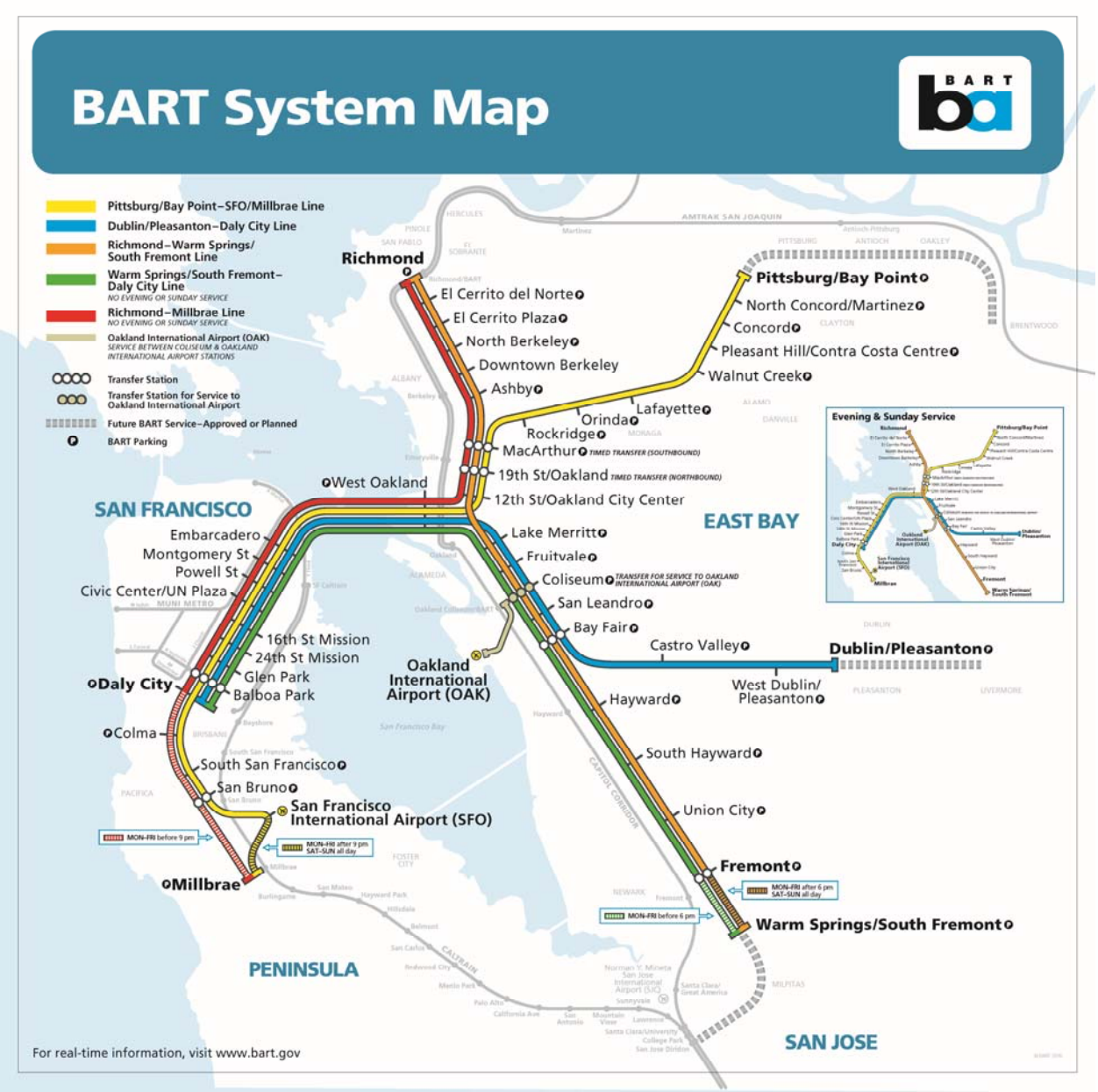
	Headway (minutes)
Monday through Friday[1]	Day: 15 Night: 20
Saturday, Sunday and major holidays	20

[1] For the Pittsburg/Bay Point—Daly City line, peak period (6 a.m. to 9 a.m. and 4 p.m. to 7 p.m.) headways are five or 10 minutes

BART periodically reviews and adjusts service levels, if necessary, to meet varying levels of ridership demand. Changes include lengthening or shortening trains, adding or removing trains scheduled on a route, or even changing a route's service hours or terminal stations. BART's current peak-period revenue service requires 595 cars out of a total fleet of 669 cars, an effective utilization rate of nearly 89%.

Depending on demand, holiday rail service is operated on a full or modified weekday schedule, or a Saturday or Sunday schedule. BART service is also coordinated with major Bay Area events. Additional rail service for special events is provided by either adding cars to regularly scheduled trains, placing additional trains in service, or providing revenue operations at times when the system is normally closed (e.g., early Sunday morning opening for the annual Bay-to-Breakers footrace in San Francisco).

Figure 2-7 BART System Map



BART-to-OAK is an automated people mover operating between the Coliseum station or Oakland International Airport. BART-to-OAK has the same general hours of operation as BART's rapid rail service, and provides a service frequency of six minutes during the day and evenings, and 20 minutes at night.

The East Contra Costa BART Extension Project (eBART) is a two-station rail commuter rail service that will provide a key linkage to eastern Contra Costa County. eBART will use modern Diesel Multiple Unit (DMU) trains to provide rail service between BART's Pittsburg/Bay Point Station and Antioch. The system consists of eight DMUs, a maintenance and operations facility, two stations, a transfer platform, and approximately 10 miles of track. eBART revenue service is planned to commence by May of 2018.

The Silicon Valley Berryessa Extension (SVBX) will link the Warm Springs/South Fremont station to Milpitas and Berryessa near San Jose. The SVBX will be constructed through a partnership between BART

and the Santa Clara Valley Transportation Authority (VTA), and VTA will pay all capital and operating costs of this project, including any impacts the BART's core system. SVBX is expected to open in 2018.

2.3.2 Demand Responsive Service

BART complies with the Americans with Disabilities Act (ADA) requirement to provide paratransit service comparable and complementary to the BART system. Federal regulations define the ADA paratransit service area as a 0.75-mile radius around each BART station.

Paratransit service is available to persons who are prevented from using the accessible fixed-route services BART offers due to a disabling health condition. BART participates in a regional ADA eligibility process followed by the principal transit operators in the San Francisco Bay Area. BART, together with other Bay Area transit agencies, works to coordinate regional paratransit travel through the Bay Area Partnership Accessibility Committee.

Paratransit Partnerships with Other Operators

To provide effective paratransit service in its service area, BART partners with the following transit operators:

AC Transit: In their areas of joint service, BART and AC Transit fund and administer the East Bay Paratransit Consortium (EBPC). Service is provided through contractors. BART assumes 31% and AC Transit 69% of the broker and service provider costs based on their proportionate areas of responsibility. They have split the cost of the Program Coordinator's Office 50/50 since FY11. This office provides a neutral central point of contact and fulfills administrative and contract monitoring activities for the two agencies.

SFMTA: BART has a Memorandum of Understanding (MOU) with the San Francisco Municipal Transportation Agency (SFMTA) whereby SFMTA provides service to meet BART's obligation within the City and County of San Francisco. BART reimburses SFMTA for 7.9% of the net cost of ADA paratransit service for all San Francisco riders. BART also pays SFMTA an administrative fee for these services, which is calculated at 4.7% of BART's annual payment.

Other Agencies: BART has financial agreements with the Contra Costa County Transit Authority (County Connection), Eastern Contra Costa Transit Authority (Tri Delta Transit), and Livermore Amador Valley Transit Authority (Wheels). These agencies provide paratransit service on BART's behalf during the same hours they operate their own ADA paratransit service. BART's share of the service provided by these operators is small compared to that provided by EBPC and SFMTA.

The efforts of BART and partner operators focus on providing all ride requests to eligible recipients while at the same time controlling costs.

2.3.3 Connecting Services Provided by Other Operators

Many Bay Area bus operators provide connecting (or "feeder") service to BART. These operators are AC Transit, Benicia Breeze, County Connection, Dumbarton Express (operated by AC Transit), Fairfield-Suisun Transit, Golden Gate Transit, Muni (SFMTA), Rio Vista Delta Breeze, SamTrans (including Caltrain), Santa Clara Valley Transportation Authority (VTA), Solano Express, Tri Delta Transit, Union City Transit, Vallejo Transit, WestCAT, and Wheels.

2.4 Fares

2.4.1 Fixed-Route Fares

BART fares are computed using a distance-based formula with surcharges applied. Fare structure components and fare media, including discounted tickets and transfers, are shown in Figure 2-8. Figure 2-9 details station-to-station fares for BART's 46 stations.

On January 1, 2016, the following fare change was implemented:

- → Fares increased by 3.4% on average in accordance with the Board-approved productivity-adjusted Consumer Price Index (CPI)-based fare increase program.
- → The necessary federal Title VI equity analysis and public outreach were performed on this increase, and the Board approved the finding that the increase did not result in a disproportionate impact on protected groups.

On January 1, 2018, the following Board-approved fare changes will be implemented:

- → A fare increase of 2.7% on average in accordance with the Board-approved productivity-adjusted CPI-based fare increase program.
- → A $0.50 surcharge added to the fare for each trip taken with a magnetic-stripe paper ticket.
- → A new 50% discount for youth riders age 13 through 18.
- → A discount reduction from 62.5% to 50% for youth riders age 5 through 12.

The necessary federal Title VI equity analysis and public outreach were performed and approved by the Board; a mitigation action plan, subject to Board approval, will be developed for the paper ticket surcharge to distribute free Clipper cards to low-income riders.

2.4.2 Demand Responsive Fares

The ADA limits the fare that can be charged for ADA paratransit service to twice the full adult fare for a comparable fixed-route trip.

Fares for paratransit services in which BART participates vary widely due to the range of fare structures of BART and local bus agencies.

- → BART/AC Transit EBPC fares are distance-based and range from $4.00 to $6.00 for trips in the East Bay and from $6.00 to $10.00 for trips into and out of San Francisco.
- → San Francisco trips that go beyond the BART service territory carried by EBPC also pay an additional Muni paratransit fare of $2.25.
- → SFMTA paratransit provides travel within San Francisco.
- → SF Access ADA service is $2.25 per ride.
- → SFMTA also provides non-ADA taxi service for eligible riders at the rate of $5.50 for $30 worth of service.
- → Fares for BART's other paratransit partners currently range from $2.50 to $4.00 per trip.

2.4.3 Inter-operator Transfer Arrangements and Fare Coordination

BART riders can receive discounted transfer fares for trips on the following operators: AC Transit, County Connection, Muni, Tri Delta Transit, Union City Transit, VTA, WestCAT, and Wheels. Discounted transfers

are automatically given when the rider uses a Clipper card on all these operators (Clipper is the Bay Area's universal fare card that works on most Bay Area transit systems). AC Transit, County Connection, Union City Transit, and Wheels also accept a paper transfer dispensed in the paid area of the BART station. In addition, Muni and BART have an agreement whereby BART accepts Muni's "A" Fast Pass, available only on Clipper, for unlimited rides on BART within San Francisco. The current values of the transfers and "A" Fast Pass are shown in Figure 2-8.

Figure 2-8 BART Fare Components and Ticket Prices (effective January 1, 2016)

TRIP LENGTH	Minimum Fare: Up to 6 miles	$1.95
	Between 6 and 14 miles[1]	$2.00 + 14.6¢/mile
	Over 14 miles	$3.14 + 8.8¢/mile
SURCHARGES	Transbay	$0.97
	Daly City[2]	$1.12
	San Mateo County[3]	$1.41
	Capital[4]	$0.13
	Premium fare applied to trips to/from SFO	$4.42
	Oakland Airport Project Fare	$6.00
SPEED DIFFERENTIAL	Charge differential for faster or slower than average trips, based on scheduled travel time	±5.6¢/minute
RESULTING FARES	Range [5]	$1.95 to $15.70
	Average fare (before discounts) [6]	$4.08
	Average fare paid (after discounts) [6]	$3.80
RAIL FARE DISCOUNTS and SPECIAL FARES[7]	Children under 5	Free
	62.5% Discount:	$0.70-$5.85 when using Clipper card; $9 mag stripe ticket with $24 ticket value
	Children 5 through 12	
	Persons 65 and over	
	Persons with a qualifying disability	
	Students 13 through 18: 50% discount [8]	$16 ($32 ticket value)
	Regular adult: 6.25% discount	$45 and $60 ($48 and $64 ticket value)
	Excursion (entry/exit, same station) [9]	$5.75
MONTHLY RAIL/ MUNI PASS [10]	"A" Fast Pass (Unlimited monthly use of BART within San Francisco and SF Muni)	$91 (effective 1/1/17)
ONE-WAY TRANSFERS: FROM BART TO [11]	AC Transit (Clipper fare)	$0.50 off of $2 Clipper fare (25% disc)
	County Connection	$1 off of $2 fare (50% disc)
	Muni, within San Francisco[12]	$0.50 off of $2.25 fare (22% disc)
	Tri Delta Transit	$0.75 off of $2 fare (37.5% disc)
	Union City Transit	$0.50 off of $2 fare (25% disc)
	VTA (express buses only at Fremont station)	$0.50 off of $4 fare (12.5% disc)
	WestCAT	$0.75 off of $1.75 fare (43% disc)
	Wheels	$1 off of $2 fare (50% disc)
TWO-WAY TRANSFERS: FROM BART/ TO BART	AC Transit (cash fare)	$0.25 off of $2.10 one-way cash fare (12% disc)
	Muni, Daly City station[13]	Free ($2.25 one-way fare)
ADA SERVICE	East Bay Paratransit Consortium[14]	$4.00-$10.00
	All other areas	See ADA Paratransit Section

NOTES: BART Fare Components and Ticket Prices

[1] Trips over 6 miles within the East Bay Suburban Zone (certain station pairs between Pittsburg/Bay Point and Orinda, Fremont-Bay Fair, Richmond-Ashby, and Dublin/Pleasanton-Bay Fair) are priced at the fare indicated for trips up to 6 miles.

[2] The Daly City surcharge is applied to trips between Daly City station and San Francisco stations; it does not apply to Transbay trips or San Mateo County surcharge trips.

[3] The San Mateo County surcharge is applied to trips between San Mateo County stations (except trips between the San Francisco International Airport (SFIA) station and Millbrae station for which only the Premium Fare is charged) and trips between San Mateo County stations (except Daly City) and San Francisco stations. It does not apply to Transbay trips.

[4] The capital surcharge is applied to trips that begin and end in the three-county BART District including Daly City; the Board approved this surcharge in May 2005 to be used to fund capital projects within this area.

[5] Fares shown are effective January 1, 2016. BART rail fares are computed by automatic fare collection equipment and are rounded to the nearest 5¢. Prior fare increases occurred on January 1, 2014; July 1 of 2012 and 2009; January 1 of 2008, 2006, 2004, and 2003; April 1 of 1997, 1996, and 1995; January 1, 1986; September 8, 1982; June 30, 1980; and November 3, 1975.

[6] The average rail fare before and after discounts includes rail passenger revenue from all fare instruments. The figures shown are for FY16.

[7] Discounts are given with the appropriate Clipper card. High-value discount, red, and green magnetic stripe tickets continue to be sold via mail, at Lake Merritt Station, five senior centers (green tickets), SFO, and at Bay Crossings at Embarcadero Station (until June 2017). The retail network is being phased out, including the closure of six My Transit Plus ticket sales kiosks at the end of 2016, as BART continues its transition to the Clipper card.

[8] Sold at participating middle and high schools; tickets include a last ride bonus.

[9] There is a three-hour limit on the excursion fare for magnetic stripe tickets and a six-hour limit for Clipper cards.

[10] BART began accepting the regular adult Muni Fast Pass for BART travel within San Francisco on April 1, 1983. The current “A” BART/Muni Fast Pass allows unlimited rides on Muni and BART within San Francisco. The price of the monthly “A” Fast Pass is $91 effective January 1, 2017. Muni reimburses BART $1.31 (effective January 1, 2016 through December 31, 2017) for each Fast Pass trip on BART. Muni Fast Passes are available only on Clipper.

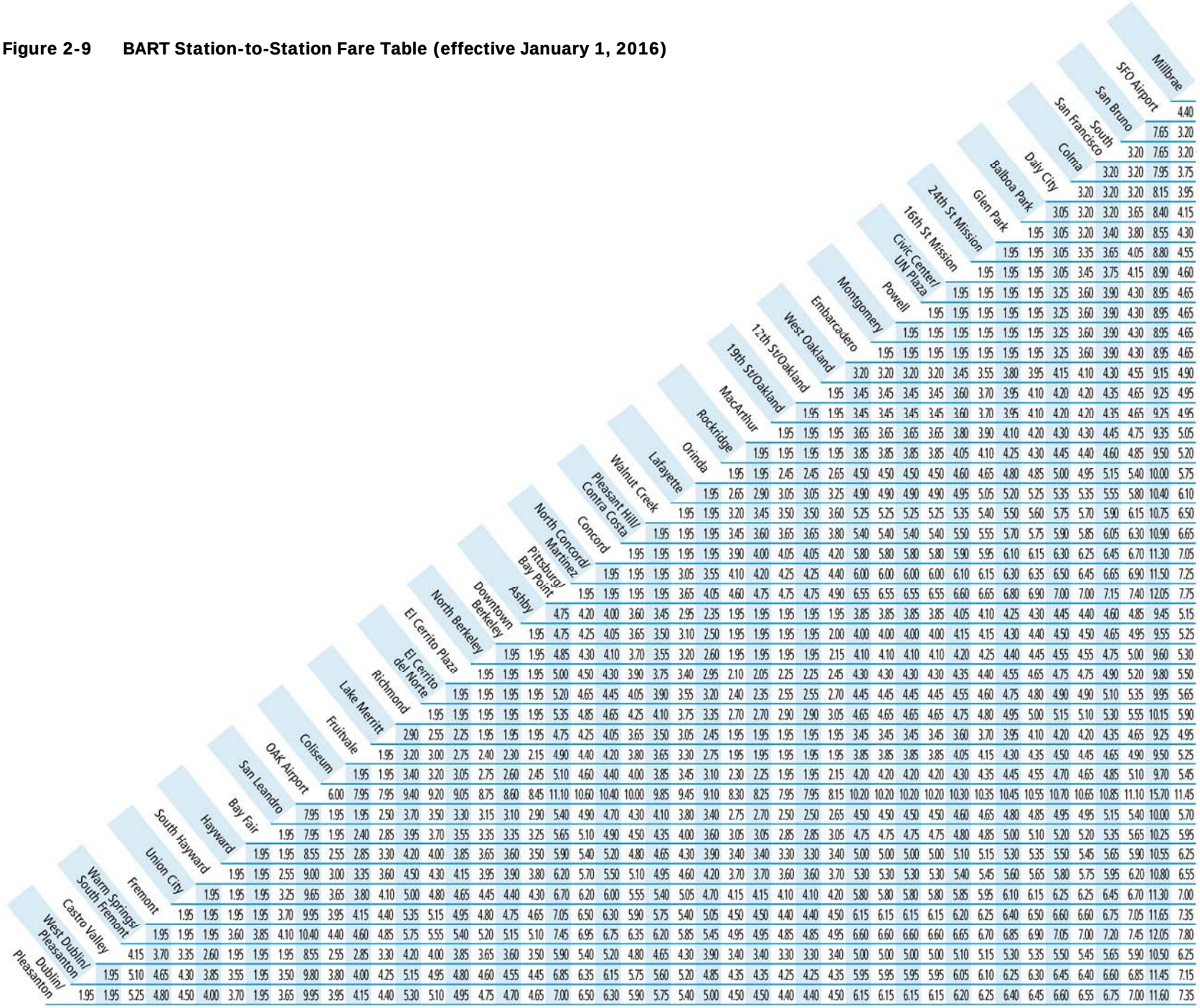
[11] When transferring between BART and a Clipper-enabled operator, the Clipper card automatically gives the transfer discount.

[12] Effective April 10, 2014; before that time, Muni offered a two-way transfer.

[13] The free Muni trips for BART riders transferring to/from Muni lines at Daly City station has been in place since 1980 and is now available on Clipper only. BART reimburses SFMTA for the cost of one of the two trips made, as recorded by the Clipper system.

[14] BART and AC Transit formed the East Bay Paratransit Consortium, which provides service to eligible BART customers in service areas that overlap with AC Transit.

Figure 2-9 BART Station-to-Station Fare Table (effective January 1, 2016)



Effective January 1, 2016, the inter-operator BART Plus program was discontinued as it was intended to end when the operators became Clipper-enabled, which five of the six bus operators did in November 2015 (BART was already Clipper-enabled). The BART Plus magnetic stripe ticket had functioned as a flash pass on the bus operators, with loaded value available in eight denominations for use on BART. At the time the program ended, on an average weekday, approximately 30 trips were taken on BART with the BART Plus ticket out of more than 425,000 total BART trips. BART performed the necessary Title VI analysis and outreach for all BART Plus operators at their request, and no disproportionate impact on protected groups was found.

2.5 Customer Information

BART provides information about its services and partner agency services in stations through advertisements and other publicity, online, and by telephone including:

- → Website (bart.gov)
- → Mobile web app (m.bart.gov)
- → Email and text subscriptions (bart.gov/alerts)
- → Text on-demand (bart.gov/sms)
- → BARTable Website (bart.gov/bartable)
- → Third-party applications (bart.gov/apps)
- → Twitter (@sfbart and @sfbartalert)
- → Facebook (facebook.com/bartsf)
- → YouTube (youtube.com/BARTable)
- → In-station paper bulletins
- → In-station Transit Information Displays (TIDs, *http://www.actransit.org/transit-center-maps-and-information/*)
- → In-station Real-Time Displays (RTDs)
- → In-station platform digital displays
- → Telephone (phone numbers vary depending on location)

2.6 Physical Infrastructure and Capital Assets

BART operates and maintains a wide variety of capital assets and manages an extensive system of infrastructure distributed throughout the Bay Area that includes rail cars, tracks, stations, electrical power distribution, communications and train control networks, and maintenance facilities. Most of this infrastructure is more than 45 years old and at, or close to, the end of its useful life, increasing the challenges BART faces to maintain high performance and meet growing demand. To help address the impact of these aging assets, voters in the three-county BART district passed Measure RR in November 2016, which will provide $3.5 billion in general obligation bond funds for BART's infrastructure and capacity needs.

In 2013, BART staff began implementing a comprehensive strategic Asset Management Program (AMP) to optimize decision-making on how to maintain and replace assets. The BART Board of Directors supported this effort by adopting an Asset Management Policy in 2014. A key product of the AMP is the Strategic Asset Management Plan (SAMP), which provides guidance to efficiently and effectively rebuild BART's high-performing but aging transit system. The SAMP includes strategies specifically designed to return maximum value for money expended and to manage safety, operational, and financial risk. It also identifies the procedures and accountabilities needed to achieve Asset Management Policy

objectives. The passage of Measure RR will allow BART to accelerate investment to address its highest-risk assets in the coming years.

2.6.1 BART's Comprehensive Asset Management Program: Allocating Limited Resources to High Value Investments

While many transit asset management programs focus solely on physical assets, BART takes a systematic, risk-focused approach to prioritizing investment of scarce resources for both operating and capital needs. This is in accordance with the best practices for asset management as defined by the International Organization for Standardization (ISO55000) that guides organizations to reach beyond the management of physical assets and incorporate the aspects of people, process and technology.

The system's 200,000+ physical assets are cataloged into a comprehensive asset register that includes key information for risk management, including age, replacement cost, and maintenance history. With this comprehensive asset management framework, staff can assess the risk of near-term failure for each asset and the consequent impact on the BART system. The assets with highest risk in terms of safety and operations get the highest priority for reinvestment.

More than just the physical infrastructure being in a state of good repair is required to fulfill BART's Vision to "*…support a sustainable and prosperous Bay Area by connecting communities with seamless mobility,*" as described in the BART Strategic Plan (BSP) Framework. The BSP is used to balance the resource demands of the physical assets with those of the workforce, technology, and business processes that support them.

To ensure coordination between the BSP and the SAMP at all levels of the organization, four-year work plans have been developed to support BSP goals. In these plans, staff identify resources, such as staff and/or funding, required to meet day-to-day activities and strategic improvement. Activities lacking resources are compiled into a comprehensive Needs Inventory. Asset Management staff then prioritizes each resource request in the Needs Inventory. BART management uses the resulting inventory in the investment decision-making process in which they make the tradeoff between the best solution and available resources (e.g., staff and funding). The objective is to find the solution with the lowest lifecycle cost that best addresses risk within the financial resources available. The needs selected for funding become the basis for "Budget Initiatives" that can adjust department budgets on an ongoing or one-time basis depending on the need.

In addition to the enterprise risk assessment process, an advisory body—BART's Resource Governance Group (RGG)—provides a cross-functional review of the Needs Inventory to ensure that funding decisions minimize risks to BART's safety, operations, and financial stability and promote the BSP goals.

The RGG includes staff from many BART departments to reflect the full range of system functions. RGG members provide expert knowledge about how proposed Budget Initiatives impact BART operations and administration, and suggest comprehensive solutions that may improve the initial resource requests. The RGG's overall mission is to:

- → Guide where BART spends its money to get the best long-term value for its investment.
- → Identify initiatives and innovations that can reduce net long-term operating and maintenance costs (e.g., lower lifecycle costs).
- → Identify any areas of expenditure in proposed Budget Initiatives that do not align with asset management strategies or strategic goals, resulting in possible deferral and further evaluation.

→ Identify areas where proposed Budget Initiatives can be bundled across service units to best fit BART's needs.

→ Advise if capital investments can be postponed in return for increased maintenance.

→ Balance labor and capital expenditure needs.

The role of the RGG will evolve as BART's AMP matures.

2.6.2 Trains and Other Vehicles

BART's current revenue fleet consists of 669 cars designated 'A,' 'B,' and 'C.' In 2007, BART initiated the procurement of new rail cars and, in 2012, Bombardier was awarded the contract to design and construct BART's next generation of vehicles. BART is now in the process of accepting the first of these 'D' and 'E' cars, and seeks to expand the total fleet to 1,081 cars. Ten pilot cars have been delivered for testing and evaluation, and are expected to enter service once testing has been successfully completed. Production of additional cars will also follow testing and qualification of the final design. Figure 2-10 describes BART's current and new car rail vehicle inventory.

Figure 2-10 BART Rail Vehicle Inventory

Car Type	Number in Fleet	Function	Years of Manufacture	Years of Renovation	Length and Width
A2	59	Lead or trail car (ends of train)	1971 to 1975	1995 to 2002	75 feet long x 10.5 feet wide
B2	380	Mid-train car only			70 feet long x 10.5 feet wide
C1	150	Lead, mid-train, or trail car	1987 to 1990	N/A	
C2	80		1995 to 1996		
D	310	Lead, mid-train without passenger pass through, or trail car	2013-2022 (on order)	NA	70 feet long x 10.5 feet wide
E	465	Mid-train car only with limited passenger pass through when coupled to D car			

BART has modified the original interior configurations of the 'A,' 'B,' and 'C' cars by removing seats to create space (for bicycles, wheelchairs, luggage, and strollers), adding hand straps and replacing car flooring.

The following are standards related to train length, control, and speed:

→ Train length: Three cars minimum, per California Public Utilities Commission requirement, to 10 cars maximum, limited by station platform lengths. End cars are either cab-equipped 'A' or 'C' cars. When placed in revenue service, 'D' cars will also function as lead cars.

→ Train control: Fixed block, Automatic Train Operation. Computers along the right-of-way control train movements, under supervision of a central computer at the Operations Control Center. Train operators can override the automatic system if needed.

→ Train speed: Revenue service is based on a maximum speed of 70 miles per hour and an average speed of 34 miles per hour, including station stops.

Public input played an important role in helping BART design the new 'D' and 'E' rail cars. Based on customer feedback, the interior layout is designed to maximize seating, openness, and comfort within

the available space, with more handholds, higher ceilings, and bike racks in every car. The new train cars will feature these improvements:

- → Quieter: micro-plug doors will help seal out noise.
- → Cooler: cooling systems will distribute air directly from the ceilings, improving comfort for standees on hot days.
- → Comfortable: padded seats will have lumbar support and will be covered with wipeable fabric for ease of cleaning.
- → Easier to get on and off trains: cars will have three doors, instead of the current two, on each side---two at the ends of the cars and a third door in the middle of the car.
- → Easy to use: routes will be color coded like the BART system map, and next stop information will be readily available via automated announcements and digital screens.

BART also uses more than 30 other types of "non-revenue" vehicles to maintain and service the BART system.

2.6.3 Tracks and Related Infrastructure

BART operates via almost 110 route miles of heavy rail track: 38 miles in subways and tunnels; 23 miles on aerial structures; and 48 miles at ground level. In total, BART uses and maintains approximately 500 linear miles of track counting all tracks running in two (or more) directions, train storage, track sidings, and rail access routes from yards. BART's grounds and right-of-way include the areas adjacent to ground level trackways and other access points to system facilities. BART also invests in fences around its grounds and other track intrusion prevention, which contributes to maintaining system safety and security.

2.6.4 Maintenance Shops and Yards

Planned preventive maintenance and unscheduled repairs of BART's rail cars are performed at four facilities located at or near these stations:

- → Concord
- → Hayward
- → Richmond
- → Daly City

Accident damage, component repair, and overhaul functions are performed at the Hayward facility.

In 2006, the Rolling Stock and Shops (RS&S) department implemented a proactive maintenance approach aimed at continuous improvement through strategically engineered, planned, and scheduled maintenance and overhaul activities. The initial objective was to move BART from a reactive run-to-failure car maintenance model to a proactive, planned maintenance model. This strategy, discussed in more detail in Chapter 3, has substantially increased service reliability for the rail car fleet.

Preventative maintenance and unscheduled repairs of the BART-to-OAK fleet are performed at the Airport Connector Maintenance Facility in Oakland.

To prepare for the incoming new rail car fleet and for upcoming extensions, BART must expand its maintenance shop capacity. The Hayward Maintenance Complex (HMC) project will provide much of the needed maintenance and storage capacity for car repair shops, component repair shops, and

infrastructure shops to support the southern expansion to Warm Springs/South Fremont and Berryessa and Milpitas stations. This project, which is under construction, will reconfigure the existing Hayward revenue vehicle shop for increased primary repair shop capacity and procure a 26-acre parcel for new facilities. The project includes a new component repair shop, a vehicle-level overhaul shop, a new central parts warehouse, and a new maintenance and engineering repair shop. This integrated solution helps to meet the requirements for the new revenue car fleet while also relocating needed infrastructure maintenance capacity southward to support maintenance of extensions into Santa Clara County. Until the new cars are online, BART must invest carefully in its existing aging fleet to sustain strategic gains in reliability while safeguarding against over-committing resources to a fleet which will soon be retired.

Engineering and design work for capacity enhancements to other RS&S facilities is also underway. These critical improvements, needed to ensure the safe and efficient maintenance of the growing fleet, include additional car lifts in Daly City and Richmond shops and a wheel truing facility for the Concord shop.

These projects are further described in Chapter 5.

Vehicle Storage and Staging

BART currently operates five lines of service over the network, supported by four major yards which are primary 24-hour servicing locations.

The four major yards are Concord Yard with 267 revenue vehicles currently assigned, Richmond Yard with 186 vehicles assigned, Daly City Yard with 102 vehicles assigned, and Hayward Yard with 114 vehicles assigned. These facilities also store the entire fleet when operations cease each night and are the points from which trains are dispatched for daily service. Incidental overnight vehicle storage takes place at the terminal end points of Millbrae, Pittsburg/Bay Point, and Dublin/Pleasanton.

In total, BART's existing storage yards have an absolute capacity of 684 individual cars. Tail tracks at Millbrae, Pittsburg/Bay Point and Dublin/Pleasanton add capacity of 209 cars to that of the yards; neither yards nor tail tracks have reserve capacity. The total capacity of 893 cars, however, does not meet the effective capacity required for efficient movement of trains and cars between revenue service, storage and maintenance. This shortfall will be exacerbated by the arrival of new cars from BART's current order which, with the current fleet of 669, will soon exhaust the effective capacity of BART's existing yards.

With the arrival of 775 new cars, it will be a challenge for BART's yards to store and maintain two disparate and operationally distinct fleets, which could co-exist for as long as 10 years. The new fleet will not immediately replace the existing fleet but will increase capacity until a subsequent order of cars enables complete retirement of the legacy fleet. In response to passenger demand and fleet availability BART intends to operate more 10-car trains during more of the day. While this would potentially end the practice of varying train lengths throughout the day BART's existing yards are not configured for a preponderance of 10-car trains, which may result in storage capacity shortfalls.

Surrounding land uses limit the expansion of every yard except Hayward. BART's current Hayward Maintenance Complex project comprises two phases of development. Phase I, which is already proceeding, entails the expansion of shop capacity and functional capability at the existing Hayward Yard. Phase II will provide new storage and operational capacity northeast of the HMC shop complex, on the opposite side of the existing BART mainline tracks. While Phase II has not yet been funded for final design and construction, the environmental clearance documents for the HMC project include a conceptual design for Phase II, also known as Hayward Yard East. BART already owns the property,

which is well-located to service the VTA Silicon Valley Berryessa Extension (SVBX). A new yard in this location will enable BART to fulfill two commitments that it otherwise cannot:

- → Reliability: The yard will store BART legacy cars in a secure, serviceable and ready-to-operate condition. This entails storing the cars to ensure they can be immediately deployed, retrieving cars from the yard, assembling trains, and dispatching trains into the operating system.
- → Increasing Service: The yard must be able to store, build and dispatch trains that consist of legacy and new cars as BART uses both fleets to step up the level of regular service.

While the Hayward Yard East facility will expand BART's absolute storage capacity, it is located far from the termini of the system, where most trains begin revenue service. With the higher frequency enabled by a planned new train control system, BART will operate a much larger fleet and will need more storage capacity at or near the extremities of the system. To meet this need, BART is investigating properties that may enable expanded or new storage capacity. The acquisition and development of these properties would not only increase capacity, it would enable BART to store and service its larger fleet near existing termini, thereby improving overall efficiency and economy.

2.6.5 Train Control, Power Systems, Communications, and Administration

Most of BART's administrative staff is located in downtown Oakland at 300 Lakeside Drive near the 19th Street station. The Operations Control Center (OCC) houses BART's central train control computer system that supervises train movements 24 hours a day. Train operations are controlled by certified personnel working in the OCC. Communications from OCC to train operators occur via trunk radio. OCC communicates with stations via telephone. In addition, OCC personnel can monitor train movements and station activities via a network of remote cameras located at key points.

The BART train control system controls the speed and movement of trains on the rail network, and keeps the trains running safely by controlling the distance between trains. BART's current train control system is operating at full capacity through the Transbay core and can safely accommodate one train every 2.5 minutes, or 24 trains per hour, through the Transbay Tube.

The BART traction power system provides power for the movement of trains. Power is received at 115KV or 34.5KV from Pacific Gas & Electric (PG&E) and transformed in BART substations to 1000 VDC which is distributed along a third-rail system to power trains. The BART facilities electrical systems energize critical tunnel ventilation systems, yards, shops and stations. These systems operate in the 120V to 4160V range and include a network of switchgears and transformers. BART also maintains and operates a battery-sourced backup power system to provide uninterrupted power to the train control, station emergency lighting and fire alarm systems in the event of a loss of facilities' power.

BART has a complex communications network which monitors and controls critical operational assets including those located in the train control, traction power, automatic fare collection, and fire alarm systems. Communications systems include electronic and telecommunication systems within the BART right-of-way; BARTnet (BART Internal Internetworking System); closed-circuit television systems; radio systems; fiber-optic and copper cable plants; UON (Unified Optical Network), public address systems; PBX and IP-based telephone systems, and; SCADA (Supervisory Control and Data Acquisition).

2.6.6 BART Stations

Stations are the portals by which passengers enter and exit the BART system. BART has 46 stations: 16 subway, 13 elevated, and 17 at grade (ground level).

- → Stations are situated on average between one-half to one mile apart within and near downtown San Francisco, Oakland, and Berkeley, and from two to 10 miles apart in suburban areas.
- → Stairways, elevators and escalators enable riders to enter and exit the stations from the street level, and to move between the mezzanine and platform levels.
- → Automated fare collection equipment accepts cash, credit cards, and debit cards to vend and process magnetic stripe tickets and to load value onto Clipper cards. Beginning in January 2018, Clipper cards also will be vended.

Within stations, information is provided to riders by the following means:

- → Platform-level automated train destination signs show an arriving train's destination, car length and other information.
- → Platform and concourse-level displays provide information on train schedules, local area destinations, transit connections, and other information.
- → Real-time information is provided by voice announcements over the station public address system, from station agents and from BART's Operations Control Center (OCC).
- → Electronic message boards in station agent booths display elevator status.
- → Platforms are typically about 700 feet long, to accommodate the maximum train length of 10 cars.
- → BART also operates a 3.2 mile automated guideway transit system which provides train service between BART's Coliseum Station and the Oakland International Airport, known as BART-to-OAK. The service is not physically connected with existing BART heavy rail tracks and has its own fleet of four cable-drawn vehicles that operate on fixed guideways with a control center located near the Oakland International Airport.
- → All BART stations offer intermodal transfer between BART and other transit and personal mobility modes. Additionally, certain BART stations offer direct connection with other local, regional and intercity rail services:
  - San Francisco International Airport: SFO Airtrain (airport circulator)
  - Millbrae: Caltrain (commuter rail)
  - Civic Center, Powell, Montgomery and Embarcadero: SFMTA Muni Metro (urban light rail)
  - Richmond and Coliseum: Capitol Corridor (intercity rail)

BART has a Station Modernization Program that will invest resources and efforts into the existing core stations and surrounding areas. By upgrading and modernizing station functionality and improving capacity and flow, stations will become safer and more pleasant places.

2.6.7 Fare Collection Assets

BART has a significant amount of fare collection equipment so customers can buy tickets and Clipper cards (as of January 2018), enter and exit the system, add fare to their tickets and Clipper cards if needed to exit, and pay for parking. A list of these assets is provided in the table below. Most of this equipment was originally purchased and installed in 2002 through 2003, replacing previous-generation equipment, and was retrofitted in 2016 and 2017 through the Asset Refresh program. The count includes new equipment for extension stations (such as eBART), as well as equipment being added at core stations (such as Union City, El Cerrito Plaza, and Downtown Berkeley) through BART's Station Modernization Program.

Figure 2-11 BART Fare Collection Assets

Fare Collection Asset	Quantity
Entry Gates	112
Exit Gates	112
Reversible Gates	425
Accessible Gates	85
Ticket Vending Machines	347
Add Fare Machines (includes machines for parking payment)	216
Parking Validator Machines (for parking payment with Clipper)	80
Bill-to-Bill Changers	70

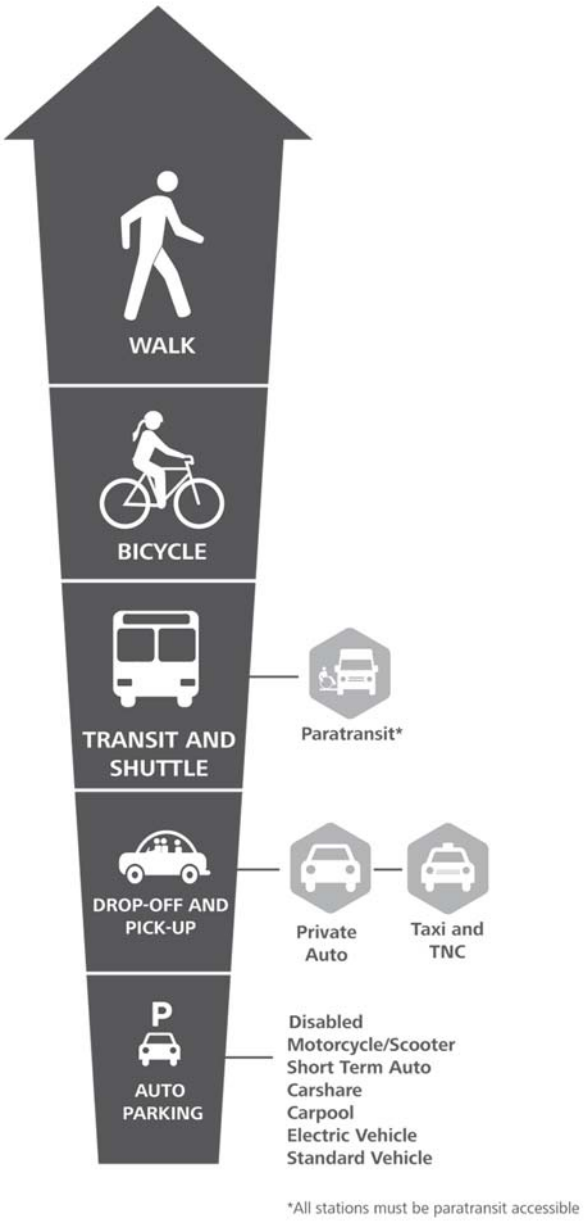
2.6.8 Station Access

BART's Station Access Policy, adopted in June 2016, seeks to support the broader livability goals of the Bay Area, reinforce sustainable communities, and enable riders to get to and from stations safely, comfortably, affordably, and cost-effectively. The Station Access Policy guides BART's station access investments, resource management, and practices through 2025. The Policy identifies the following goals:

- → Safer, Healthier, Greener: Advance the region's safety, public health, and greenhouse gas (GHG) and pollution-reduction goals.
- → More Riders: Invest in station access to connect more riders cost effectively, especially where and when BART has available capacity.
- → More Productive and Efficient: Manage access investments, programs, and current assets to achieve goals at the least cost.
- → Better Experience: Be a better neighbor, and strive for an excellent customer experience, including on the first and last mile of the trip to and from BART stations.
- → Equitable Services: Invest in access choices for all riders, particularly those with the fewest choices.
- → Innovation and Partnerships: Be an innovation leader, and establish durable partnerships with municipalities, access providers, and technology companies.

The Policy also includes a Station Design Access Hierarchy, shown in Figure 2-12. The Hierarchy guides design decisions at the project level, ensuring safe access for the most vulnerable modes. Consistent with BART's Access Policy, many of BART's efforts are directed at increasing and improving access options, supporting active modes, and reducing the drive-and-park mode share. More on the BART Station Access Policy can be found at www.bart.gov/accesspolicy.

Figure 2-12 BART Access Hierarchy



The weekday access mode shares to stations from home, according to BART's 2016 Customer Satisfaction Survey, are shown in Figure 2-13. The most notable changes over the past 10 years (compared to the 2006 Customer Satisfaction Survey) are the increases in the walking and biking mode shares (+5 and +2 percentage points, respectively), and the decreases in the transit and drive-alone mode shares (-3 percentage points each).

Figure 2-13 BART Weekday Access Mode Shares

Weekday Access Mode	Share
Walk	34%
Drive alone	31%
Transit	14%
Drop-Off (includes taxi and transportation network companies such as Uber and Lyft)	12%
Bike	5%
Carpool	4%
Total	100%

As part of the Station Access Policy, BART also adopted access mode-share targets, which by 2025 seek to increase active modes of access to 52% (including pedestrian and bicycle), to increase shared mobility to 32% (including transit, carpool, drop-off, shuttle), and to decrease the drive and park mode-share to 16%. To achieve these targets, BART will implement several initiatives to comprehensively improve multimodal access at stations. This will include work with local jurisdictions to ensure well-designed access improvements are made to the pedestrian, bike, and transit networks surrounding BART.

Initiatives include improving pedestrian and bicycle safety and access to stations, both throughout BART property and in some cases on city streets; removing barriers to pedestrian and bicycle access to stations; adding more secure bicycle parking (i.e., bike stations); improving intermodal areas and transit connections; and improving curb and parking management.

Pedestrian Infrastructure

Street networks under control of local jurisdictions at BART's underground stations include pedestrian infrastructure such as sidewalks, crosswalks, and pedestrian countdown signals. All other BART stations, which are surrounded by intermodal, parking, and plaza areas under BART jurisdiction, have sidewalks along driveways and bus zones that connect the surrounding street networks to the station entrances. Some elevated stations within freeway medians (e.g., Dublin/Pleasanton and West Dublin/Pleasanton stations) also have pedestrian bridges. Some stations constrained on one side by a major barrier such as a railroad right-of-way (e.g., Coliseum and Bay Fair stations) have pedestrian tunnels. BART works closely with partner jurisdictions to ensure good pedestrian accessibility to stations around the perimeters of the station areas. As outlined in the Station Access Policy, BART may invest in projects on and off BART property to improve access to stations.

Stairways, elevators, and escalators that connect the street level to concourse and platform levels provide pedestrian access within BART stations.

All BART stations also have facilities to accommodate people with disabilities, including elevators and accessible paths from accessible parking areas, bus intermodals, and accessible drop-offs. Station areas also provide curb cuts with yellow tactile detectable warning strips that assist the visually impaired to safely travel between the street and the sidewalk.

Transit and Shuttle Infrastructure

Most of BART's non-urban stations have intermodal areas that provide convenient access for buses, shuttles, taxis, paratransit service, and standard and ADA-accessible passenger drop-off and pickup zones.

Of BART's 46 stations, 27 have dedicated space for bus stops and layover. Bus stops typically include shelters and seating, and sometimes include real-time departure displays. At 17 stations, which are mostly in urban environments, there are bus stops within the public right-of-way, often immediately adjacent to the station entrances. SFO and OAK stations are within airport property, where buses are available. At San Francisco's downtown stations (Embarcadero, Montgomery, Powell, and Civic Center), BART shares the concourse level with Muni light rail train lines, providing integration between systems. At Millbrae station, BART shares the station area with Caltrain.

BART coordinates with local transit providers and shuttle operators to improve and increase access to its stations. The number of bus lines serving BART stations ranges from a single route (e.g., Orinda) to 15 or more (e.g., Downtown Berkeley). According to the 2016 Customer Satisfaction Survey, 14% of riders traveling on weekdays from home to BART use public transit to access BART stations. BART makes payments to the local transit operators via feeder service agreements.

There are at least 100 privately and publicly operated shuttles that make stops at BART stations–a 200% increase since 2009. At least three-quarters of all BART stations are served by shuttle service(s), including community shuttles open to the public (e.g., Emery-Go-Round, Broadway Shuttle, Daly City Bayshore Circulator); hospital and university shuttles (e.g., Kaiser, Alta Bates, UC Berkeley, UC San Francisco, Cal State University East Bay); single-employer, last-mile shuttles (e.g., Tesla, Clorox, Men's Wearhouse); multiple-employer, last-mile shuttles (e.g., Sierra Point shuttles, South San Francisco–Oyster Point Shuttle); and single-employer, long-distance commuter shuttles (e.g., Genentech, Google, Facebook, and Cisco).

The 2016 Customer Satisfaction Survey showed a slight increase in the number of people being dropped off from home at BART stations vs. ten years ago. This is due to the use of Transportation Network Companies (TNCs) such as Uber and Lyft, which accounted for 2.5% of weekday home-based trips to BART in 2016.

As the Customer Satisfaction Survey provides data on home-based access to BART, rather than workplace-based access to BART, most changes in shuttle ridership are not captured by this survey. However, demand for the constrained curb space at BART stations has grown, and most station areas are congested during peak periods. To address this issue, BART is preparing a set of Curb Use Guidelines to guide staff in making decisions about curb assignments, with the goal of maximizing benefit to BART riders.

BART is also preparing a set of Multimodal Access Design Guidelines (MADG) that will serve to update the access-related sections of the BART Facilities Standards (BFS). The BFS are the basic requirements governing the material, equipment and methods used in construction contracts administered by BART. The MADG are intended to set minimum standards for pedestrian, bicycle and transit access infrastructure and guide access design for station area upgrades, Transit-Oriented Development (TOD), and new construction.

In conjunction with BART's Asset Management Program, staff is preparing an Access-Related Assets Inventory with the goal of recording assets and their condition to help staff prioritize improvements related to customer access. The focus of this effort is assets such as lighting, bus shelters and canopies, seating, and other access-related elements in BART station areas, which play a critical part in the customer experience as riders travel to and from the system's stations.

Bicycle Infrastructure

The focus of BART's bicycle program is to improve access to and from BART for passengers using bicycles. Bicycle parking and other related improvements are less costly to build than auto parking, can

increase ridership, promote fitness and public health, support related BART policies and are essential to meeting the BART's goal of providing sustainable transportation.

The bicycle program is guided by the 2012 BART Bicycle Plan. At the time the plan was written, about 4% of BART riders used a bicycle to get from home to BART. The 2016 Customer Satisfaction Survey shows the bike access share now to be 5%. Based on this trend, staff is working toward a goal of 10% bike access by 2022—10 years after the Bike Plan was adopted. This plan identifies and prioritizes the following strategies to improve bicycle access:

- → Improved cyclist circulation in stations.
- → Plentiful secure bike parking.
- → Infrastructure improvements beyond BART boundaries.
- → Better access for bikes on BART.
- → Persuasive programs that highlight the benefits of cycling to BART.

Specific projects to support implementation of the Bike Plan are detailed in the Bike Program Capital Plan. It includes conceptual plans for additional secure bike parking to meet projected 2022 demand. It also describes an effort to link BART's eLockers to the internet for operation with Clipper (among other benefits), an analysis of where bicycle stair channels are needed, and a prioritized list of fare gate arrays that would benefit from additional wide/accessible fare gates.

These strategies remain the focus of efforts to increase bike access to BART. Current initiatives are aimed at significantly increasing the supply of secure bike parking with the construction of new Bike Stations and bike locker plazas along with the installation of strategically placed racks in high-visibility locations. BART is also testing new high-security smart bike racks with the hope of adding these to the parking mix. An effort is underway to finalize a bike stair channel design and incorporate it into the BFS. This will facilitate the installation of stair channels at several key locations around the system to improve vertical circulation for cyclists.

BART is also testing straps on-board trains in the Bike Spaces areas to improve the safety and convenience of transporting bikes on trains. Lastly, BART is working cooperatively with the new Bay Area Bike Share program to locate bike docks in convenient, high-visibility locations as they look to expand near BART stations in San Francisco as well as near selected Oakland and Berkeley stations.

Figure 2-14 BART Bike Parking Supply

Bike locker spaces	1,898
Bike station spaces (7 stations)	1,071
Bike rack spaces	3,832
Total Bike Parking Spaces	6,801

Car Sharing Infrastructure

Three companies--Getaround, Zipcar and Gig--provide car sharing services at 24 BART stations in seven jurisdictions (Berkeley, Concord, Daly City, El Cerrito, Oakland, Pleasant Hill, and San Francisco). Car sharing vehicle pods are usually located in BART parking lots and garages. Customers arriving at a BART station can pick-up their rented car share vehicle to travel from the station to their final destinations and back.

Park-and-Ride Infrastructure

As of June 2017, BART had over 48,000 parking spaces at 34 of its current 46 stations, as shown in Figure 2-15. Most of these parking spaces are in surface lots; remaining spaces are in BART's 17 parking structures, with a small number located on city streets. Paid parking, discussed in more detail in Chapter 4, is one of BART's larger non-fare revenue sources. BART offers the following paid parking programs: daily fee parking; and monthly, single-day and airport/long-term reserved permit parking.

Figure 2-15 BART Automobile Parking at Stations

BART Station	Parking Spaces	BART Station	Parking Spaces
Millbrae	2,978	Coliseum	954
Pleasant Hill	2,937	Rockridge	892
Dublin/Pleasanton	2,886	Fruitvale	873
Concord	2,358	North Berkeley	795
El Cerrito del Norte	2,176	Richmond	750
Fremont	2,141	El Cerrito Plaza	749
Walnut Creek	2,093	Ashby	548
Warm Springs/S Fremont	2,082	MacArthur	475
Pittsburg/Bay Point	2,035	West Oakland	457
North Concord/Martinez	1,973	Lake Merritt	218
Daly City	1,954	Glen Park	56
Colma*	1,770	12th Street	0
Bay Fair	1,665	19th Street	0
Lafayette	1,528	16th Street/Mission	0
Hayward	1,449	24th Street/Mission	0
Orinda	1,361	Balboa Park	0
South San Francisco	1,350	Civic Center	0
South Hayward	1,272	Downtown Berkeley	0
San Leandro	1,268	Embarcadero	0
West Dublin/Pleasanton	1,190	Montgomery Street	0
Union City	1,144	Oakland Intl Airport	0
Castro Valley	1,118	Powell Street	0
San Bruno	1,058	San Francisco Intl Airport	0
	TOTAL		**48,553**

*Colma Station includes 815 spaces in the SamTrans surface parking lot.

BART's strategy for parking resource improvement is to focus on parking management approaches, such as improving the carpool program, and to invest strategically in parking expansion.

2.6.9 Transit-Oriented Development

BART owns roughly 250 acres within one-half mile of its existing and under- construction stations, most of which are in surface parking lots. In 2016, the BART Board adopted a new Transit-Oriented

Development (TOD) Policy. The policy establishes goals of supporting the implementation of *Plan Bay Area* and infill development near stations in partnership with cities to increase ridership where the system has capacity to grow, reduce auto dependence, and lower regional greenhouse gas emissions.

To implement the TOD Policy and to achieve the 2025 and 2040 TOD performance targets the BART Board adopted in December 2016, BART will accelerate the pace of TOD projects on BART property, and staff will work with cities to expand tools and resources for TOD within one-half mile of stations. The Board aims to have a total of 7,000 housing units built on BART property by 2025, of which 35% are affordable, and one million square feet of office and commercial space. This includes projects with executed agreements at Fruitvale, MacArthur, Millbrae, Pleasant Hill, Richmond, San Leandro, South Hayward, Walnut Creek, and West Dublin/Pleasanton stations; one project in negotiation at West Oakland station; and future potential projects at Balboa Park, El Cerrito Plaza, and Lake Merritt stations. At least two additional projects will be identified and initiated beyond these known projects prior to 2026 in order to achieve the expected unit count.

2.6.10 Security

The safety and security of passengers, employees and the general public is BART's highest priority. Security measures are implemented at all levels of the BART organization through both operational activities and capital projects. The BART Police Department (BPD) has the lead role for operational security activities and works with other departments to coordinate security programs that are risk-based and intelligence-driven. BPD uses the principles of Community- Oriented Policing and Problem-Solving (COPPS) to partner with stakeholders and identify security solutions that address root causes of crime and disorder.

BART identifies security gaps through threat and vulnerability assessments, and data analysis. Security committees and change-control boards use this information to provide direction and focus for projects that address identified security gaps. The BFS incorporate "crime prevention through environmental design" (CPTED) concepts to ensure that capital improvement projects provide security by design. BART's System Safety and Police departments both provide input and oversight to ensure that capital projects meet the BFS requirements for safety and security.

A vital purpose of BART's security policy is the control of fare evasion, which results in lost revenue and erodes public confidence in the system. BART's ability to minimize fare revenue loss has been outpaced by increases in ridership and by the boldness of the fare evaders. As part of an integrated approach, BART is defining means to 'harden' station elements against certain modes of evasion. These proposed measures are part of a system wide strategy that addresses other station elements (e.g., elevators and fare gates) and includes legislation, enforcement, adjudication, public information and the responsibilities of BART employees.

Fare evasion can only be identified and controlled if there are distinct boundaries between 'free' and 'paid' areas of BART stations. Existing station boundaries enable evasion over fixed barriers and through gates provided to serve specific and limited purposes. BART's station modernization program is an opportunity to redefine the functions and attributes of all means of access to the paid system, and to program investments that will improve fare payment compliance.

BART is implementing a comprehensive strategy to combat fare evasion, including infrastructure, enforcement and technology. BART is "hardening" station areas such as service gates to reduce opportunities to fare evade. New facility standards are developed to ensure new and remodeled stations are fare evasion resistant.

BART's enforcement model is being restructured, including a proposed ordinance that introduces proof-of-payment requirements, and clarifies rules for paid areas and possession of valid ticket media. BPD processes and tools are being modernized to reflect this new enforcement model. The new model will provide clear guidance, appropriate penalties and disincentives, with fair processes and administration.

Fare evasion is very challenging to quantify. BART is exploring and testing video analytics technology intended to identify fare evasion by monitoring existing camera feeds and provide counts to better inform enforcement and project prioritization.

3 BART GOAL AREAS, OBJECTIVES, AND PERFORMANCE EVALUATION

This chapter describes BART's strategic vision, mission, and goals, including a description of the process used to establish goals and objectives and an analysis of BART's actual performance over the past 10 years on key indicators associated with each goal area. The chapter also provides 10-year retrospectives of BART's ridership; revenue service hours and miles; and finances. The remaining sections cover MTC's Community-based Transportation Planning Program, BART's Title VI Program Triennial Update Report, and the District's FTA Triennial Review.

BART's previous SRTP/CIP, published in October 2014, referred to a set of interim draft goals, objectives, and performance indicators because an update to BART's Strategic Plan was being contemplated at the time. In October 2015, BART's Board of Directors adopted the District's new Strategic Plan Framework with the vision of "*BART supports a sustainable and prosperous Bay Area by connecting communities with seamless mobility"* and the mission to "*Provide safe, reliable, clean, quality transit service for riders,"* as well as long-term goals described below and shown in Figure 3-1. The relationship of the new goals to goals listed in the previous SRTP/CIP is also noted.

Goal Areas

Leadership & Partnership in the Region

- → Economy: Contribute to the region's global competitiveness and create economic opportunities.
- → Equity: Provide equitable delivery of transit service, policies, and programs.
- → Environment: Advance regional sustainability and public health outcomes.

Riders & Public

- → Experience: Engage the public and provide a quality customer experience.

Infrastructure & Service

- → System Performance: Optimize & maintain system performance to provide reliable, safe, cost-effective and customer-focused service (encompasses 2014 SRTP/CIP goal of service reliability).

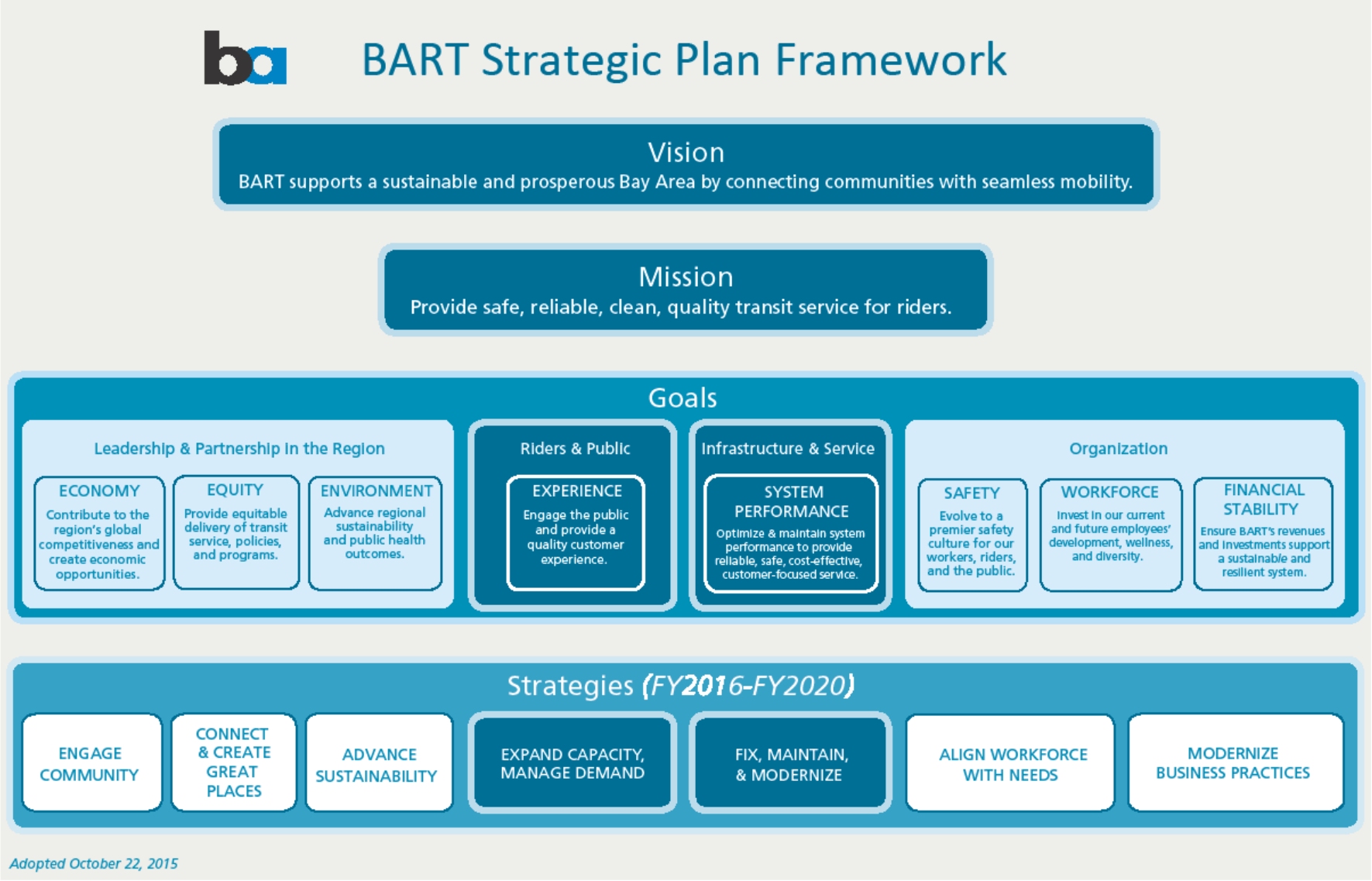
Organization

- → Safety: Evolve to a premier safety culture for our workers, riders, and the public (encompasses 2014 SRTP/CIP safety goal).
- → Workforce: Invest in our current and future employees' development, wellness, and diversity.
- → Financial Stability: Ensure BART's revenues and investments support a sustainable and resilient system (encompasses 2014 SRTP/CIP goal of financial sustainability and system effectiveness).

As shown in Figure 3-1, BART has identified a set of strategies designed to support progress towards the goal areas in the near-term timeframe of FY17 through FY20. Staff has developed four-year work plans associated with each of the strategies (such as "Engage Community" and "Connect and Create Great Places"). Each work plan focuses on a limited number of key activities that define the District's strategic work in that field in the near term. The work plans are interdisciplinary and interdepartmental, with one or two executive managers in charge of achievement.

As noted in Section 2.6.1, Asset management and the budget process is evolving, and the links among work plans, resources, and performance measurement will strengthen over the next three years.

Figure 3-1 BART Strategic Plan Framework



3.1 Performance Measures for Four Strategic Plan Goal Areas

This section focuses on evaluating BART's historical performance on a subset of the Strategic Plan goal areas--rider and customer experience, system performance, safety, and financial stability--because these are most relevant to the requirements of the SRTP/CIP and are areas for which the most long-term historical metrics are available. BART is working to develop and begin tracking an expanded set of measures covering the remaining goal areas (economy, equity, environment, and workforce).

To evaluate BART's performance, data was drawn from BART's Quarterly Performance Reports, the biennial Customer Satisfaction Survey, and mandatory metrics reported to MTC as part of the Transit Sustainability Project (TSP). MTC's TSP recommendations establish performance measures, performance standards, and a monitoring process for BART and the other large transit operators in the Bay Area. Per MTC Resolution 4060, SRTP/CIPs are required to be consistent with the TSP process and demonstrate progress toward achievement of one of the TSP performance measures.

The TSP performance standard is a 5% real reduction by FY17 in at least one of three performance measures and no growth above the Consumer Price Index (CPI) thereafter. The TSP performance measures as defined by the California Transportation Development Act are:

- → Cost per service hour
- → Cost per passenger
- → Cost per passenger mile

Figure 3-2 illustrates performance over 10 years (FY07-FY16) in each of the four Strategic Plan goal areas, followed by sections discussing trends and highlights for key performance measures in each of the goal areas.

3.1.1 Strategic Plan Goal Area: System Performance

On-Time Performance

Maintaining published schedules and train frequencies is BART's single most important factor that impacts customer perception of BART's reliability. BART measures the on-time performance of customers and trains during peak hours and average weekdays. To be "on-time," a train/customer must arrive at the destination station less than five minutes late compared to published schedules. Train on-time represents the percentage of trains that dispatch from their scheduled starting point; provide service to all stations without run through, offload or cancellation; and arrive at the endpoint less than five minutes late compared to the scheduled arrival time.

Actual on-time performance for both customers and trains was stable throughout the 10-year period. However, in FY15, BART reduced its on-time performance standards, despite achieving all-time high performance levels in revenue vehicle reliability as measured by mean time

between service delays, as described below. This reduction was an acknowledgement of certain realities facing BART. Aging infrastructure means more system failures that can create delays, such as with BART's train control system, and corrections that require more time and attention. Also, starting in FY15, BART increased heavy maintenance efforts on the railway. Safety rules require that rail service in active work areas be slowed or stopped, which lowers BART's on-time performance. Recent record ridership levels also impact on-time performance by increasing the number of delays caused by police, medical, and other non-train related events. Such events are now the biggest cause of delays on the BART system.

Mean Time between Service Delays

Another standard indicator transit agencies use to track the reliability of their rail cars is the amount of time that passes, on average, between service failures that result in delays, also known as the mean time between service delays (MTBSD). BART increased its minimum standard to 4,000 hours for the MTBSD in FY17. From FY04 to FY16, BART has steadily improved its performance as reflected by this indicator, more than doubling the average time that elapses between failures from 1,901 hours in FY04 to 4,649 hours in FY16. This steady improvement is a result of refinements in BART's asset maintenance and management strategy under the Rolling Stock and Shops' (RS&S) Strategic Maintenance Program (SMP).

In 2006, the SMP was introduced in the RS&S department. The SMP is a proactive maintenance approach aimed at continuous improvement through strategically engineered, planned, and scheduled maintenance and overhaul activities. The initial objective was to move BART from a reactive run-to-failure car maintenance model to a proactive, planned maintenance model. This strategy has led to increasing service reliability for the fleet to a record of over 4,600 hours MTBSD in FY16. Continuous gathering of data related to car and component failures and tracking of reliability trends informs RS&S's engineering and maintenance efforts and drives decision-making and action. This has allowed BART to move more cars out of the shop and into revenue service. With the opening of the Warm Springs/South Fremont station, 89% of BART's fleet is required to provide peak revenue service. If BART operated at the industry standard of 80% fleet availability, BART would need to own another 75 cars to provide that same service level. At the current procurement cost of $3.3 million per car, that is over $247 million of fleet costs.

Figure 3-2 BART Strategic Plan Goal Area Performance

STATEGIC PLAN GOAL AREA		FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	Performance Standards (FY16)	Progress
SYSTEM PERFORMANCE	Ridership (average weekday)	339,359	357,775	356,712	334,984	345,256	366,565	392,293	389,279	423,120	433,394	429,695	●●●
	On-Time Performance												
	Customers												
	-Peak	94.8%	94.7%	94.2%	95.6%	94.2%	95.5%	94.6%	94.2%	91.1%	89.2%	95.0%	●○○
	-Daily	95.4%	94.7%	95.0%	95.7%	94.6%	95.7%	94.9%	94.5%	91.8%	91.5%	95.0%	●●○
	Trains												
	-Peak	91.4%	90.9%	90.6%	92.6%	90.9%	93.0%	91.7%	91.4%	87.3%	85.1%	N/A	●●○
	-Daily	92.3%	91.5%	92.7%	93.4%	91.9%	93.9%	93.1%	91.9%	87.8%	87.5%	92.0%	●●○
	Peak Car Availability	587	599	575	584	582	585	587	577	567	582	578	●●●
	Mean Time between Service Delays	3,004	3,007	2,683	2,796	2,995	3,216	3,758	3,584	4,000	4,649	3,550	●●●
	Elevators in Service												
	-Station	99.2%	99.5%	99.1%	98.5%	98.7%	98.7%	98.6%	98.0%	98.6%	98.5%	98.0%	●●●
	-Garage	98.8%	98.8%	99.3%	99.4%	99.1%	96.6%	96.9%	95.4%	97.2%	95.1%	98.0%	●●○
	Escalators in Service												
	-Street	96.6%	96.8%	97.7%	96.6%	93.7%	86.2%	89.6%	92.2%	91.3%	89.5%	95.0%	●○○
	-Platform	98.5%	98.4%	98.8%	98.0%	96.4%	93.8%	94.8%	95.6%	95.8%	95.3%	96.0%	●●○
RIDER AND CUSTOMER EXPERIENCE	Customer Complaints per 100K Trips	3.99	4.97	4.09	4.06	3.96	3.69	4.21	5.27	4.63	5.74	5.07	●○○
	Percent of Customers who are Satisfied[1]	85%		84%		82%		84%		74%	69%[2]	–[3]	
	Percent of Riders who Agree BART is Good Value for the Money[4]	67%		71%		64%		70%		63%	59%[2]	–[3]	
SAFETY	Station Incidents per Million Patrons	4.25	4.07	4.33	4.30	4.24	3.93	5.21	5.20	4.24	4.47	5.50	●●●
	Vehicle Incidents per Million Patrons	0.64	0.79	0.91	0.95	0.81	0.90	0.87	1.04	0.83	0.88	1.30	●●●
	Injuries to BART Workers	11.01	9.14	11.16	12.92	14.77	15.25	15.79	14.92	10.00	12.24	13.30	●●●
	Crimes against Persons per Million Riders	1.99	1.52	2.34	1.47	1.73	2.02	2.24	1.89	1.72	1.84	2.00	●●●
	Police Response Time in minutes	3.72	3.75	3.77	2.81	4.70	4.98	4.60	4.18	4.10	4.66	5.00	●●●
FINANCIAL STABILITY	System Farebox Recovery Ratio	60.3%	59.5%	60.1%	64.8%	69.9%	69.4%	71.8%	72.9%	75.6%	74.4%	73.4%	●●●
	Cost per Passenger	$4.47	$4.71	$4.82	$4.85	$4.60	$4.65	$4.68	$4.74	$4.68	$4.91	$4.86	●●○
	Cost per Passenger Mile	$0.33	$0.35	$0.36	$0.35	$0.33	$0.33	$0.33	$0.33	$0.33	$0.34	$0.34	●●●
	Cost per Revenue Vehicle Hour	$246	$261	$265	$275	$269	$284	$303	$308	$310	$311	$307	●●○

[1]From biennial Customer Satisfaction Survey, combined "very" and "somewhat" satisfied ratings.
[2]From Customer Satisfaction Survey done September 2016, which is FY17.
[3]Performance Standards are not set for Customer Satisfaction Survey measures.
[4]From Customer Satisfaction Survey, combined agree "strongly" and "somewhat" ratings.

●○○ Goal Not Met by more than 5%
●●○ Goal Not Met but within 5%
●●● Goal Met

3.1.2 Strategic Plan Goal Area: Rider and Customer Experience

Overall Customer Satisfaction

Between FY07 and FY13, overall customer satisfaction was stable and relatively high. More than 80% of customers were very or somewhat satisfied with the services provided by BART. However, satisfaction has declined since then, to 74% in FY15 and then to 69% in FY17. Between the FY13 and FY17 surveys, average weekday ridership grew 9%, reaching historic highs and increasing crowding on the trains and adding strain to the aging BART system. Although many improvements are on the horizon, such as new rail cars and numerous projects to rebuild BART, the rebuilding process itself will require periodic planned service closures. It is hoped that BART's improved service related to new rail cars and system reinvestment efforts should lead to increases in satisfaction ratings.

Value for the Money

In FY07, FY09 and FY13, customers gave high ratings to BART's value--at least two out of three agreed that BART was "a good value for the money." During these time periods, the local economy was relatively strong and customers were satisfied with BART. In FY11, however, perceptions of BART's value dropped to 64%; this decrease was likely a result of the impact of the Great Recession, with ridership declines in late FY09 through FY10. In FY15, 63% of customers rated BART as a good value, down from a 70% rating in FY13. This decline was likely connected to the drop in overall satisfaction during the same period. Some customers were frustrated with crowded trains and the overall condition of the system and did not feel they were getting their money's worth. This trend continued in FY17, when perceptions of value dropped to 59%. Going forward, perceptions of overall value are likely to rebound once overall customer satisfaction rebounds, if the economy remains strong and customers experience improved service resulting from new rail cars and BART's system reinvestment efforts.

3.1.3 Strategic Plan Goal Area: Safety

Station Incidents and Vehicle Incidents

In each of the past 10 years, BART has met its standards for passenger safety as measured by the number of station and vehicle incidents per million passengers. BART sets a goal of no more than 5.5 station incidents per million passengers and 1.3 vehicle incidents per million passengers. Station incidents and vehicle incidents are all incidents that meet the FTA criteria as "reportable" (mostly injuries and illnesses) and occur either in BART station areas or on BART train cars. Between FY07 and FY16, station incidents have consistently met this standard. The average number of vehicle incidents also has stayed beneath 1.3 incidents per million passengers for the 10-year period; every year except FY14 had less than one incident per million passengers.

To improve safety, BART recently implemented an earthquake early-warning system. The system receives data from over 100 seismic stations of the California Integrated Seismic Network throughout Northern California. If the network senses an earthquake above 4.0 for local quakes and 5.0 for tremblers further away, BART automatically slows trains down to 26 miles per hour. The automated signals to BART's trains have the advantage of not relying on human reaction time.

3.1.4 Strategic Plan Goal Area: Financial Stability

MTC's Transit Sustainability Project (TSP) requires each operator to achieve a five percent real reduction by FY17 in one of three key performance metrics: Cost per Revenue Hour, Cost per Passenger or Cost per Passenger Mile, as compared to the highest cost baseline year between FY08 and FY11.

BART has met the cost per passenger and cost per passenger mile standards each year through the last reporting period of FY15. Generally, this is due to the strong growth in ridership since FY11 that BART served without substantially increasing operating and maintenance costs. In the future, it may be a challenge for BART to continue to meet the standards, as BART's maintenance needs for an aging system may result in additional operating expenses. These situations are not specifically addressed in the TSP.

It should be noted MTC requires operators to report TSP metrics net of inflation to measure the true progress of cost containment efforts by operators. The TSP performance measures cited in Figure 3-2 are in current year dollars.

3.2 Ten-Year Retrospective of BART System Performance

In addition to the performance measures associated with BART's Strategic Plan described above, BART uses three other major operating statistics to evaluate performance: ridership, revenue miles, and revenue hours. The sections below provide a 10-year retrospective of these key statistics, as well as BART's financial history over the same period.

3.2.1 Ridership Retrospective

Ridership growth is one of the key measures for determining BART's success. While ridership growth for the 10-year period overall was strong, the first few years reflected the consequences of the 2008 financial crisis and resulting Great Recession. Strong annual ridership gains seen in FY07 and FY08 were subsequently erased, and total annual ridership was reduced to below its FY07 level. It was not until FY12 that ridership recovered and surpassed the previous high of 107.4 million annual trips set in FY08. In subsequent years, annual ridership bolstered by the rapidly growing regional economy saw robust growth year-over-year. This resulted in an impressive 26% increase in annual passenger trips during the 10-year period, from 101.7 million in FY07 to 128.5 million in FY16.

Figure 3-3 shows average weekday, Saturday, Sunday, and total annual linked trips for the past 10 fiscal years. Figure 3-4 graphically illustrates the trend in total annual trips over this period.

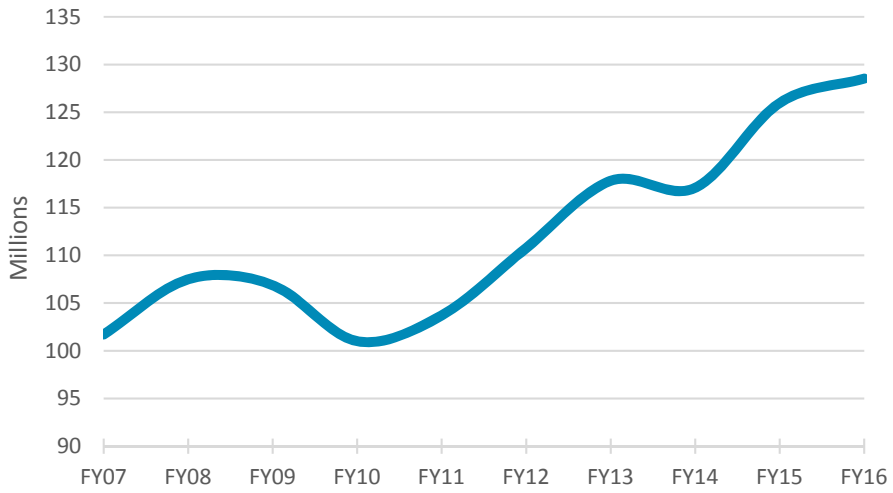
During this time, BART set records not only for total annual passenger trips, but also for average weekday trips (433,400 in FY16). In FY16, average Saturday trips (201,400) and average Sunday trips (143,800) fell short of their highest points in FY15.

Figure 3-3 BART Ridership

	Total Passenger Trips (Linked) [1]	Change	Average Weekday Trips	Change	Average Saturday Trips	Change	Average Sunday Trips	Change
FY07	101,704,000	5%	339,400	5%	172,000	6%	124,900	7%
FY08	107,488,000	6%	357,800	6%	181,200	5%	132,500	6%
FY09	106,874,000	-1%	356,700	0%	182,800	1%	130,200	-2%
FY10	101,004,000	-5%	335,000	-6%	175,200	-4%	125,300	-4%
FY11	103,714,000	3%	345,300	3%	173,400	-1%	126,400	1%
FY12	110,777,000	7%	366,600	6%	190,000	10%	138,800	10%
FY13	117,815,000	6%	392,300	7%	202,900	7%	148,200	7%
FY14	117,074,000	-1%	399,100	2%	203,300	0%	150,600	2%
FY15	125,979,000	8%	423,100	6%	207,500	2%	151,600	1%
FY16	128,524,000	2%	433,400	2%	201,400	-3%	143,800	-5%

NOTE: [1] A linked trip is a trip from origin to destination. Even if a passenger must make a transfer, the trip is counted as one linked trip.

Figure 3-4 BART Annual Ridership (FY07-FY16)



Additionally, all of BART's top 10 highest ridership days occurred during this 10-year period, with the exception of the 2017 Warriors Championship Parade in June 2017, as shown in Figure 3-5.

Figure 3-5 BART Top 10 Ridership Days

Rank	Date	Day	Exits	Events
1	10/31/2012	Wed	568,061	Giants World Series Victory Parade; Halloween
2	6/19/2015	Fri	548,076	Warriors Championship Parade/Rally; A's vs. LA Angels
3	2/5/2016	Fri	528,679	Super Bowl City - Justin Herman Plaza; NFL Experience
4	11/3/2010	Wed	522,198	Giants World Series Victory Parade; Warriors vs. Memphis
5	6/15/2017	Thu	518,743	Warriors Championship Parade/Rally; As vs. NY Yankees
6	10/31/2014	Fri	511,640	Giants World Series Victory Parade; Halloween
7	2/4/2016	Thu	486,596	Super Bowl City - Justin Herman Plaza; NFL Experience
8	8/29/2013	Thu	475,015	Bay Bridge Closure
9	2/3/2016	Wed	471,663	Super Bowl City - Justin Herman Plaza; NFL Experience
10	10/6/2016	Thu	465,688	Dreamforce 2016; 49ers vs. Arizona

While overall ridership growth over the past 10 years was generally positive, growth was most intense in the already highly constrained Transbay corridor. Due to BART's current capacity constraints, growth in this market put an increasing number of riders on already crowded trains during the peak hours, in the peak direction, exacerbating the problem.

Year-over-year growth in the weekday Transbay travel market outpaced both intra-East and intra-West Bay trips (see Figure 3-6). Record job growth in the urban cores of downtown San Francisco and Oakland and the relative scarcity of affordable housing options in inner Bay Area communities contributed to this growth. Factors contributing to reductions in the percentages of total BART trips made within the West Bay and East Bay may be the replacement of shorter BART trips by ride-hailing services, increases in the use of other modes, or the reduction of BART riders using the Muni "A" Fast Pass, as discussed below.

Figure 3-6 BART Average Weekday Trips by Market Area

	Transbay	Intra-West Bay	Intra-East Bay	Total
FY07	159,734	99,238	80,387	339,359
FY08	168,452	106,482	82,840	357,775
FY09	166,751	107,089	82,872	356,712
FY10	162,719	96,523	75,742	334,984
FY11	169,417	97,126	78,713	345,256
FY12	180,585	102,603	83,377	366,565
FY13	195,780	108,726	87,787	392,293
FY14	205,210	107,682	86,254	399,146
FY15	221,519	112,492	89,108	423,120
FY16	232,613	112,889	87,892	433,394

% Change	Transbay	Intra-West Bay	Intra-East Bay
FY07	--	--	--
FY08	5%	7%	3%
FY09	-1%	1%	0%
FY10	-2%	-10%	-9%
FY11	4%	1%	4%
FY12	7%	6%	6%
FY13	8%	6%	5%
FY14	5%	-1%	-2%
FY15	8%	4%	3%
FY16	5%	0%	-1%

Ridership trends largely reflect the overall health of the economy; travel increases when the economy is healthy and declines during times of recession. Described below are key economic milestones and their effects on ridership over the past 10 years:

- → Starting in the summer of 2007, the region was approaching the peak of the housing bubble of the mid-2000s and, due to this regional economic strength, annual BART ridership was at a record high.
- → Ridership declined in early 2009 in response to the Great Recession, with ridership reaching its lowest point in the summer and fall of 2009 (FY10). A year-to-year ridership decline of 10% was observed in summer 2009.
- → Monthly ridership loss persisted until July 2010, when trips started to grow again very slightly.
- → Although moving in a positive direction, ridership growth was inconsistent until early 2011, when growth of around 4% to 6% indicated that the region's recovery from the recession was taking hold.
- → Bay Bridge toll increases, increased congestion from regional population and job growth, and gas price fluctuations were also factors that likely contributed to making BART a more attractive option compared to the automobile.
- → During spring 2016, economic analysts were reporting that the Bay Area was at full employment.

Other factors that affected ridership, both positively and negatively, during the 10-year period include:

- → Since January 2010, BART ridership in San Francisco has been impacted by Muni's implementation of a two-tier Fast Pass pricing structure and substantial price increases. The "A" Fast Pass, priced at $91 effective January 2017, is accepted both on Muni and BART within San Francisco, while the $73 "M" Fast Pass, is accepted on Muni only. Since the introduction of the more expensive "A" Fast Pass, Fast Pass trips on BART have declined by 50%, from 12.5 million trips in FY09 to 6.3 million trips in FY16. This decline has been only partially offset by riders taking intra-San Francisco trips using non-Fast Pass BART fare products.
- → The West Dublin/Pleasanton Station opened in February 2011. In FY16, ridership at this station averaged about 3,700 weekday entries and an equal number of weekday exits.
- → In general, ridership growth on the SFO Extension in San Mateo County outpaced growth in the rest of the system. Ridership grew from approximately 30,000 weekday trips in FY07 to nearly 51,000 weekday trips in FY16. About 11% of all air travelers at the San Francisco International Airport (SFO) use BART to access or depart the airport.
- → In November 2014, BART to Oakland International Airport service commenced operation, replacing the AirBART shuttle bus. In FY16, the service averaged about 3,100 weekday entries and exits. About 9% of all air travelers at Oakland International Airport (OAK) use BART to access or depart the airport.

→ Ridership to both SFO and OAK has been negatively impacted by increased use of transportation network companies such as Uber and Lyft.

→ Beginning in late FY15, BART began a series of major maintenance projects resulting in planned weekend service disruption. BART provided bus bridges to passengers; however, due to the operational uncertainties involved in bus bridges, BART advised affected passengers to consider alternative means if possible. This information campaign had the intended effect and reduced ridership to a more manageable level that the bus bridges could serve effectively. This is a factor contributing to the decline in weekend ridership.

→ Ridership growth began to slow in FY16, with just a 2% increase over FY15 for weekdays and declines of -3% and -5%, respectively, in Saturday and Sunday ridership.

3.2.2 Revenue Service Hours and Miles

While ridership increased over the past 10 years, BART's revenue service hours and miles remained steady overall. The following events explain the few fluctuations that did occur over this period:

→ Between FY07 and FY11, the variation in service hours and service miles was related to the stabilization in operating plans for serving the SFO Extension.

→ FY08 and FY09 saw an increase in service hours and/or service miles related to the January 2008 increase in off-peak service frequency (off-peak headways were reduced from 20 to 15 minutes).

→ Service hours and service miles decreased in FY10, following the September 2009 return to 20 minute off-peak headways. The return to prior service levels was mainly due to budget considerations; however, declining fleet reliability, in part the result of increased off-peak service frequency between January 2008 and September 2009, also had an effect.

→ Service hours and service miles gradually increased between FY11 and FY15 with incremental increases in train lengths on the Dublin/Pleasanton line and, during non-commute periods, on other Transbay lines.

→ Service hours and service miles decreased slightly in FY14 due to the impact of the BART strikes and work stoppages in July and October 2013.

→ Service hours and service miles were increased in two phases in FY13 and FY16 by extending the operating hours of the Red line (Richmond-Millbrae) from 7pm to 9pm.

→ Service hours and service miles were dramatically increased in FY16 to address increasing train peak and off-peak crowding using a fixed supply of cars by increasing maintenance shop productivity, turning more trains back midline during peak commute periods, and eliminating three-car trains on the Richmond-Fremont line seven days a week.

Figure 3-7 shows a 10-year retrospective summary of BART's revenue service hours and revenue service miles.

Figure 3-7 BART Revenue Service Hours and Miles

	Revenue Service Hours	Change from Prior Year	Revenue Service Miles	Change from Prior Year
FY07	1,844,000	--	64,330,000	--
FY08	1,940,000	5%	66,988,000	4%
FY09	1,941,000	0%	67,843,000	1%
FY10	1,780,000	-8%	63,237,000	-7%
FY11	1,774,000	0%	63,347,000	0%
FY12	1,800,000	1%	64,266,000	1%
FY13	1,821,000	1%	65,652,000	2%
FY14	1,803,000	-1%	64,766,000	-1%
FY15	1,906,000	6%	67,269,000	4%
FY16	2,032,000	7%	71,629,000	7%

3.2.3 BART Financial Retrospective

BART's actual financial outcomes for the previous 10 fiscal years (FY07 through FY16) are shown in Figure 3-8.

Over the past 10 years, total sources of operating funds have increased by nearly 50%, with the strongest growth in fare and parking fee revenue. Growing ridership, BART's program of small, regular fare increases, and moving to a market-based approach for parking fees all contributed to revenue growth. Sales tax, BART's second-largest source of funds, declined by nearly 20% during the Great Recession, and it took five years to recover to pre-recession levels.

During this same period, total operating expenses have increased by about 37%, less than the rate of growth in revenue sources. The remainder of the growth in operating sources was directed to critical capital needs, with a five-fold increase in capital allocations between FY07 and FY16.

Figure 3-8 BART Operating Financial History

($ millions)	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Operating Revenue										
Net rail revenue	281.5	308.9	317.5	331.4	342.7	366.5	406.1	415.7	462.8	488.7
ADA	0.6	0.6	0.6	0.7	0.8	0.9	0.8	0.8	0.9	0.9
Subtotal net passenger revenue	282.1	309.5	318.1	332.0	343.5	367.3	406.9	416.6	463.6	489.6
Parking revenue	8.7	10.2	11.2	11.8	14.0	14.8	15.7	20.0	28.4	33.5
Other operating revenue	22.0	22.1	20.0	24.9	19.5	19.8	20.7	26.5	22.7	23.8
Subtotal non-fare revenue	30.7	32.3	31.2	36.7	33.5	34.6	36.4	46.6	51.1	57.3
Total Operating Revenue	312.8	341.8	349.3	368.7	377.0	402.0	443.3	463.2	514.7	546.9
Tax and Financial Assistance										
Sales tax	198.8	202.6	184.3	166.5	180.8	195.2	208.6	221.1	233.1	241.5
Property tax	27.4	29.0	30.4	30.1	29.5	29.7	31.7	32.1	34.3	38.1
State Transit Assistance (STA)	21.2	21.7	0.0	0.0	19.7	18.3	17.3	20.0	18.1	11.3
LCTOP Cap-and-Trade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6
ARRA grants/feeder swap	0.0	0.0	0.0	25.4	0.0	0.0	0.0	0.0	0.0	0.0
SamTrans - SFO operations	4.7	6.0	2.8	2.9	1.5	0.0	0.0	0.0	0.0	0.0
Allocations from reserves	0.0	5.6	23.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	7.0	7.2	10.1	9.2	6.7	5.7	6.5	4.3	15.1	9.8
Total Financial Assistance	259.1	272.2	251.0	234.1	238.2	248.9	264.0	277.5	300.6	302.3
TOTAL SOURCES	571.9	613.9	600.3	602.8	615.1	650.9	707.3	740.7	815.3	849.2
Rail Car Fund Swap	22.7	22.7	22.7	22.7	0.00	26.7	24.0	72.0	74.2	50.2

	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Expenses										
Net labor	326.73	360.63	381.66	352.26	352.85	375.56	401.24	409.27	419.67	450.13
OPEB unfunded liability[1]	0.00	21.27	5.19	14.41	5.39	5.13	5.83	2.16	2.03	1.64
Traction/station power	34.78	34.64	36.78	35.33	35.30	35.06	37.31	37.23	36.00	37.68
Other non-labor	92.84	89.56	91.24	87.38	83.16	99.02	106.75	105.85	115.60	122.02
Subtotal Rail Operating Expenses	454.35	506.10	514.87	489.38	476.69	514.78	551.13	554.51	573.31	611.47
Purchased transportation	2.75	2.85	3.74	11.00	2.55	2.67	3.48	4.30	10.50	13.28
ADA paratransit service	10.01	10.33	11.01	11.88	12.07	12.17	12.41	12.49	13.31	13.54
Subtotal Non-Rail Expenses	12.76	13.18	14.75	22.88	14.62	14.84	15.88	16.79	23.81	26.82
Total operating expense	467.11	519.28	529.62	512.25	491.31	529.62	567.01	571.30	597.12	638.29
Rail car fund swap	22.68	22.68	22.68	22.68	0.00	25.94	23.98	72.00	74.17	50.18
Debt Service and Allocations										
Debt Service	70.33	65.93	67.69	68.47	68.12	62.29	62.46	58.26	55.98	48.63
Capital & Other Allocations	25.41	17.16	8.17	33.41	43.89	52.18	31.13	46.26	61.44	51.93
Allocation - Rail Cars	0.00	0.00	0.00	0.00	0.00	0.00	45.58	46.00	45.00	45.00
Allocation - Priority Cap Prog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.62	19.39	26.99
Allocation - Stations & Access	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.94	8.10
Allocation - SFO Reserve	0.99	17.50	0.00	0.65	0.00	8.60	6.99	6.39	11.00	12.22
Allocation - Operating Reserve	7.63	15.35	0.00	0.00	15.60	3.31	0.00	6.00	5.00	0.00
Total Debt Service and Allocations	104.36	115.94	75.85	102.53	127.60	126.38	146.17	171.52	203.75	192.86
TOTAL USES	571.47	635.22	605.47	614.79	618.92	656.00	713.18	742.83	800.86	831.16
OPEB unfunded liability[1]	0.00	-21.27	-5.19	-14.41	-5.39	-5.13	-5.83	-2.16	-2.03	-1.64
ANNUAL FINANCIAL RESULTS ($M)	0.42	0.00	0.00	2.41	1.58	0.00	0.00	0.00	0.00	0.00

NOTES: [1]OPEB: Other Post-Employment Benefits.

3.3 Compliance

3.3.1 MTC's Community-Based Transportation Planning Program

BART participates in MTC's Community-Based Transportation Planning program (CBTP), which brings local residents, community organizations and transportation agencies together to identify low-income neighborhoods' most important transportation challenges and develops strategies to overcome them.

Recommendations for BART have included improved pedestrian and bicycle infrastructure, bicycle parking, improved wayfinding, additional/upgraded bus shelters, increased lighting, and other safety improvements. BART has worked with MTC to design and implement regional transit wayfinding improvements and continues to implement station wayfinding improvements throughout the system.

Past improvements for BART include elevator installation at the Ashby station, in conjunction with the Ed Roberts campus, and the Westside Entrance and Walkway Project at the Balboa Park station, where an accessible path now connects the west side of the station to Ocean Avenue. Bike lockers and bike stations have been installed or increased at a number of stations, with additional stations scheduled for future years. A new sidewalk along an existing driveway was built at Fremont station. Wayfinding and bus shelter improvements have also been implemented. Lifeline funds also are being used for improvements to the intermodal zones at Concord, Richmond, and Pittsburg/Bay Point stations.

More recently, over the past two years BART has been investing in enhanced late-night bus service. The first year was a pilot project funded by BART and Lifeline STA funds from December 2014 to December 2015. The pilot augmented the frequency of existing AC Transit route 800 and 801 service between San Francisco and Alameda County for two hours on weekend nights and added new express service connecting San Francisco to downtown Oakland, Rockridge, Walnut Creek, Pleasant Hill, and Pittsburg/Bay Point (route 822). The second year, from December 2015 to December 2016, was funded solely by BART. Funds from route 822, which did not attract many riders during the pilot year, were shifted to existing AC Transit routes 800 and 801 to provide increased frequencies all night on weekends. With the FY18 budget, the BART Board approved an extension of the service through summer 2018.

3.3.2 Title VI Program Triennial Update Report

BART is required to submit a report to the FTA every three years detailing its efforts to comply with Title VI of the Civil Rights Act of 1964, which requires that any agency receiving federal money cannot discriminate on the basis of race, color or national origin. In February 2017, BART submitted the Board-approved 2016 Title VI Program Triennial Update report for the period January 1, 2014 to December 31, 2016 to the FTA in accordance with FTA Circular 4702.1B (effective 2012).

The 2016 Title VI Program Triennial Update report outlines BART's service and fare equity analysis process, which includes Title VI data collection, data analysis, and results and findings of

the analysis together with input received from the public through outreach activities in multiple languages. The report also includes BART's Disparate Impact and Disproportionate Burden Policy which establishes thresholds to determine when a proposed fare change or major service change would result in a disparate impact on minority riders or a disproportionate burden on low-income riders.

If the assessment finds that minority riders (as defined by Title VI) experience disparate impacts from the proposed new fares, BART will take steps to avoid, minimize, or mitigate these disparate impacts. If the additional steps do not mitigate the potential disparate impacts on minority riders, pursuant to FTA Circular 4702.1B, BART may proceed with the proposed new fares only if BART can show:

- → A substantial legitimate justification for the proposed new fare; and
- → There are no alternatives serving the same legitimate objectives that would have a less disparate impact on minority riders.

If the assessment finds that low-income riders experience a disproportionate burden from the proposed new fare, pursuant to FTA Circular 4702.1B, BART should take steps to avoid, minimize, or mitigate these impacts where practicable. BART shall also describe alternatives available to low-income riders affected by the proposed new fare.

The 2016 Title VI Program Triennial Update report is available at www.bart.gov/guide/titlevi.

In addition to the program-specific data collection and analysis requirements stated above, the Title VI Circular also includes a number of general reporting requirements that are completed by departments within BART. These include public notification of protections under Title VI; Title VI complaint procedures and forms; a policy for providing access for limited-English-speaking populations (based on the U.S. Department of Transportation's limited-English-proficiency [LEP] guidance); inclusive public-participation processes; a breakdown of minority representation on planning and advisory bodies; and equity analyses of the locations of any proposed transit facilities. All documentation related to these general reporting requirements can be found in BART's Title VI Program Triennial Update report at www.bart.gov/guide/titlevi.

3.3.3 FTA Triennial Review

This section describes the agency's most recent FTA Triennial Review for compliance with the requirements of Title VI of the Civil Rights Act of 1964, Equal Employment Opportunity Program, and Disadvantaged Business Enterprises. The Triennial Review is one of FTA's management tools for examining grantee performance and adherence to current FTA requirements and policies.

BART completed its most recent FTA Triennial Review in September 2012. BART was found to be compliant in all but one area where deficiencies were identified: Disadvantaged Business Enterprise.

The findings of the FTA Triennial Review are shown in Figure 3-9. The FTA reviewed BART's response to the above deficiencies, dated January 31, 2013, and found that corrective actions to

these deficiencies had been achieved and no further action was required. The FTA closed the review as of February 28, 2013.

Figure 3-9 FTA Triennial Review Findings

Review Area	Finding	Deficiency	Corrective Action	Response Date
Disadvantaged Business Enterprise	D-17	Grantee not ensuring prompt payment	Submit report to Region IX Civil Rights Officer on progress in implementing short term initiatives identified in the Small Business Opportunity Plan and provide an update on the Vendor Payment Tracking System. The Standard Operating Procedures must address compliance with DBE program requirements for public participation, prompt payment and return of retainage, and accurate completion of the Uniform Reports. The Uniform Report due 12/1/12 must include all required information.	January 31, 2013
	D-18	Public participation process deficiencies		
	D-20	Uniform reports do not include required information		

BART also performs FTA Triennial Program Updates for its Equal Opportunity Employment Program and Disadvantaged Business Enterprises Program.

4 OPERATING SERVICE PLAN AND FINANCIAL PLAN

This chapter details BART's long-term operating outlook, rail service plan, and operating financial forecast for FY17 through FY26. These 10-year ridership, operating service, and financial forecasts help guide BART's annual budget decision-making process and identify potential challenges and opportunities that may arise over the next 10 years.

The financial forecast for the SRTP is based upon the FY18 budget, which the BART Board adopted in June 2017. Actual results for FY17 are not yet available, with the exception of ridership and sales tax.

4.1 Long-term Operating Financial Outlook

This financial forecast shows that BART is anticipating challenges in its operating program over the 10 years of this plan. These challenges include:

- → Maintaining reliable service to meet ridership demands while integrating the new rail cars into revenue service, implementing system reinvestment projects, and operating new system extensions: Recent years of strong peak period ridership growth have stressed the system, particularly in the capacity-constrained Transbay corridor. Running the current fleet of older cars with more car miles, more passengers and more crowding has increased delays and made service less reliable.
- → Funding a large portion of critical capital renovations and infrastructure upgrades out of its operating program: While this high level of self-funding (over $500 million in the past five years alone) helps advance critical reinvestment, this level of allocations can leave the operating program with a forecasted structural deficit when operating revenues decline.
- → Addressing near-term projected operating shortfalls: BART's FY18 budget process started with a projected operating shortfall of $31 million. Actions taken to balance the FY18 budget, including fare increases and expense reductions, also helped reduce future year projected shortfalls.

BART anticipated many of these challenges to its operating program as reflected in its FY15 SRTP. In recent years, BART helped address these potential shortfalls through new programs that increase efficiency through its Asset Management Program (AMP) and Strategic Maintenance Program (SMP), and by identifying new funding, such as Measure RR and federal Core Infrastructure Grant funds.

BART is implementing its AMP, which identifies and prioritizes infrastructure needs and allows BART to make operating allocations and capital investment choices based on risk and criticality to safety and system operations. This process benefits the financial sustainability of both the operating and capital programs.

BART will continue to develop innovative programs like the SMP to operate as efficiently as possible. The SMP is a maintenance approach to reinvestment designed to move BART to a proactive, planned maintenance model. The SMP has increased rail car reliability even though BART's fleet (the oldest in the nation) is aging. BART is now applying SMP concepts beyond revenue vehicles, such as wayside, facilities, structures, track, and electrical/mechanical systems.

In November 2016, voters approved Measure RR, a $3.5 billion bond measure that funds critical capital reinvestment projects. The injection of Measure RR funds will allow BART to more quickly address the most critical capital reinvestment and capacity projects, taking some pressure off the operating program to fund capital projects and potentially increasing ridership and associated fare revenue by improving system reliability.

BART has been accepted into the project development phase of the Federal Transit Administration's (FTA's) Capital Investment Grant Program in the Core Capacity category of eligibility. BART is now working to fulfill the requirements to advance into the engineering phase and to qualify for a Full Funding Grant Agreement to help pay for 306 additional rail cars, replacement of the legacy train control system, storage for the additional cars, and enhancements to the traction power system to increase BART capacity in the Transbay corridor. These four projects comprise BART's Transbay Corridor Core Capacity Program, described in Chapter 5. Like Measure RR, securing these funds will provide significant capital funds for the projects, which is expected to potentially increase ridership and associated fare revenue.

BART Board Resolution 5208 directs all incremental revenue from the four CPI-based fare increases implemented between FY14 and FY20 to high-priority capital projects. The high-priority capital projects, also known as the "Big 3," include new rail cars, increased maintenance capacity through the Hayward Maintenance Complex, and replacement of BART's legacy train control system. The forecasted operating shortfalls are projected to be largest in the next few years, as all incremental fare increase revenue between 2014 and 2021 is directed to the Big 3, which means that the remaining fare revenue--the largest source for funding system operations—remains at 2012 levels. Exacerbating the operating shortfall is a decline in ridership that began in FY17, further eroding operating sources.

The SRTP assumes that at the end of the eight-year CPI-based fare increase program and after an additional $200 million is directed to fund 306 additional rail cars, incremental fare increase revenue will remain in the operating program.

The financial forecast shows a Revenue Enhancement/Cost Containment line that reflects BART's commitment to produce a balanced budget for the Board's consideration prior to the start of each future fiscal year. BART will continue to develop strategies to address future projected deficits. The cumulative 10-year shortfall is currently estimated at $285 million, just 3% of the cumulative operating expenses over 10 years. These strategies include current efforts

to increase sources of operating revenues, and could include further expense reductions and more closely matching the timing of operating to capital allocations to the actual funding needs of projects. In addition, BART continues to seek additional revenue sources for capital needs to lessen the demand on operating revenues.

BART will look at both the operating program and allocations as strategies to lower operating expenses. Reductions in staffing could have a negative influence on service and system performance. For example, to address the impacts of the two recessions between 2000 and 2010 BART reduced a considerable amount of expense, as exemplified in the total number of positions available for BART's operating budget. Despite adding seven stations and over 100,000 daily riders, BART operates with just slightly more staff today than at the start of the first recession 16 years ago: 3,240 operating positions at the end of FY17 compared to 3,169 in FY01. In both recessions, BART also reduced operating to capital allocations to manage operating shortfalls.

It is important to note the SRTP forecast is based upon many assumptions. Fare revenue and sales tax, which make up nearly 90% of all operating sources, depend on future ridership growth and the economic health of the Bay Area. The schedule of system reinvestment projects, such as the delivery of new rail cars, can change the timing of operating to capital allocations and future service plans. Other factors affecting forecasts include labor and benefit costs (many of which are outside of BART's control), regional congestion, and the public's propensity to take transit. In addition, over the next 10 years, the Bay Area is likely to experience periods of higher-than-normal growth as well as economic downturn. If revenues increase more than projected, or if expenses grow less than projected, deficits could be reduced. Conversely, lower revenues or higher expenses could produce a larger shortfall.

4.2 Operating Service Plan

As part of the SRTP planning process, BART estimates the level of service required to accommodate forecasted ridership on an annual basis. Ridership forecasts are unconstrained by capacity and assume BART's ability to maintain adequate reliability and on-time performance, as well as riders' ability to access stations. Should ridership demand grow faster than BART's ability to increase capacity, there may be negative impacts to rider comfort and the ability to board trains, which could ultimately discourage further expected ridership growth. In the 10-year forecast period, the ability to provide most additional capacity depends on two projects: the delivery and subsequent availability of new cars, and the implementation of a new train control system.

4.2.1 Ridership Forecasts

As part of the service and financial planning process, BART uses ridership data from the most recent fiscal year to serve as the base year for its ridership forecasting model. This ensures that the baseline ridership levels and trip distributions reflect the most current trends. The model, using updated baseline data, is then adjusted to account for the various factors affecting ridership, such as:

- → Projected changes in regional population and employment (per MTC's *Plan Bay Area*).
- → Scheduled openings of new extensions and stations.
- → Scheduled BART fare and service changes.
- → Projected changes in competing travel markets (e.g., auto travel times and fuel costs).

The East Contra Costa Extension (eBART) and the Silicon Valley Berryessa Extension (SVBX) are projected to open in FY18.

Per the terms of BART's 2001 Comprehensive Agreement with the Santa Clara Valley Transportation Authority (VTA), the financial responsibility for SVBX rests with VTA, and operations of the BART extension into Santa Clara County will not financially impact BART. The additional service for this extension, is shown in Figure 4-2, BART Rail Service Forecast.

Ridership forecasts have been revised downward in response to recent lower than expected ridership. Factors affecting ridership include service disruptions due to planned maintenance and capital projects, such as the Transbay Tube retrofit, and the impact of Transportation Network Companies (TNCs). BART ridership to both the San Francisco International Airport and Oakland International Airport has been trending down, due in large part to the reported increase in TNC mode share at both airports. Off-peak travel, short and medium trips, and intra-East Bay and West Bay are also down and this may be due to TNCs; however, it is more difficult to directly correlate the increase in TNC usage and reduction in these trip types as TNC data is not generally not available for analysis. Based upon FY17 performance, budgeted ridership for FY18 has been revised downward. This outlook also reduced the base for the forecast for the long-term outlook. This decrease is offset by the increased ridership projected for the SVBX project.

Figure 4-1 shows the resulting ridership forecast through FY26, which includes the SVBX and eBART projected openings in FY18.

Figure 4-1 BART Ridership Forecast

	FY17 (actual)	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Average Weekday	423,395	431,709	440,917	453,232	464,527	475,491	482,072	488,786	495,633	502,755
Total Annual (M)	124.2	125.9	128.5	132.1	135.4	138.6	140.5	142.5	144.5	146.6
Annual Change	-	1.4%	2.1%	2.8%	2.5%	2.4%	1.4%	1.4%	1.4%	1.4%

Key findings informing the ridership forecast are as follows:

→ After several years of relatively strong weekday ridership growth, this trend began to slow and ultimately reverse in late FY16. Weekday ridership in FY17 averaged 423,395, which is 2.3% below FY16.

→ Weekend ridership, which makes up a smaller and more volatile component of BART's ridership, continued to decline through FY17 with Saturdays and Sundays under budget by 11.3% and 13.9% respectively. This decline is in part due to the planned maintenance projects which resulted in track closures, bus bridges, and strong encouragements to seek alternative means of transportation. Weekend ridership can also be impacted by reduced congestion for competing modes like autos and TNCs, as well as available underpriced parking at popular destinations.

Given the above indicators, the baseline ridership for FY18 has been adjusted downward to reflect these recent declines. Ridership at existing stations is expected to be flat in FY18, with the only growth in ridership expected at new stations:

→ Based on BART's actual experience with previously opened extensions and infill stations, ridership at the new extension stations is expected to grow at a faster rate than the current core system in the first few years after opening and then gradually taper down.

- Approximately 2,100 new weekday exits are expected to use the new Warm Springs/South Fremont Station in the first full year of service, FY18.
- Using forecasts prepared by VTA, approximately 7,200 new weekday exits are expected to use the two new SVBX stations in the first year of service, FY18.
- Approximately 1,700 new weekday exits are expected to use the two new eBART stations in the first year of service, FY18.

→ Passenger miles are projected to increase at a rate that is slightly higher than average. This is largely due the impact of extension stations and recent trends of declining non-Transbay trips. The largest declines are short (0-6 miles) and medium (6-14 miles) distance trips during off-peak hours in the intra East Bay and Intra West Bay travel markets. These types of trips may be competing with alternatives such as TNCs.

→ All revenue generated from trips beginning or ending within SVBX are allocated to the VTA, with the exception of trips between SVBX and the SFO Extension. Revenue from these trips will be allocated to the extension which records the exit.

4.2.2 Service Planning

BART's service plans for future years are based on the ridership forecast described in the prior section and moderated by anticipated operational constraints. The most significant near-term constraints are the number of legacy fleet cars that may be deployed, the rates of delivery and acceptance of new cars, and implementation of the Train Control Modernization Program (TCMP) which will increase Transbay core capacity beyond its current limit of 24 trains per hour.

Service plans produces a fleet demand for an entire weekday based on:

- → Average passengers per car: BART's loading standard is 115 passengers per car.
- → Headways: Service is scheduled at 15-minute headways on each of the five lines during the peak periods, with additional peak hour trains on the Yellow line initially, expanding to other Transbay lines as car availability and demand necessitate.
- → Transbay Tube throughput: 23 trains through the Transbay Tube during the peak hour and in the peak direction, with capacity for 24.
- → Number of trains on each route: Four trains per hour in each direction, except for additional peak trains on the Yellow line. On evenings and weekends, service is reduced to three lines and three trains per hour in each direction.
- → Total cars and control cars required: Every revenue service train has a control car at either end to enable bi-directional operation. Additional control cars may be placed within a train to enable a train of eight to 10 cars to be 'broken' into smaller revenue trains of four to six cars for operation during off-peak periods.

Figure 4-2 shows the BART Rail Service Forecast, a preliminary overview of how BART might operate service to accommodate the projected increase in ridership and service due to opening extensions and adding capacity through FY26.

Key findings from the service planning forecast are as follows:

- → The next few years will present challenges for BART service provision. When WSX opened, only the aging current fleet was available to address the increased car requirements associated with the extension. While delivery of the new rail cars started in FY16, a rigorous testing process is required before production can be ramped up and vehicles will be accepted into BART's fleet allowing for increased service.
- → BART scaled up the Hayward primary shop starting in FY17 as part of the larger Hayward Maintenance Complex. HMC will allow BART to service more train cars and return them to revenue service faster.
- → In FY18, SVBX is expected to begin service. The additional new cars required to deliver the incremental increase in service are being paid for by VTA. Additional vehicles could be added later in response to ridership growth on this line. Given the expected increased demand from SVBX, a peak train dispatched from the Hayward yard is planned to be added to the Green line to help address crowding on San Francisco-bound trains.
- → eBART is also expected to open in FY18. To accommodate forecasted demand and maintain the existing headways, peak-period trains will be lengthened and an additional train will be added.
- → In the next few years, BART expects to increase train lengths to 10 cars on all peak Transbay trains and to as many as eight cars on East Bay (Orange line) trains. This is dependent on delivery and acceptance of the new rail cars.
- → The strategy for transitioning from conventional train control to Communications-Based Train Control (CBTC) will follow from BART's selection of a supplier and

negotiation of a contract schedule. The possibility of 12-minute headways during peak service will be a major benefit of this project. By 2026, upon completion of CBTC through the core system bounded by Daly City, MacArthur, and Bay Fair, and with the entire fleet CBTC-enabled, BART will be able to run up to 30 trains per hour per direction through the Transbay Tube.

→ BART plans to selectively retain rail cars from the current fleet to help maintain and expand service until there are sufficient new vehicles to replace them. The current fleet is not expected to be completely retired until as late as FY26. The projected requirement of 1,081 cars reflects BART's intent to operate the fleet at an industry-standard maintenance spare ratio of roughly 20%.

Operating at 15 minute headways during evening and weekend service is estimated to cost approximately $8 million annually in current year dollars. This increase in off-peak service would require additional operating funds beyond those included in the Operating Financial Plan and could significantly restrict off-peak maintenance access.

However, as more shop capacity becomes available and substantial numbers of new cars are operating reliably, staff proposes to continue to incrementally lengthen the evening service hours of the Red and Green Lines as outlined in the 2013 BART Sustainable Communities Operational Analysis. Extending Green Line service on weekday evenings beyond its current cut off time of 7 PM is part of the service planning analysis related to VTA's Berryessa Extension. This service expansion would provide two to four trains every 20 minutes for the majority of the stations in the system, including those in the heavily traveled corridors in San Francisco, Oakland, Berkeley and San Leandro. The costs associated with this service increase are included in the operating forecast.

Figure 4-2 BART Rail Service Forecast

	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Peak Vehicles	556	640	694	694	694	770	770	770	770	810
Fleet Vehicles	669	695	840	860	893	984	984	984	984	1081
Base Trains	54	56	56	56	56	56	56	56	56	59
Peak trains	62	66	72	72	72	77	77	77	77	81
Transbay trains peak hour/peak direction	23	23	24	24	24	24	24	24	24	28
Total car miles (millions)	77.79	84.59	88.11	88.11	88.11	91.29	91.29	91.29	91.29	115.36
Total car hours (millions)	2.45	2.64	2.73	2.73	2.73	2.83	2.83	2.83	2.83	3.37

NOTES:

F17 and FY18 service statistics reflect planned service levels for FY17 and FY18. FY19 through FY26 service plans reflect service planned as of January 1 of each year.
FY17: WSX opened.
FY18: SVBX and eBART expected to open.
FY26: TCMP allowing for 12-minute headways during the peak

4.2.3 ADA Paratransit Service

As described in Chapter 2, BART's primary responsibility for paratransit is met through the East Bay Paratransit Consortium (EBPC), which is funded and administered in partnership with AC Transit. The EBPC delivers demand responsive ADA service during all revenue-service hours with a fleet of approximately 210 contract-service provided lift-vans that annually carry over 730,000 trips. BART also partners with local operators to offer paratransit service in BART's other service areas, usually by BART's providing payment directly to the transit operator to cover BART's share of the service costs.

Figure 4-3 below shows current projections for the EBPC. The projections are based on recent ridership trends with moderate growth expected to continue. "Total Passengers" include ADA riders as well as attendants and companions, and "ADA Passengers" excludes attendants and companions. Productivity is defined as passengers per revenue vehicle hour and is calculated for both categories of ridership.

Figure 4-3 ADA Paratransit Projected Passengers and Productivity

Projections	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Total Passengers	736,538	742,062	747,628	753,235	758,884	764,576	770,310	776,087	781,908	787,772
Total ADA Passengers	637,735	642,518	647,016	651,545	656,106	660,698	665,323	669,981	674,670	679,393
Productivity (Tot. Pass.)	1.72	1.73	1.73	1.74	1.74	1.75	1.75	1.75	1.75	1.75
Productivity (ADA Pass.)	1.49	1.50	1.50	1.50	1.50	1.51	1.51	1.51	1.51	1.51

4.3 Operating Financial Plan

The Operating Financial Plan includes projected revenues, financial assistance, expenses, and allocations out of operating funds to other BART programs. Projections of passenger revenue are calculated using ridership forecasts described in Figure 4-1. Expense forecasts are developed through a multi-step process that uses ridership forecasts, projections of future service requirements, known impacts of labor contracts, and anticipated changes to benefit costs. It is important to note that BART's capital needs have a meaningful impact on its Operating Financial Plan and are a significant driver of projected deficits.

These forecasts are, as much as possible, consistent with or based upon regional forecasts and historical trends. For example, the MTC provides guidance on projections for inflation, State Transit Assistance (STA) and Low Carbon Transit Operations Program (LCTOP) funds. Figure 4-4 shows the current 10-year operating financial outlook through FY26. Major categories of revenues and expenses are described in subsequent sections.

The financial forecast is based upon the FY17 and FY18 adopted budgets as shown in the first two columns of Figure 4-4, with additional input from budget trends experienced in FY17.

Several operating source categories were under budget in FY17. For these areas, the under budget FY17 estimates informed the FY18 budget and out-year forecasts.

The next sections describe each line item in Figure 4-4.

4.3.1 Operating Sources: Revenue

Rail Passenger Revenue

Rail passenger revenue is projected based on the ridership forecast shown in Figure 4-1. Annual fare revenue is estimated for each year by multiplying an origin-destination matrix of projected trips by a station-to-station fare matrix. The resulting daily fare revenue is then converted into an annual figure and reduced by the various fare discounts BART offers.

Fare increases are estimated using the CPI-based fare formula that accounts for changes in inflation, both nationally and locally, over the two-year period preceding the fare increase; this result is reduced by a productivity factor of 0.5% to account for increases in BART labor and operating efficiencies. Rail passenger revenue projections include Board-approved FY18 budget fare changes that take effect on January 1, 2018, as follows:

- → The 2018 CPI-based fare increase of 2.7%.
- → A $0.50 flat surcharge on each fare paid with magnetic-stripe paper tickets.
- → A reduction from 62.5% to 50% to the discount offered youth age 5 through 12.
- → A new 50% discount provided to youth age 13 through 18.

Fare Increase Revenue for Priority Capital Projects

In 2013, the Board acted to renew the CPI-based fare increase program and to dedicate incremental fare revenue generated by the fare increases in 2014, 2016, 2018, and 2020 to help fund high-priority capital needs. These needs currently include the Big 3 projects of new rail cars, HMC, and TCMP. The financial forecast shows the incremental revenue in a separate line.

Between the first fare increase in January 2014 and the end of FY16, BART directed a total $55 million of incremental fare revenue to the Big 3 projects. Allocations between FY17 and the end of the current CPI-based program will depend upon actual ridership and inflation. The financial forecast estimates additional allocations of $270 million of incremental fare increase revenue from FY17 through December 2021, the end of the current Board-adopted program, based upon the current SRTP forecast of ridership and future fare increases.

For planning purposes, the SRTP assumes the CPI-based fare increase program continues beyond the last programmed increase in 2020. The SRTP also assumes that once BART's contributions to the current Big 3 projects are complete, and after an additional $200 million is directed to fund 306 additional rail cars, incremental fare increase revenue remains in the operating program to fund rail operations, as it did prior to 2014. Continuation of the CPI-based fare increase program beyond 2020, and the use of the fare revenue, is subject to future Board approval.

Figure 4-4 BART Operating Financial Forecast

(Escalated $M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Revenue										
Rail Fare revenue	474.6	471.9	492.8	511.5	529.1	546.7	601.1	620.9	644.4	668.9
Fare incr. for priority capital programs	35.4	38.8	44.3	53.9	63.8	74.5	42.1	45.0	45.0	44.2
Total net rail passenger revenue	510.0	510.8	537.1	565.4	592.9	621.2	643.1	665.9	689.4	713.1
ADA passenger revenue	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Net passenger revenue	510.8	511.7	538.0	566.3	593.8	622.1	644.0	666.8	690.3	714.1
Parking revenue	33.5	35.2	36.2	37.3	38.4	39.6	40.8	42.0	43.3	44.6
Advertising revenue	9.7	11.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7
Other operating revenue	17.8	20.2	18.4	18.5	18.8	19.1	19.3	19.2	19.5	19.8
Subtotal non-fare revenue	61.0	67.1	65.3	66.5	67.9	69.3	70.8	71.9	73.5	75.0
Total Operating Revenue	**571.8**	**578.8**	**603.4**	**632.8**	**661.7**	**691.4**	**714.8**	**738.7**	**763.8**	**789.1**
Financial Assistance										
Sales tax	249.2	252.5	260.0	267.8	275.9	284.1	292.7	301.4	310.5	319.8
Property tax	38.6	42.2	44.3	46.5	48.8	51.3	53.8	56.5	59.4	62.3
State Transit Assistance (STA)	8.9	26.8	32.0	31.8	31.6	31.4	31.2	31.0	30.7	30.5
Low Carbon Transit Operations Program	7.0	0.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Low Carbon Fuel Standard	0.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Local and other assistance	6.4	6.2	5.9	6.0	6.1	6.8	6.2	6.4	6.5	8.8
SVBX Assistance	0.0	7.1	14.8	10.7	5.9	4.1	2.8	1.1	0.0	0.0
Total Financial Assistance	**310.1**	**338.8**	**365.5**	**371.4**	**376.8**	**386.2**	**395.2**	**405.0**	**415.6**	**429.9**
TOTAL SOURCES	**882.0**	**917.5**	**968.9**	**1,004.2**	**1,038.5**	**1,077.6**	**1,110.1**	**1,143.7**	**1,179.4**	**1,219.0**
5307 Rail Car Fund swap assistance	47.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(Escalated $M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Expense										
Net labor and benefits	499.6	541.9	598.1	629.4	659.9	691.1	717.3	740.8	762.9	804.0
OPEB unfunded liability	2.4	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Traction/station Power	41.0	43.3	47.6	49.6	50.9	53.4	54.9	56.3	58.0	69.4
Other Non-Labor	120.5	125.1	134.4	137.2	141.1	145.3	149.7	152.9	157.1	165.3
Subtotal Rail Operating Expenses	**664**	**713**	**783**	**819**	**855**	**893**	**926**	**954**	**982**	**1,043**
eBART	0.0	0.0	14.2	14.5	14.9	15.2	15.6	15.9	16.3	16.7
BART-to-OAK	6.1	6.3	6.4	6.5	6.7	6.8	7.0	7.1	7.3	7.5
ADA Paratransit Service	14.2	15.0	15.3	15.6	16.0	16.3	16.7	17.0	17.4	17.8
Other Purchased transportation	7.7	8.0	8.4	8.9	9.3	9.7	10.2	10.7	11.2	11.8
Subtotal non-heavy rail expense	21.9	23.0	23.7	24.5	25.3	26.1	26.9	27.8	28.7	29.6
Total Operating Expense	**691.5**	**742.7**	**827.5**	**865.1**	**902.2**	**941.4**	**975.0**	**1,004.5**	**1,034.0**	**1,096.3**
5307 Rail Car Fund Swap Expense	47.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Service and Allocations										
Bond debt service	51.7	50.8	52.1	52.3	52.5	52.6	52.8	53.0	53.2	53.3
Allocations:										
Baseline Capital Allocation	23.3	14.4	27.3	21.5	22.0	22.5	23.0	23.5	24.0	24.5
Additional Capital Initiatives	17.3	14.8	3.4	1.9	1.9	2.0	1.8	1.8	1.8	1.8
Rail Car Sinking Fund	45.0	39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Priority Capital Programs	35.4	38.8	44.3	53.9	63.8	74.5	42.1	45.0	45.0	44.2
Additional Allocations	0.0	0.0	10.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
SFO Operations/New Car Allocation	13.3	7.5	7.0	8.5	9.4	10.2	10.8	11.7	12.6	8.7
Stations/Access Projects	5.2	5.0	5.5	6.0	6.5	7.0	7.5	8.1	8.7	9.3
Other (CARP, LCFS, Met Building, Other Alloc.)	1.7	7.5	5.6	5.7	5.8	5.8	5.9	5.9	6.0	6.0
Total Debt Service and Allocations	**192.9**	**177.9**	**155.2**	**174.9**	**186.8**	**199.6**	**168.9**	**174.0**	**176.3**	**172.9**
TOTAL USES	**884.4**	**920.6**	**982.7**	**1,039.9**	**1,089.0**	**1,141.0**	**1,143.9**	**1,178.5**	**1,210.3**	**1,269.2**
OPEB unfunded liability	2.4	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
NET RESULT	**0.0**	**(0.0)**	**(10.7)**	**(32.5)**	**(47.1)**	**(59.9)**	**(30.3)**	**(31.2)**	**(27.2)**	**(46.3)**
Revenue Enhancement/Cost Containment	0.0	0.0	10.7	32.5	47.1	59.9	30.3	31.2	27.2	46.3
Revised Net Result	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ADA Passenger Revenue

BART complies with the ADA requirement to provide paratransit service comparable and complementary to the BART system. In their areas of joint service, BART and AC Transit fund and administer the EBPC, which provides service through contractors. BART directly collects fare revenue from EBPC trips. Fare revenue projections are a function of ridership. Recent paratransit ridership has been relatively flat and is expected to remain flat during the time covered by this SRTP, with a projected growth in revenues of 0.75% per year.

Parking Revenue

Paid parking is BART's largest source of non-fare revenue. BART charges daily and permit parking fees at its current 34 stations with parking facilities. In 2013, the Board approved modifications to the paid parking programs by implementing a demand-based approach to parking fees. Daily parking fees are re-evaluated every six months, based on the occupancy of the parking facility. Costs for permits and fees may either increase or decrease by 50¢ per day, depending upon whether the facility's utilization is above or below 95% capacity. There is a daily fee maximum of $3 at all stations, with the exception of West Oakland, which does not have a cap. All stations have a $3 daily parking fee now, except West Oakland ($9), South Hayward ($2) and Coliseum ($2.50).

Under current policy, additional revenue raised from the demand-based initiative is dedicated for investments in station access and station improvements including renovation, heavy cleaning, and addressing quality of life issues. In addition, the funds are used to enhance the customer experience, including improvements in signage and communication. Programs and projects funded by the increased parking revenue consist of both operating and capital efforts, some of which are one-time in nature and others ongoing.

The FY18 parking revenue budget is $35.2 million. Of this revenue, $15.1 million is directed to the demand-based initiative, funding $10.1 million of ongoing programs such as Station Brightening (through deep cleaning) and dedicated parking enforcement staff, and $5.0 million of one time projects and programs such as fare evasion prevention and initiatives focused on public safety and security. The one-time allocations are shown as a line item in Section 4.3.4

Aside from the changes noted above, parking revenue is projected to increase annually by 3% each year, based upon increased utilization of parking spaces. This revenue forecast does not assume any impact from future TOD projects on BART parking lots nor changes to the maximum daily fee.

Advertising

Advertising currently brings in more than $10 million per year in guaranteed revenue. BART has an advertising franchise agreement with a third party that manages the sales and posting of advertising on BART's behalf. Guaranteed revenue for the current 10-year agreement totals $95 million, and annual guarantees are quadruple the level from 10 years ago. The franchisee pays BART either a minimal annual guarantee or 70% of net revenue, whichever amount is greater.

BART's advertising franchise vendor sells advertising space in BART stations and on BART trains. Ad inventory includes static poster frames; illuminated sign boxes; specialty media directly

applied to floors, walls, and ceilings; and six digital advertising screens at Montgomery Street Station showing a mix of digital ads, news, weather, and other information. For a premium, advertisers can purchase a "saturation" campaign to have advertising exclusivity in a particular station or location. Also for a premium, advertisers can purchase an "activation" where they establish a limited presence in a station to interact with BART riders, often handing out coupons, free product samples, or other giveaways.

In 2017, BART began selling Train Wraps and Innovation/Amenity Station Sponsorships as recently authorized by the Board, which is estimated to increase FY18 revenue by approximately $1.2 million. Also in 2017 BART began installing six additional digital ad screens at Powell Street Station and will be assessing other ways to increase revenue and modernize the advertising infrastructure after the current agreement expires in September 2018. The forecast currently assumes no increase to advertising revenue over the next 10 years and will be updated with projections from the upcoming new agreement once revenues are estimated.

Other Operating Revenue

Other sources of operating revenue include fiber optics and telecommunication programs; advertising contracts; parking fines and forfeitures; and station concessions. Categories not tied to contracts are forecast to keep pace with inflation.

The Commercial Communications Revenue Program (CCRP), a division of the Office of the Chief Information Officer (OCIO), is responsible for generating revenue through fiber optic, cellular and wireless licensing opportunities. BART's right-of-way is a critical asset for regional communications. Many of the nation's largest telecommunication firms rely on BART's property to carry their signals across the Bay Area. To date, CCRP has generated over $42 million in revenue.

In November 2016, BART entered into an agreement with SFMTA to manage the fiber optic and cellular licensing opportunities in the SFMTA underground. Although it will take one to two years to construct the necessary telecommunication infrastructure, this agreement has the potential to increase BART's revenue by an additional $1 to $3 million annually in coming years. This additional revenue will be included in the forecast once amounts are estimated.

The CCRP recently completed two critical business development tasks: Salesforce opportunity tracking database that will increase BART's ability to process timely agreements and an asset management and inventory mapping system. Together these two business tools will enable BART to solicit additional licensing opportunities and work to further increase revenue.

4.3.2 Operating Sources: Financial Assistance

Sales Tax

BART's largest source of financial assistance is a dedicated 75% share of a one-half cent sales tax levied in the three BART counties. The economic segments that make up BART's sales tax receipts are generally diverse. Approximately 45% of revenues are driven by restaurant, miscellaneous retail (such as small chain stores), and new auto sales. However, these areas are susceptible to economic downtowns, which results in reduced sales tax revenue generations.

Over the past 10 to 20 years, which include the substantial negative impacts of two recessions and several strong periods of economic growth, BART's annual sales tax growth rate has ranged from 1.6% to 3.3%. In FY16, after several years of strong, better than expected results of 6% to 9% annual growth, sales tax growth began to slow. Some of the decline was due to lower fuel prices during 2016. Actual sales tax for FY17 came in slightly less than budgeted, with 2.3% actual growth, and the FY18 budget assumes 2.1% growth. Beyond FY18, sales tax growth is projected at 3% annually, as most regional economic forecasts anticipate Bay Area sales tax growth to return to more sustainable long-term rates.

Property Tax

BART receives a pre-Proposition 13 property tax assessment in the three BART counties. Based on historic property tax growth rates, which have averaged between 4.3% to 5.7% over the past 10 to 20 years, the forecast assumes annual property tax revenue growth of 5%. This long-term growth rate assumes that the real estate and housing market returns to a more sustainable growth pattern, down from the recent high growth rates.

State Transit Assistance

BART receives funding through appropriations of State Transit Assistance (STA), which is derived from actual receipts of the sales tax on diesel fuel. Statewide collections can fluctuate based on diesel prices and consumption. In addition, appropriations to transit operators can vary based on calculations of qualifying revenues for the local operator and the region. STA funding has not been consistent throughout the years and can be subject to actions in the governor's state budget. In some years, BART received no STA funds and more recently, STA revenues statewide have declined due to lower diesel prices.

Senate Bill 1 (SB1), passed in April 2017, provides for new formula-based funding sources for public transit, augmenting the current STA program. For public transit, SB1 increases the incremental sales tax on diesel fuel dedicated to the STA program by 3.5% - generating approximately $250 million per year, with inflation adjustments, to be used for transit capital and operations purposes. SB1 also implements another 0.5% increase on the incremental sales tax on diesel fuel - generating approximately $40 million per year with inflationary increases over time to intercity passenger and commuter rail systems.

A new "Transportation Improvement Fee" is established under the Vehicle License Fee law. Fee revenues are dedicated to the STA program ($105M per year) for "state of good repair" types of expenditures. Fees are also directed to the Transit and Intercity Rail Capital Program ($245M per year) and a new "Solutions for Congested Corridors Program" ($250M per year) for allocation to a balanced set of transportation, environmental and community access improvements within highly congested travel corridors in California – including public transit projects.

MTC estimates include an increase of approximately $16.2 million for BART in FY18, on top of BART's original FY18 estimate of $17.5 million. From this total, $6.9M will be directed by MTC to feeder bus operators providing service to BART stations, leaving a net of $26.8 million for BART.

The transit operator shares are currently based on FY15 revenue-based STA factors. Actual funding amounts should be expected to change, based upon updated revenue-based STA factors and actual diesel tax revenues and Transportation Improvement Fees in FY18.

Low Carbon Transit Operations Program

BART receives funding from the Low Carbon Transit Operations Program (LCTOP), one of several programs of the Transit, Affordable Housing, and Sustainable Communities Program (Senate Bill 862) established in 2014 by the California legislature. Programs in Senate Bill 862 are funded by revenue from the state's Cap-and-Trade Program through the auction of carbon credits. The LCTOP provides transit agencies with operating and capital assistance for programs to reduce greenhouse gas emissions and improve mobility and prioritizes serving disadvantaged communities. Senate Bill 32 extended the Cap-and-Trade Program to 2030.

BART programmed LCTOP funds received between FY16 and FY18 to help offset the $45 million annual operating allocation to the new rail car program. This allocation is separate from the incremental fare increase revenue allocation to the Big 3 projects. The new rail cars will increase BART's capacity, resulting in additional riders on transit that will reduce greenhouse gases.

BART's FY17 LCTOP receipts of $2.1 million were nearly $5 million under budget. In addition, state auction results preceding the development of BART's FY18 budget were very low and inconsistent. Using guidance from MTC, BART conservatively budgeted no LCTOP funds for FY18. However, recent legal decisions upholding the state's Cap-and-Trade program and relatively robust May 2017 auction results indicate that BART could receive unbudgeted LCTOP funds in FY18 at a level greater than FY17.

For FY19 and beyond, the SRTP forecast assumes statewide LCTOP recovers to $150 million, the level seen in FY16, with an estimated $4.5 million for BART. The programmatic use of these future funds will be determined in subsequent years.

Low Carbon Fuel Standard Program

The Low Carbon Fuel Standard Program (LCFS) is a state program administered by the California Air Resources Board. The purpose of the program is to move state energy production toward less carbon-intensive fuel sources. Under newly updated regulations, electric railroad operators such as BART are permitted to sell credits to producers of higher-carbon-intensity fuels for the purpose of meeting their program compliance obligations. Revenues collected from the LCFS credits depend on the LCFS credit market and the timing of BART's sales. Based on four years of market history, BART expects annual revenue between $2.9 million and $8 million per year, though actual revenues in future years are unpredictable and will depend on market conditions at the time. Funds will be used according to BART's LCFS Policy, which the BART Board will consider in 2017. For planning purposes, this SRTP assumes $4 million of LCFS revenue annually.

Local and Other Assistance

BART also receives smaller amounts of annual operating funding from several local sources. Alameda County's Measure B and Measure BB provide approximately $4.6 million for BART's paratransit service operations and rail service in Alameda County. Contra Costa County's Measure J provides approximately $80,000 annually for transit operations.

As part of operating service to the joint BART/Caltrain station at Millbrae, Caltrain is required to pay for the use, operations, and maintenance costs applicable to Caltrain service and passengers at the station. For FY17, the payment is about $0.9 million; future payments are based on actual inflation and thus are estimated to increase by 2.2% annually through FY26.

SVBX Assistance

The SVBX Financial Assistance is a new line item that reflects the estimated net difference between fare revenue collected on the extension and the calculated operating expense. Per the terms of the 2001 Comprehensive Agreement governing operations of BART service into Santa Clara County, VTA will reimburse BART for the net expense for operating service on this extension.

Projected SVBX fare revenue is based on the application of BART's distance based fare formula with ridership forecasts provided by the VTA. These forecasts reflect expected ridership in both FY18 and FY35 with ridership interpolated in the years in between. Each year, BART and VTA will reconcile financial results using actual ridership and related fare revenue, and actual operating and maintenance costs to determine the actual net financial result.

Rail Car Fund Swap (Federal 5307 Reimbursement)

Through an agreement between MTC and BART regarding new rail cars, MTC has allocated federal grant funds to BART for preventive maintenance work and BART has spent the federal funds and returned an equivalent amount of BART funds that MTC placed into an interest-generating reserve account to help fund the new rail cars. This grant is recorded by BART as Financial Assistance and then transferred to MTC as an expense to be placed in a sinking fund for future rail car replacement. The net result of the assistance and expense to the budget's bottom line is zero. The FY17 fund swap amount was $47.1 million. FY17 was the final year of the fund swap program and, when FY17 funds are included, a total of $386 million has been directed to the MTC reserve account to fund BART rail cars. Beyond FY17, MTC will program the federal funds directly to the rail cars.

4.3.3 Operating Uses: Expenses

Operating expense projections use the FY18 adopted budget as the base. Projections for future years reflect the terms of current labor contracts, anticipated changes to benefit costs, inflation, and agreements with other agencies and service providers. Expenses include the anticipated cost of operating eBART and the opening of the Hayward primary shop as part of the expanded HMC. Operating expenses for the SVBX are included but are offset by equal amounts of operating revenue as those costs are fully borne by VTA. In addition, the forecast reflects the operating expense of lengthening and adding trains to revenue service with the arrival of new cars, with deliveries and initial service beginning in FY18.

Net Labor and Benefits

Labor costs, including both wages and benefits, are the primary driver for BART's operating uses, comprising about 73% of BART's operating expense. Labor costs reflect the wage increases and benefits included in the FY18 through FY21 labor agreements. For represented employees, annual wage increases of 2.50% are scheduled for FY18 and FY19, with a 2.75% wage increase

scheduled for FY20 and FY21. For non-represented employees, wage increases are scheduled to be the same, but delayed six months. An annual wage increase of 2.0% is assumed for the years not covered by the labor contracts. Major benefit categories include active employee medical insurance and pension, while smaller categories include other post-employment benefits for retiree medical and life insurance.

Active Employee Medical Insurance

Active employee medical insurance plan premiums have increased by approximately 7.0% annually over the past four years. However, cumulative average health premium costs are about the same in FY18 compared to FY17. The change in premium costs between FY17 and FY18 is much lower than recent increases, which have been growing faster than inflation. The flattening of medical rate increases is not assumed to continue. For the next five years, the actuarial projection of annual rate changes ranges between 3.75% and 4.0%, and the SRTP includes these actuarial projections. While these increases are still expected to outpace inflation, the growth rates are almost half of what the average growth rates were between FY14 and FY17. The actuarial projections do not account for the potential changes to heath care law being considered by the U.S. Congress. For the SRTP, no assumption was made for increases to medical plan contributions from employees beyond current contributions.

Pension

The California Public Employee Retirement System (CalPERS) administers BART's two pension plans: Safety (sworn police officers) and Miscellaneous (all other employees). Within these two plans is an employer share and an employee share of pension costs. In 2012, the state legislature passed Assembly Bill 340, the California Public Employees' Pension Reform Act (PEPRA). PEPRA affects employees hired on or after January 1, 2013 and contains several provisions that are intended to lower future pension costs for public agencies, including changes to retirement plans and how pensions are calculated, and places a cap on the amount used to determine an employee's pension. While parts of PEPRA are in litigation, the SRTP assumes that PEPRA continues into the future.

CalPERS determines all employer and employee pension contribution rates annually. Both the Miscellaneous and Safety plans have hovered around the current funding levels since the economic downturn of 2009 – 2010. In 2009 CalPERS incurred a 24% investment return loss, and BART's plans, like other CalPERS agencies, have not yet recovered. In recent years CalPERS has implemented a number of actions to improve the stability of the fund and guard against market downturns. These actions have caused increases to employer payments, for example the Miscellaneous Plan employer rate has risen about 10% per year the last three years.

CalPERS is continuing to implement strategies intended to improve the long-term health of the pension fund. Most recently in December 2016, the CalPERS Board approved a decrease in the discount rate (assumed future investment return) from 7.5% to 7.0%. This change will be phased in over three years from FY19 to FY21, with the impact on employer rates spread over five years for each of the three phases. This change will significantly increase BART's future contributions, adding to increases from prior measures implemented recently.

BART's actuary makes future year pension projections based on the CalPERS assumptions. As a result, the future projections show a significant increase in BART's contribution to pension through FY21 when the payments are estimated to stabilize somewhat as the CalPERS changes will have been fully implemented and PEPRA plays a larger role in pensions cost. The SRTP includes the changes to CalPERS policy and actuarial assumptions with the resulting pension increases built into the current forecast. The SRTP projections are based on forecasts by the District's actuary for Normal Cost percentages of payroll and the fixed Unfunded Liability payment, using an estimated investment return of 6.5%. The FY18 Budget is $72 million for the employer share payment and $9 million for the portion of the employee share payment paid by BART.

Employees subject to PEPRA pay 100% of the required employee contribution, which is 6.25% for the Miscellaneous Plan and 13.0% for Safety Plan. Classic (Non-PEPRA) employees, per the current labor contracts, make contributions of 4.0% of pay towards the 7.0% Miscellaneous Plan employer rate and the 9.0% Safety Plan employer rate. The SRTP assumes that both the current PEPRA and non-PEPRA employer contributions will continue. The SRTP reflects the actuarial assumption that new hires will go from 50% PEPRA to 100% PEPRA over the twenty years beginning in FY13.

As of the latest valuation report for FY18, BART's funded ratio is 80% for the Miscellaneous Plan and 63% for the Safety Plan. The funded ratio measures plan assets versus plan liabilities. Both ratios have decreased slightly from the previous valuation as the unfunded accrued liabilities increased, mostly due to weak investment returns. When compared to other pension plans, BART's funded ratio for the Safety Plan is below average while the Miscellaneous Plan, which covers more than 90% of BART's employees, is above or on par with most of the other agencies. Under current assumptions, BART's funded ratios for both plans are expected to decrease through FY20, then gradually recover with the plans becoming fully funded around FY41.

Retiree Medical

Retiree medical insurance is funded by District employer payments into a dedicated trust, with full annual contributions being made since FY14 after a "ramp-up" period from FY06-FY13. The FY18 Budget is $36 million. Based on the FY18 valuation from BART's actuary, annual payments increase significantly from FY17's actuarially determined contribution. This increases annual funding by a net of approximately $6 million in FY18 and adds net operating expenses of $120 million over the next 10 years, ranging from an increase of $4 million in FY18 up to $18 million by FY25. In addition, the total unfunded liability increases from $111 million in the FY17 valuation to $300 million in the FY18 valuation.

As a result, the funded status of the retiree medical plan dropped from 67% in FY17 to 44% in the FY18 valuation. These impacts resulted from changes to several key actuarial assumptions, including the addition of an "implied subsidy", higher future medical cost trends, demographic assumptions, and other assumption changes such as spouse coverage. The implied subsidy had the largest impact, and is due to revised standards released by the Actuarial Standards Board which affects valuations after March 2015. This change involves calculating higher insurance costs for retirees 50-65 years of age and applying of the costs to the liability and annual funding requirements. Although the actual medical costs may not be higher, actuarial standards require

BART to recognize the implied higher cost. Even with these changes, the unfunded liability is scheduled to be paid off by 2035.

Other Post-Employment Benefits

Other Post-Employment Benefits (OPEB) unfunded liability is to record non-cash accounting recognition of annual expense for the liability for post-retirement benefits other than retiree medical and pension, specifically life insurance, with an equal offsetting budget adjustment. There is no net impact to the net operating result.

Traction and Station Power

BART's electric power cost is one of the largest operating budget categories, representing just under 5% of its total annual operating budget. BART uses approximately 400,000 megawatt-hours (MWh) per year to power its fleet of 100% electric rail cars, as well as its stations, shops and wayside facilities, making it among the largest electricity users in Northern California. BART's electricity demand profile follows its daily ridership patterns, with peak usage during morning and evening commutes, and during special events.

Between 1972 and 1995, BART purchased electricity from Pacific Gas and Electric Company (PG&E) as a large industrial retail customer. However, recognizing the significant impact electric power supply costs have on BART's operating expenses, and the potential for BART to reduce its costs through a decoupled arrangement (purchasing energy supply separately from energy delivery services), in 1995 the California legislature passed Senate Bill 184. This created a new section of the Public Utilities Code (PUC), §701.8, authorizing BART to purchase electric power supply from sources other than PG&E while continuing to receive electricity delivery services from the utility. PUC §701.8 has since been amended several times, allowing BART to today purchase electricity supply from several sources, including from eligible renewable energy sources as defined under state law. As a result, BART's electricity costs today are approximately 18% lower than they would be if BART were a conventional retail utility customer.

To meet its significant electricity needs, today BART purchases most of its supply through market-priced contracts for imported low-carbon and zero-carbon power under a medium-term, two-year supply agreement that expires on December 31, 2018. BART is also the sole participant in a 2.5 megawatt solar photovoltaic project located in the City of Gridley and facilitated by the Northern California Power Agency (NCPA), a public agency of which BART is a member. In 2014, with NCPA's help, BART entered a 20-year power purchase agreement for the output of the 4.3 megawatt Lake Nacimiento hydroelectric project in Central California. Additionally, through an existing contract with the federal Western Area Power Administration, a small portion of BART's supply will continue to come from federal hydro projects through 2024.

In addition to the supplies listed above, BART also meets a portion of its energy needs from solar projects located on BART property, including two operating solar projects at maintenance facilities, one project on bus canopies at BART's Union City Station, and solar panels installed on the station roof and on parking canopies at the new Warm Springs/South Fremont Station. In 2017, two new solar projects on parking canopies at BART's Lafayette Station and its new eBART Antioch Station will come online, significantly increasing BART's use of on-site solar resources.

As described above, most of BART's current electricity needs are met through a two-year agreement which expires in 2018. In preparation for this, and consistent with the BART Board-adopted Wholesale Electric Portfolio Policy passed on April 27, 2017[1]. BART released a Renewable Energy Request for Proposals[2] in May 2017. Through the resulting agreement, BART expects to secure a significant amount of its projected open, unpurchased, position with fixed-priced renewable energy supplies. BART expects to complete negotiations and execute one or more contracts by the end of 2017.

While energy supply procurement strategies and costs are managed by BART staff under the direction provided by Board-adopted policies, BART purchases delivery services from PG&E separately, at rates set by the California Public Utilities Commission (CPUC) and the Federal Energy Regulatory Commission (FERC). BART expects the per MWh rates it pays for energy supply to grow just under 1.5% per year, while delivery rates will grow just under 3% per year.

Other Non-Labor Expenses

Non-labor expenses include materials usage; rental and maintenance contracts; insurance; utilities other than traction and station power; professional and technical services; and other miscellaneous expenses, including fees paid to MTC and financial institutions to administer the Clipper regional transit smart card program. Most other non-labor categories are assumed to increase at the rate of inflation.

eBART

eBART is a new rail service that uses modern Diesel Multiple Unit (DMU) trains to provide rail service between BART's Pittsburg/Bay Point Station and Antioch and Pittsburg. The system consists of eight DMUs, a maintenance and operations facility, two stations, a transfer platform, and approximately 10 miles of track. eBART anticipates launching service in May 2018 with a full year of revenue service in FY19 anticipated at $14.2 million.

BART-to-OAK

BART service to the Oakland International Airport opened in November 2014 and will be operated and maintained for 20 years by a private contractor, Doppelmayr Cable Car. Contractor performance measures and inflation factors apply to the calculation of annual operations and maintenance (O&M) costs. The FY18 budgeted O&M cost is $6.3 million, growing based upon the escalation factors built into the contract.

ADA Paratransit Service

BART's paratransit program has been operating under full federal compliance since 1997. Expenses, which rapidly escalated during the program's early days, have been relatively stable in recent years. The SRTP forecasts expenses of $15.0 million for FY18 and a subsequent annual expense growth 3%.

[1] https://www.bart.gov/sites/default/files/docs/BART%20Wholesale%20Electricity%20Portfolio%20Policy%204.27.17.pdf

[2] https://www.bart.gov/sustainability/renewable-RFP/2017.

Other Purchased Transportation

BART has agreements with SFMTA and AC Transit to pay for feeder bus service to BART stations. The annual purchased transportation payment is linked to changes in Bay Area inflation and changes in the number of riders transferring between BART and the associated operator, with an annual cap of 5% for increases or decreases. The AC Transit agreement also includes a provision whereby 10% of the overall payment, up to $1 million, was retained by MTC to be used towards fare coordination efforts between the two agencies. A pilot fare coordination program recently concluded, and the pilot report's recommendations are to consider future fare-based discount opportunities for the demographics that appeared to be most receptive to the discounts tested in the pilot, which are central and northern portions of the AC Transit service area and residents earning less than $100,000 per year. The report and recommendations were finalized in April 2017.

Rail Car Fund Swap Expense

As noted in Section 4.3.2, Financial Assistance, MTC allocates federal Section 5307 Urbanized Area Formula Grant funds to BART for preventive maintenance work, and these funds are then swapped with other funds to pay for new rail cars. There is no net impact to BART's operating budget as the federal funds are swapped for other funds. FY17 was the final year of the fund swap.

4.3.4 Operating Uses: Debt Service and Allocations

Since 1976, BART has been allocating operating funds to capital projects and is one of the few transit operators to do so. These annual allocations are used for many critical capital projects that do not qualify for grant funding or for which other funding sources may not be available. BART has substantially increased annual allocations when funding sources, primarily ridership and fare revenue, have grown more than budgeted and expected. Conversely, BART has reduced allocations when facing reduced operating revenues associated with recessions and lower ridership. This approach allows for the increases in operating sources to be redirected to one-time or short-term capital needs and for scaling back when financial resources require, instead of reducing service. In recent years, BART has taken an even larger role in self-funding critical capital needs to reduce its reliance on unpredictable federal and state funding. BART makes various types of operating allocations, which include debt service, allocations to support the capital program, and other allocations as required by agreements with other agencies or accounting rules.

Bond Debt Service

BART first issued bonds backed by sales tax revenues in 1970 and has periodically sold additional bonds to finance or refinance the capital costs of constructing, improving, renovating, and equipping the system. As of December 2016, the principal for all outstanding sales tax revenue bonds was approximately $595 million. BART's last new bond sale was in 2012, with the issuance and refunding of bonds totaling $242 million, including $111 million for the BART-to-Oakland International Airport project. Since then, BART has refunded $326 million of outstanding debt, resulting in savings of $61 million. BART's credit rating for sales tax backed debt is currently "AA+," nearly the highest level given by credit rating agencies. Annual debt service for all current bonds is $50.8 million in FY18, increasing to $53.3 million in FY26. No new

sales tax debt issuances are planned but BART anticipates that current outstanding debt will be refunded at lower rates when market conditions allow.

Allocations – Baseline Capital

The annual baseline allocation serves as the required local match for federal grants and to fund ongoing capital projects for which grants are not typically available (such as stations and facilities renovation, inventory buildup, non-revenue vehicle replacement, tools, and other capitalized maintenance).

Allocations – Additional Capital Initiatives

BART allocates one-time capital funding to projects that are generally multi-year and non-recurring through the Additional Capital Initiatives allocation. Additional capital renovation allocations are made when funding allows for critical projects of a short-term nature. In FY18, this allocation funds pre-revenue service startup expenses for eBART and year four of the five-year Train Control Uninterrupted Power Supply Renovation program. The allocations also fund a one-year project to replace BART's trip planning tool, an enhanced vendor payment and tracking system, replacement of board room equipment, Millbrae trail track project, and on-going OCIO programs. Future year allocations are determined during the annual budget process.

Allocations – Rail Car Sinking Fund

In 2012 BART committed to fund $298 million for the first 410 cars of the 775-car Rail Car Replacement Program. FY18 marks the final year of this initial allocation as the remainder of the cars will be funded by the Priority Capital Projects/Programs allocation described below.

Allocations – Priority Capital Projects/Programs

BART has made a commitment to fund the Big 3 capital projects that are needed for system reliability and for system capacity increases to meet future ridership demand: new rail cars, HMC, and TCMP. Incremental fare revenue from the January 1, 2014 and 2016 fare increases and subsequent fare increases scheduled for 2018 and 2020 are directly allocated to a fund for these programs. To fund BART's contributions to an additional 306 rail cars beyond the current 775-car order, the SRTP assumes some additional fare increase allocations through FY26.

- → New Rail Car Fleet. BART is under contract to purchase 775 new cars. BART has committed $293 million from BART operating funds to the first 410 cars and $164 million of incremental fare increase revenue to the remaining contract cost, for a total of $457 million. Outside of this procurement, BART is seeking an additional 306 cars as part of FTA's Core Capacity Capital Investment Grant Program with a goal of securing a fleet of 1,081 new cars. The current funding plan of the Core Capacity grant assumes an additional $200 million allocation of BART funds as part of local match for the grant.
- → Hayward Maintenance Complex. BART is constructing a renewed and expanded rail car maintenance facility in Hayward that will service the new fleet. Through FY23, the SRTP assumes incremental fare increase revenue allocations totaling $138

million. Including prior allocations, total allocations of $172 million are anticipated for the project.

→ Train Control Modernization Program. BART is developing a modern Communications Based Train Control system to replace the original legacy system and allow BART to offer higher-frequency peak-period service. Through FY18, BART anticipates allocating $10.5 million of incremental fare increase revenue to the TCMP.

Additional Allocations

The SRTP assumes that BART will allocate additional funds to critical asset replacement needs, starting with an estimated $10 million in FY19, increasing to $25 million in FY20. This placeholder amount may be adjusted depending on BART's financial outlook at the time.

Allocations – To Rail Cars from SFO Extension Results

Operation of the five-station SFO Extension into San Mateo County, which is outside the three-county BART District, is projected to generate net positive financial results. Per the terms of the 2007 agreements relieving SamTrans of financial responsibility for the extension, fare revenue in excess of operating expenses is to be allocated to a dedicated reserve account. The first $145 million deposited into the reserve account is to fund commitments to BART's new rail car program. Based upon current forecasts, this obligation is estimated to be complete in FY26.

Allocations – To Stations and Access Programs from Parking Fees

Allocations to stations and access programs are funded by the incremental parking fee revenue generated by the demand-based parking program first implemented in May 2013. This incremental revenue, above the baseline revenue generated by BART's prior parking program, is directed to station improvements and station access programs. In FY18, these programs include fare evasion prevention, carpool and parking enhancements, station sustainability initiatives, and public address system improvements. Ongoing programs from previous years (with some additional funding in FY18) include station brightening (by deep cleaning), pedestrian improvements, increased parking enforcement, bike program expansion, and additional staff to address quality of life issues in downtown San Francisco stations. The allocation is the capital portion of the programs; the balance is included in the operating budget, of which the majority of operating expenses are ongoing. Future year capital projects will be determined in each fiscal year's budget process.

Allocations – BART-to-OAK (CARP)

The BART to Oakland International Airport project included the creation of a Capital Asset Replacement Program (CARP) to fund future renovation and replacement needs. BART will contribute to this escrow fund each year during the 20-year term of the operating contract. Fund expenditure is controlled jointly by BART and the contract provider, Doppelmayr Cable Car (DCC), based upon refurbishment and replacement needs over the twenty years of the contract. DCC is required to fund costs that are in excess of the CARP.

Allocations – Low Carbon Fuel Standard Credit

California's Low Carbon Fuel Standard (LCFS) uses a market-based Cap-and-Trade approach to lowering the greenhouse gas emissions from petroleum-based transportation fuels like reformulated gasoline and diesel. As an electric-powered public transit system that receives over 90% of its power from carbon free sources, BART generates LCFS credits that it sells on the open market. BART's Board will consider a policy for allocating LCFS funds in July 2017. For planning purposes, the forecast assumes that funds will be used according to this pending policy, with 50% directed to sustainability projects and 50% allocated to the operating program.

Allocations – Joseph P. Bort MetroCenter (Met) Building

In 2017, BART completed the purchase of the Joseph P. Bort MetroCenter, which will house BART police staff and contain space that will be leased to non-profit agencies. Allocations will fund the purchase of the MetroCenter building and one-time capital costs. There will be operating to capital allocations between FY18 and FY27 to fund repayment of the loan from BART cash reserves used to purchase the building, totaling approximately $20 million. The FY18 amount is $1.36 million plus an additional $0.65 million for one-time capital costs.

Allocations – Other

Other allocations include annual accounting entries of $0.6 million to offset amounts booked as other revenue or financial assistance for the Pleasant Hill/Contra Costa Centre and MacArthur stations.

Revenue Enhancement/Cost Containment

As discussed in the beginning of this chapter, this line represents BART's commitment to address future year deficits, either on an annual basis or as part of an overall financial strategy.

5 CAPITAL IMPROVEMENT PROGRAM

This chapter presents BART's Capital Improvement Program (CIP), an inventory of capital investment needs over the next 15 years (FY17-FY31), and the funding sources available to address those needs.

Previous BART CIP documents have focused on a 10-year time period. Shifting to a 15-year view of capital needs allows the plan to cover the period over which BART anticipates that most of the Measure RR-funded System Renewal Plan will be completed, as well as the full timeframe of the Transbay Corridor Core Capacity Program.

The CIP identifies more than 700 projects across nine major infrastructure categories. The projects in the program will maintain and enhance BART's service by renovating and strengthening the core system; improving safety, security, and reliability; and modernizing and expanding the system to accommodate increasing ridership demand.

Important resources for addressing the identified needs will come from Measure RR, the BART System Renewal Program, which was approved by BART District voters in November 2016. The measure authorizes the sale of $3.5 billion in general obligation bonds to repair and replace critical safety infrastructure, relieve crowding, and improve station access. However, the CIP demonstrates that, even following the approval of Measure RR, a significant shortfall remains between projected need and available funds. BART will continue to seek additional funding at the federal, state, and local level for the capital program.

The CIP is consistent with the Metropolitan Transportation Commission's (MTC's) *Plan Bay Area* (2040) Regional Transportation Plan (RTP), and with the BART Strategic Plan. The CIP is a snapshot of the current outlook, and is updated periodically as projects are further developed and the funding picture evolves.

5.1 Capital Financial Outlook

5.1.1 Capital Needs Summary

This CIP identifies BART's capital investment need to be $17.6 billion for the period FY17-FY31. The need spans BART's major investment types including:

Investment Type	% of Total Need
System Reinvestment	68%
System Enhancement	25%
Earthquake Safety	3.5%
Safety and Security	3%
System Expansion	0.5%

BART's capital needs can also be categorized as major investment programs that correspond with funding opportunities. The major investment programs include:

Major Investment Program	Funding Need	Committed Funding	Discretionary Funding (Forecast)	Description
Capital Asset Renewal	$8.9 billion	$3.9 billion	$653 million	Over half of the identified need is for reinvestment in state of good repair for BART's original infrastructure not included in other programs listed below. This set of projects includes renewal of tracks and related infrastructure, stations, traction power, and other major system components.
Major Systems Renewal and Crowding Relief (Big 3)	$3.8 billion	$2.6 billion	$962 million	Major investment is required for a set of projects known as the Big 3, which include replacing and expanding the rail car fleet, upgrading a major maintenance facility to serve the new fleet, and replacing the aging train control system. These projects will renew the existing system and provide peak period crowding relief.

Major Investment Program	Funding Need	Committed Funding	Discretionary Funding (Forecast)	Description
Transbay Corridor Core Capacity Program	$3.5 billion total (including $2.4 billion not in Big 3)	$800 million	$2.7 billion	BART's Transbay Corridor Core Capacity Program includes systems and infrastructure that will allow BART to increase service frequency through the core of the system. It includes the Train Control Modernization Program (also in the Big 3), 306 additional rail cars, a larger rail car maintenance facility, and 5 new traction power substations.
Station Modernization and Access Enhancement	$1.0 billion	$447 million	$125 million	BART's Station Modernization program will invest resources into the existing core stations to advance transit ridership and enhance the quality of life around the stations. This CIP also identifies the need to invest in opportunities for all access by all transportation modes.
BART Metro	$680 million	$177 million	$0	BART Metro is a program that will invest in tracks and stations to provide more capacity and enhance the flexibility of the BART system.
Earthquake Safety Program	$512 million	$512 million	$0 million	Remaining funds in BART's Earthquake Safety Program, along with funds from Measure RR, will fund a project to reduce the likelihood of flooding in the Transbay Tube during a catastrophic earthquake.
System Expansion	$94 million	$86 million	$0	BART is also working to complete ongoing system expansion projects and working with partners to study the possibility of future expansion. No new system expansion projects are included in this CIP.

Figure 5-1 illustrates investment need and identified funding from FY17-FY31. This plan identifies the year in which BART staff expect each capital investment will be needed based on the best currently available data. However, the timing of project expenditures may shift based on changing system needs and/or funding availability.

5.1.2 Capital Funding Summary

BART has identified a total of $11.9 billion in capital funding, of which $8.0 billion is committed and $3.8 billion is programmed and reasonably expected but not yet committed.

Committed Funding: $8.0 billion

Committed funding, defined as funding that is already secured, is summarized below.

Funding Category	Expected Funding	Description
Previously Committed Funding	$680 million	BART has previously secured $615 million in capital funding that is paying for projects now underway. This total includes more than $200 million in allocations from BART's operating budget that have been reserved for milestone payments to 'Big 3' capital projects.
Measure RR	$3.3 billion	Measure RR will provide a total of $3.5 billion to fund the most critical investments in safety, reliability, and crowding relief. The CIP assumes $3.3 billion of the Measure RR funding will be available during the 15-year plan. BART staff will work to complete the program as quickly as possible, balancing the need for reinvestment with the need to minimize service disruption.
Federal and Regional Funds Distributed by MTC	$2.7 billion	Federal and regional funds distributed to BART through MTC's Transit Capital Priorities Program will provide funding toward the rail car fleet, train control modernization, and state of good repair.
County and State Funding	$609 million	State and county partners have committed funds to specific projects in this CIP.
BART Operating Allocations – Local Match	$200 million	Allocations from BART's operating revenue will be used to fund the 20% local match requirement for expected FTA 5337 funds.
Earthquake Safety Program	$458 million	BART's $980 million Earthquake Safety Program has $458 million remaining, of which $218 million in bonds has been issued and $240 million remains to be issued. BART will use these funds, along with a $54 million contribution from Measure RR, to support seismic upgrades to the Transbay Tube, a project now underway.

Discretionary Funding: $3.9 billion

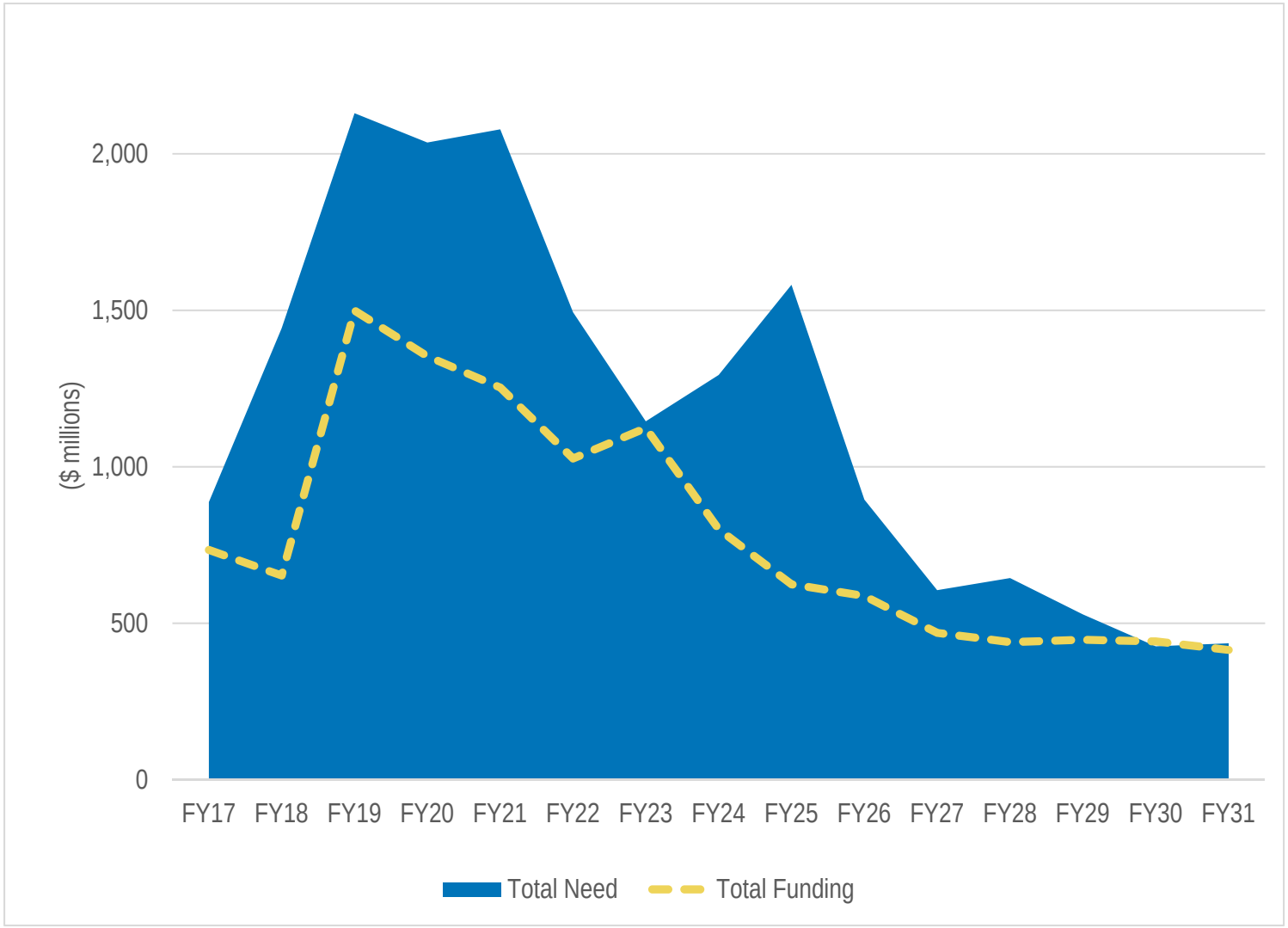
Discretionary funding includes a range of capital funding sources that BART reasonably expects to receive but are not yet secured.

Funding Category	Expected Funding	Description
Additional BART Operating Allocations	$1.6 billion	New allocations from BART's operating revenue could provide up to $1.6 billion over 15 years to fund rail car replacement, renewed and expanded maintenance facilities, and other state of good repair investments. These funds, while expected, are uncertain because they depend on factors that affect BART's operating budget, including ridership, fare revenue, sales tax revenue, inflation, and operating costs.
FTA Core Infrastructure Grant	$1.25 billion	BART has applied for an FTA Core Infrastructure Grant to help fund BART's Transbay Corridor Core Capacity Program.
Bridge Toll Funding/Regional Measure 3	$450 million	In the coming years, MTC will consider proposing to Bay Area voters a measure to raise additional money for regionally important transportation investments through an increase in bridge tolls. A portion of this funding would support BART projects to improve transportation in regional bridge corridors. *Plan Bay Area* programs money from such a measure to help fund BART's Transbay Corridor Core Capacity Program.
County Congestion Management Authorities	$300 million	Full implementation of BART's Transbay Corridor Core Capacity Program would require participation from the congestion management authorities in Alameda, Contra Costa, and San Francisco counties. The CIP estimates the required contribution over the 15-year period.
Cap and Trade/Transit and Intercity Rail (TIRCP) Program	$424 million	California's Cap-and-Trade Program will make funds available to transit operators through the TIRCP program. These funds are competitive. The Regional Transportation Plan allocates approximately $424 million from TIRCP to help fund the Transbay Corridor Core Capacity Program.
MTC Transit Performance Initiative	$64 million	BART forecasts approximately $4 million per year in funding through MTC's competitive Transit Performance Initiative (TPI) program.
One Bay Area Grant Program	$31 million	BART also receives a limited amount of funding through MTC's One Bay Area grant program. BART estimates that it will receive approximately $2 million per year from this competitive funding source.

5.1.3 Project Selection and Prioritization

The CIP reflects that identified capital investment need exceeds available funding over the next 15 years. BART uses a Strategic Asset Management Program (AMP), described in detail in Section 2.7, to allocate scarce resources to projects that address the greatest risk to the system. BART staff use asset management best practices to guide decisions about system reinvestment, address high risk needs, and maintain financial stability. The process is systematic and consistent with goals of BART's Strategic Plan, which is described in Chapter 3.

Figure 5-1 Capital Financial Outlook: Total Identified Need vs. Total Identified Funding



5.2 Capital Needs

To fully fund the CIP would require approximately $17.6 billion from FY17-FY31. $11.9 billion in funding has been identified (funding sources are detailed in Section 5.3). Figure 5-3 summarizes how the identified needs break out between investment types: system reinvestment (68.2%), system enhancement (24.6%), earthquake safety (3.5%), safety and security (3.2%), and system expansion (0.5%).

The capital investments identified in this plan reflect BART staff's best understanding of system needs based on currently available data. As BART's asset management programs are refined, it is likely that additional needs will be identified.

5.2.1 Capital Needs by Major Investment Program

Capital Asset Renewal ($8.9 billion)

More than half of the identified need is for reinvestment in state of good repair for BART's original infrastructure outside of the other major programs listed in this section. Major categories of identified need include tracks and related infrastructure; stations; and traction power and electrical systems.

Big 3: Major Systems Renewal and Crowding Relief ($3.8 billion)

$3.8 billion in investment is required for a set of projects known as the Big 3, which will both renew important elements of the existing systems and provide peak period crowding relief. BART's board has identified these projects as BART's highest priority capital investments. The projects include:

- → New Rail Cars: 775 new rail cars that will replace BART's original fleet of 669 cars.
- → Hayward Maintenance Complex: a renewed and expanded rail car maintenance facility in Hayward will service the new fleet
- → Train Control Modernization Program: A modern train control system will replace the aging original system and allow BART to offer higher-frequency peak period service

Transbay Corridor Core Capacity Program ($3.5 billion total, including $2.4 billion not in Big 3)

MTC's Regional Transportation Plan, *Plan Bay Area*, sets a vision in which public transportation forms the backbone for the next several decades of regional growth. By 2040, the Plan anticipates two million additional residents in the nine-county Bay Area. It seeks to accommodate this growth by concentrating future population and employment around major transit hubs, including BART stations. To accommodate the planned growth, BART is working with partners in the region and the Federal Transit Administration to plan for a set of investments, known as the Transbay Corridor Core Capacity Program, which will allow BART to run up to 30 trains per hour per direction via the Transbay Tube and expand the rail car fleet.

The Transbay Corridor Core Capacity Program includes the Train Control Modernization Program, as described in the Big 3, as well as 306 more rail cars (in addition to 775), an

expanded rail car storage facility in Hayward (Hayward Maintenance Complex Phase 2), and five new traction power substations to provide power for the additional trains. The program also includes several supporting elements: an unallocated contingency required by FTA, program management costs, and financing costs. The total cost of the program is $3.5 billion. Of that total, approximately $1.15 billion for TCMP is accounted for under the Big 3. The remaining cost of the Transbay Corridor Core Capacity Program is $2.4 billion.

Station Modernization and Access Enhancement ($1.0 billion)

BART's Station Modernization program that will invest resources into the existing core stations and surrounding areas to advance transit ridership and enhance the quality of life around the stations. This plan also identifies the need to invest in opportunities for all access by all transportation modes, with a focus on increasing pedestrian and bike access, improving transit connections, and strategic investment in parking.

BART Metro ($680 million)

BART Metro is a group of investments that will allow BART to evolve into a more flexible system, able to tailor services to the needs of riders within the core of the region, and riders making commute trips across the region.

This CIP identifies a set of projects that would enhance system flexibility and capacity to help achieve these objectives. They are:

- → BART Metro Station Capacity projects: Station improvements to increase the capacity of the stations, especially additional elevators, escalators and stairs in key stations;
- → BART Metro Track Capacity projects: Additional tracks, including crossover and turn-back tracks to improve operational flexibility and capacity, and additional storage tracks to allow longer trains to be stored at all locations to increase capacity.

BART Metro projects would complement the investments in the Transbay Corridor Core Capacity Program.

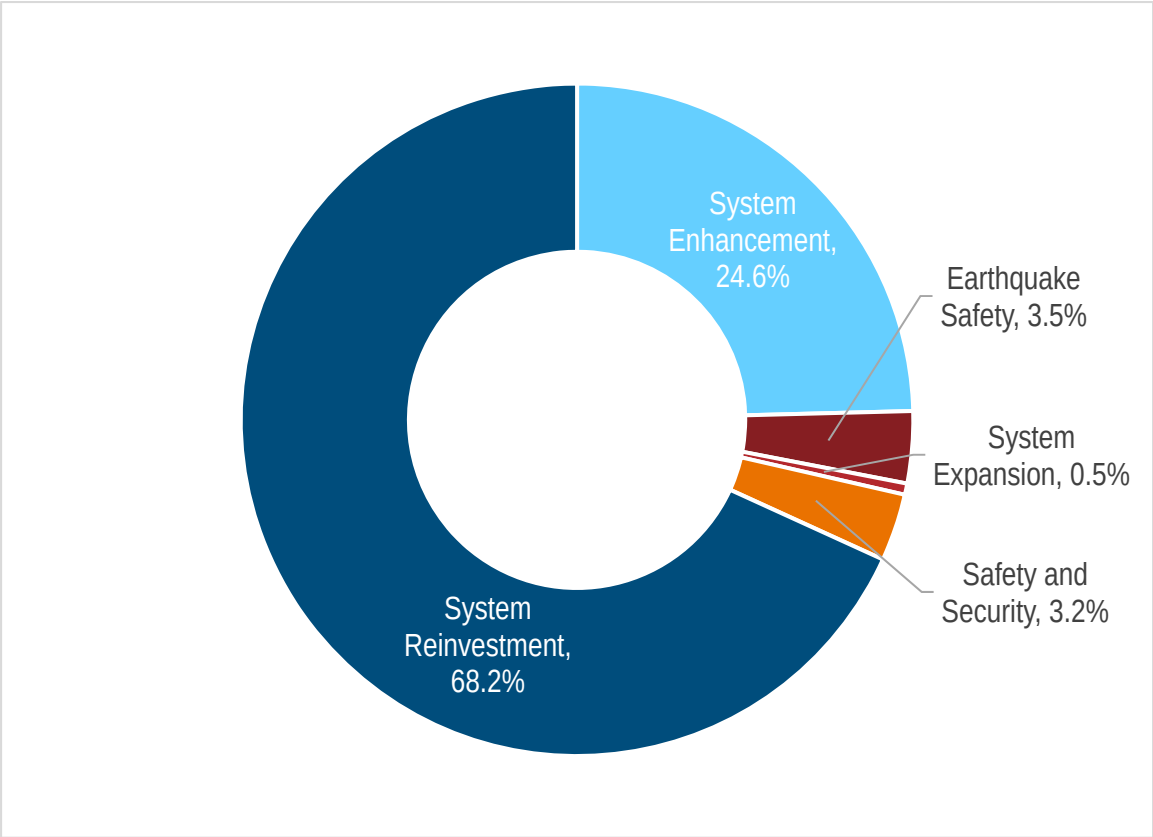
Earthquake Safety Program and related seismic safety investment ($512 million)

In 2004, BART District voters approved Proposition AA, a general obligation bond to fund BART's Earthquake Safety Program (ESP). $458 million in ESP funding remains. The majority of this funding, along with an additional $54 million from Measure RR, will be dedicated to a four-year project to reduce the likelihood of flooding in the Transbay Tube during a catastrophic earthquake.

System Expansion ($94 million)

BART is reinvesting in core system infrastructure, BART is also working to complete ongoing system expansion projects, including eBART, the Warm Springs Extension, and the Silicon Valley Berryessa Extension (a partnership with the Santa Clara Valley Transportation Authority that will be completed and operated at no cost to BART). BART is also working with partners to study the possibility of future expansion. No new system expansion projects are included in this CIP.

Figure 5-2 Capital Needs by Type



5.2.2 Capital Needs by Asset Category

The major investment programs outlined above include more than 700 capital projects, spanning all parts of the BART system.

This section presents the same set of capital needs grouped by categories of infrastructure and other capital assets. It divides the system into nine major infrastructure categories and a series of subcategories. Identified need by subcategory is provided in Figure 5-3.

The forecast relies on the best currently available information. As conditions evolve, BART will re-prioritize projects and may redirect funding.

Figure 5-3 CIP Investment Needs

($M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY17-31
Trains and Other Vehicles	**74**	**294**	**727**	**640**	**661**	**162**	**70**	**385**	**684**	**235**	**14**	**13**	**14**	**18**	**5**	**$3,994**
775 Rail Car Procurement	71.1	284.0	713.5	626.5	496.6	58.4	9.2	17.7	14.2	7.0	-	-	-	-	-	$2,298
306 Rail Cars Procurement	-	2.0	6.0	7.9	159.2	98.0	55.7	361.7	664.4	223.4	9.5	8.6	9.0	13.0	-	$1,618
Non-Revenue Vehicles	1.3	6.0	6.0	4.9	4.9	4.9	4.9	4.9	4.9	4.7	4.7	4.7	4.7	4.7	4.7	$71
Rail car improvements	1.7	1.7	1.2	0.2	0.2	0.2	0.2	0.2	0.2	-	-	-	-	-	-	$6
Tracks & Related Infrastructure	**150**	**223**	**307**	**320**	**328**	**337**	**261**	**205**	**172**	**166**	**206**	**176**	**113**	**112**	**144**	**$3,223**
Tracks	33.8	53.7	65.0	58.0	53.4	50.5	23.6	45.3	45.3	48.1	91.9	91.2	91.4	90.0	90.0	$931
Tunnels	15.1	25.6	72.3	78.5	92.9	90.3	89.4	47.7	35.5	27.4	25.0	21.4	0.3	0.3	32.4	$654
Earthquake Safety	48.8	89.2	82.9	78.3	70.3	90.1	56.7	-	-	-	-	-	-	-	-	$516
All Guideways	20.2	31.1	53.1	54.9	54.6	42.4	35.7	31.9	26.7	31.5	30.1	6.0	2.2	2.2	2.2	$425
BART Metro Track Capacity	18.9	0.0	0.0	10.0	10.0	16.8	16.8	44.6	44.6	37.8	37.8	37.8	-	-	-	$275
Aerial Structures	8.5	8.5	12.6	19.4	24.2	24.2	24.2	20.6	13.7	13.7	14.9	14.9	14.9	14.9	14.9	$244
Grounds	4.8	14.6	12.9	12.4	14.4	14.4	6.5	6.5	6.5	7.9	6.1	4.6	4.6	4.6	4.6	$126
At-Grade Guideways	-	-	8.7	8.7	8.7	8.7	8.7	8.7	-	-	-	-	-	-	-	$52
Stations	**169**	**188**	**269**	**272**	**289**	**273**	**244**	**237**	**265**	**198**	**198**	**185**	**149**	**93**	**93**	**$3,122**
Escalators/Elevators	26.3	31.0	82.6	80.1	79.5	79.5	79.5	92.8	91.7	37.3	11.4	11.4	-	-	-	$703
Operational facilities	30.9	18.7	58.9	57.1	68.0	67.6	47.9	46.0	42.4	38.5	33.7	33.3	13.2	11.3	11.3	$579
BART Metro Station Capacity	14.6	14.5	13.0	13.0	13.0	13.0	13.0	13.0	67.4	67.4	54.4	54.4	54.4	-	-	$405
Station Modernization	20.5	20.7	19.1	19.6	19.6	19.6	19.8	20.1	20.1	20.1	26.0	26.1	26.1	26.2	26.2	$330
Fare Collection	15.9	13.2	7.9	0.2	0.0	0.0	0.0	0.0	0.0	-	40.7	40.7	40.7	40.7	40.7	$241
Other passenger facilities	29.9	36.7	29.5	29.0	15.4	6.3	4.7	4.7	4.7	4.3	10.7	10.7	9.3	9.3	9.3	$215
Emergency Response	11.4	19.3	18.0	29.5	36.9	32.8	27.0	14.5	7.8	4.8	4.8	0.3	-	-	-	$207
Lighting	10.8	13.0	14.4	18.5	28.2	28.2	26.6	19.9	8.0	2.3	2.3	2.3	2.3	2.3	2.3	$181
Water Infrastructure	-	12.3	16.3	16.3	19.2	16.7	16.7	16.7	14.2	14.3	14.3	5.9	2.8	2.8	2.8	$171
Platforms	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	-	-	-	-	-	$89
Traction Power & Electrical Systems	**78**	**330**	**369**	**366**	**224**	**193**	**122**	**103**	**93**	**38**	**26**	**131**	**131**	**110**	**118**	**$2,431**
Substation Renovation Program	1.5	63.5	63.5	62.5	60.4	72.1	53.4	61.9	61.9	20.3	20.3	67.0	67.0	52.5	52.5	$780
Electrical Systems	41.5	91.8	113.3	97.1	65.9	49.0	28.6	17.5	14.4	13.8	5.3	5.3	5.3	5.3	3.4	$557
Traction Power Controls Program	10.4	100.7	109.3	121.0	31.9	28.5	14.7	-	-	-	-	14.7	14.7	11.8	10.6	$468
34.5KV Cable Replacement Program	17.4	64.7	64.7	61.5	43.4	20.9	2.6	2.6	-	-	-	44.0	44.0	40.0	51.9	$458

($M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY17-31
Core Capacity Traction Power Substations	0.7	3.1	11.9	14.1	12.1	12.4	12.8	13.2	13.6	-	-	-	-	-	-	$94
Facility Upgrades	6.0	6.0	6.0	10.2	10.2	10.2	10.2	7.7	3.5	3.5	-	-	-	-	-	$73
Train Control & Communications	**140**	**152**	**186**	**150**	**196**	**212**	**200**	**154**	**132**	**84**	**56**	**41**	**36**	**19**	**2**	**$1,760**
Train Control Modernization Program	8.5	11.7	112.3	100.3	128.9	141.7	153.5	132.1	124.4	81.4	53.5	39.7	34.5	17.0	-	$1,140
Train Control System Maintenance	80.6	86.9	38.4	17.2	13.6	21.0	14.0	12.1	7.8	2.1	2.1	1.7	1.7	1.7	1.7	$303
Communication Systems	48.3	50.7	34.5	27.0	46.1	41.7	32.1	9.8	(0.0)	-	-	-	-	-	-	$290
Integrated Computer Systems (ICS)	2.9	2.9	0.8	5.0	7.6	7.6	0.9	0.0	0.0	-	-	-	-	-	-	$28
Maintenance Shops & Yards	**95**	**108**	**145**	**145**	**220**	**168**	**105**	**37**	**41**	**32**	**37**	**33**	**31**	**25**	**29**	**$1,238**
Maintenance Buildings and Facilities	12.4	30.4	34.8	31.1	43.2	42.8	26.5	20.1	22.7	9.8	24.5	20.9	18.8	18.8	18.8	$375
Hayward Maintenance Complex (HMC)	53.3	50.0	61.0	37.6	85.8	50.2	25.0	-	-	-	-	-	-	-	-	$362
HMC Phase 2	0.6	5.0	27.5	58.7	60.4	45.7	30.1	-	-	-	-	-	-	-	-	$228
Shop Equipment	27.9	19.7	17.9	12.1	21.3	19.6	16.7	14.0	15.8	19.2	9.9	9.1	9.1	3.2	7.5	$223
Water Infrastructure	0.5	3.4	3.4	5.9	9.6	9.6	6.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	$63
Access	**103**	**86**	**88**	**96**	**96**	**92**	**88**	**88**	**80**	**79**	**25**	**25**	**17**	**17**	**17**	**$996**
Accessibility	38.5	35.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	4.7	4.7	4.7	4.7	4.7	$376
Transit and Share Mobility	38.4	22.3	25.4	25.1	25.1	25.1	25.1	25.0	25.0	25.0	13.9	13.9	6.1	6.1	6.1	$308
Drive and Park Access	13.6	16.5	17.7	26.2	26.0	22.8	18.6	18.6	10.2	10.1	6.1	6.1	6.1	6.1	6.1	$211
Active Access	12.0	11.7	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.5	-	-	-	-	-	$102
Transit-Oriented Development	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	$0
System Support	**27**	**23**	**38**	**46**	**64**	**57**	**53**	**84**	**113**	**63**	**44**	**40**	**37**	**34**	**28**	**$751**
Core Capacity Contingency/Financing	0.7	1.2	17.9	26.3	43.7	37.0	33.7	64.9	93.0	43.2	19.0	15.1	12.2	8.3	2.7	$420
Climate Change Adaption	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	18.5	18.5	18.5	18.5	18.5	$229
Information Technology	8.2	7.0	5.8	5.8	5.6	5.6	5.6	5.6	5.6	5.6	5.7	5.8	5.9	6.1	6.2	$90
BART Police	3.3	0.7	0.3	0.1	0.5	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.6	$9
Office of External Affairs	0.6	0.0	0.1	-	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	$1
Customer Service	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	$0
BART System Expansion	**52**	**38**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**$94**
eBART	21.6	21.5	-	-	-	-	-	-	-	-	-	-	-	-	-	$43
Warm Springs	9.6	9.6	-	-	-	-	-	-	-	-	-	-	-	-	-	$19
System Planning	6.4	6.8	2.0	1.1	0.2	0.2	0.2	0.2	0.2	-	-	-	-	-	-	$18
BART-to-Oakland International Airport	14.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$14
Grand Total	**887**	**1,442**	**2,130**	**2,036**	**2,078**	**1,494**	**1,145**	**1,293**	**1,581**	**895**	**606**	**644**	**528**	**426**	**436**	**$17,622**

Trains and Other Vehicles

BART's fleet of 669 rail cars is one of the oldest in the United States and requires constant maintenance and repair. Rehabilitation and upgrade of BART's rail cars in the late 1990s helped prolong the life of these essential vehicles, but they are now in need of replacement. BART has embarked on a project to acquire new cars. BART staff also use a wide range of non-revenue vehicles to maintain and access the BART system.

BART is replacing the aging fleet and expanding the current fleet from 669 to at least 775 rail cars; and as many as 1,081. A new fleet will improve reliability, decrease maintenance costs, relieve crowding, and help meet growing demand associated with regional population growth and system expansions.

Identified needs include:

- → System Renewal: Approximately 51% of the planned identified investment need in this category is for system renewal investment. It includes 669 rail cars to replace the current fleet, as well as renewal of non-revenue vehicles.
- → System Enhancement: The remaining 49% of investment in this category reflects investment needed to increase BART's rail car fleet to 1,081.

Acquire 775 Rail Cars

In 2012, BART contracted with Bombardier Transportation to build 775 new rail cars. The first new cars are now undergoing rigorous testing. Car delivery will continue through 2022.

Acquire 306 Rail Cars

A rail car fleet of 1,081 cars is necessary for the significant increase in service frequency called for under the Transbay Corridor Core Capacity Program. BART will acquire these additional cars if funding for the full program is available.

Non-Revenue Vehicles

Non-revenue vehicles are used for purposes other than passenger service. BART staff use over 30 different types of service vehicles to support BART train service, including rail grinding vehicles, which are used to grind down rough patches of track, and maintenance trucks at yards. Needs include systematic replacement of non-revenue vehicles and related equipment due to age, and wear and tear. Non-revenue vehicles have no dedicated funding source. In the past, non-revenue vehicles have been replaced as need arose using BART operating funds allocated to capital.

Tracks and Related Infrastructure

Like much of the system's infrastructure, tracks, tunnels, and support structures have been in use for decades and some need major rehabilitation. Track and Related Infrastructure projects in the CIP include:

- → System Renewal: Approximately 90% of the identified Track and Related Infrastructure investment need is for critical system reinvestment and seismic safety upgrades. Remaining funds from BART's Earthquake Safety Program (ESP) will pay for most seismic upgrades. Measure RR will provide significant funding to support critically needed investments in track, tunnels, and structures.
- → System Enhancement: Approximately 10% of identified Track and Related Infrastructure investment need is for additional system capacity projects. A set of track projects under the BART Metro program would allow BART to improve its service flexibility and reliability while also filling empty seats during the off-peak and creating high-frequency service in the region's core.

Track

BART's original tracks are worn down from 45 years of continuous use and require major repairs. BART has been working aggressively in recent years to repair and replace tracks system wide. For example, in 2016 BART replaced nine miles of rail. The approval of Measure RR will allow BART to continue to accelerate the pace of track renewal. Examples of planned track projects include:

- → Replacement of 90 miles of original rails.
- → Replacement of supporting infrastructure, including the steel fasteners that connect BART's rails to the concrete trackways below, as well as ties and switches along track segments.
- → Renewal of rails at turnouts and maintenance yards.

Tunnels

BART's tunnels include the Transbay Tube, the Berkeley Hills Tunnel and the subway sections in San Francisco and the peninsula, downtown Oakland, and downtown Berkeley. These tunnels have been in use for decades and some need major rehabilitation. Asset Management Plans identify the risks associated with tunnels, such as deterioration of the Berkeley Hills Tunnel liner around the Hayward Fault, and premature failure of tracks and train control equipment due to groundwater intrusion in some locations between San Francisco and Millbrae. Tunnel capital projects in the CIP include:

- → Major initiative to waterproof tunnels throughout the BART system.
- → Project to realign tracks in the Berkeley Hills tunnel to address issues caused by incremental movement of the Hayward Fault, as well as a major engineering project to do design a project to prevent Hayward Fault movement from causing problems for BART service in the future.
- → Overhaul of line vent fans in tunnels system wide.
- → Rehabilitating street grates and vent shafts on Market Street and other tunnels system wide.

BART's Transbay Tube links San Francisco and Oakland, and runs along the bottom of the San Francisco Bay. As the most crucial link in the system, it requires constant maintenance and reinvestment to ensure that it remains safe and reliable. Example projects in this category include:

- → Replacement of cross-passage doors and hardware to ensure emergency egress.
- → Replacement of Transbay Tube sump pumps.

A major current project to reduce the likelihood of flooding in the Transbay Tube is included under the 'Earthquake Safety Program' below.

Earthquake Safety

In 2004, BART District voters approved Proposition AA, a general obligation bond to fund BART's Earthquake Safety Program (ESP). Since that time, BART has been steadily investing in crucial seismic upgrades to its core infrastructure, including elevated structures, stations, maintenance facilities, and other buildings.

Over the next four years, BART will use remaining ESP funds and an additional $54 million from Measure RR to complete a major project that will reduce the likelihood of flooding in the Transbay Tube during a catastrophic earthquake.

All Guideways

A set of investments is required to renew trackways and supporting infrastructure throughout the BART system, whether aerial, at-grade, or underground. Examples of these types of projects include:

- → Major initiative to repair and prevent water intrusion through trackways at 16 BART stations.
- → Renewal of fire detection and reporting systems in the Berkeley Hills Tunnel, the Transbay Tube, and in the San Francisco and Oakland transition structures.
- → Upgrades to emergency lighting and renewal of trackway lighting.

BART Metro Track Capacity

BART Metro includes a series of investments in new track that would allow BART to improve its service flexibility and reliability while also filling empty seats during the off-peak and creating a high-frequency service in San Francisco and the inner East Bay, where demand for BART is highest.

Planned investments include the installation of a limited number of tail tracks, pocket tracks, and track crossovers at locations such as Richmond, Lafayette, Dublin/Pleasanton, Bay Fair, Daly City, Millbrae, and Glen Park that allow trains to switch directions without going to the end of the line, allowing additional peak trains in core areas.

Aerial Structures

Aerial (or elevated) structures allow BART trains to travel at high speed above the ground, which frees up space for streets, trails, and other uses under the tracks. Capital investment needs in this category include:

- → Renewal of aging aerial structures, including repair to columns, bridges, and sound walls.
- → Renewal of top priority aerial interlockings (the infrastructure that allows BART trains to cross from one set of tracks to another safely). Several aerial interlockings and associated turnouts must be rebuilt to allow BART to continue to operate safely and at normal speeds.
- → Rehabilitation and upgrades to infrastructure that allows work crews to safely and efficiently inspect and repair aerial structures. Projects include renewal of catwalks (structures that allow staff access to equipment along aerial structures) and improved worker fall protection.

Grounds

BART grounds include rights-of-way and other ground level areas around trackways and buildings. Asset Management Plans identify the risks associated with guideways and grounds, some of which include major deterioration of sound walls along several lines; broken irrigation systems at stations, resulting in dead vegetation that can become a fire hazard; and damaged right-of-way fencing that may not meet California Public Utilities Commission (CPUC) requirements in the next five years. Grounds projects in the CIP include:

- → Replacement and renewal of right-of-way fencing system wide.
- → Added security fencing.
- → Renewal of stairways at maintenance access points.

At-Grade Guideways

A set of investments is required to renew BART trackways at the surface level or on embankments. Projects include:

- → Renewal of high-priority at-grade interlockings and associated turnouts.
- → Slope stabilization and embankment rehabilitation at key locations in the system.

BART Stations

BART's station facilities, which are described in detail in Chapter 2, include platforms and concourses, fare collection equipment, elevators and escalators, lighting, signage, and many other features that support passengers accessing, waiting for, and boarding BART trains. Some station plazas are used by the community as civic spaces. Other stations connect to transit-oriented development, which often combines housing with office space and shopping.

Stations also include a great deal of infrastructure that is not easily visible or noticed by everyday users. This type of infrastructure includes water and ventilation systems, passenger announcement systems, power equipment, emergency infrastructure, and waste management equipment. BART's Asset Management Plans identify the risks associated with stations, some of which include: older station roofs that allow water intrusion into public and non-public spaces and leads to deterioration of infrastructure; deteriorating plumbing/sewer drains that can result in undetected leaks, flooding, electrolysis, or fire system failures.

Stations projects in the CIP include:

- → System Renewal: Approximately 75% of the identified investment need for stations investment is for system renewal projects. This category includes critical reinvestment in aging station infrastructure.
- → System Enhancement: Approximately 25% of identified need is for system enhancement, including the Station Modernization program and a set of projects under the BART Metro program that would allow BART to increase capacity at existing core stations.

Escalators/Elevators

The BART system includes 175 escalators, 132 elevators and three wheelchair lifts. These facilities are in operation continuously during service hours and require significant regular maintenance and upkeep. Escalators that lead to streets are exposed to the outside elements, which contributes to increased maintenance issues. After decades of use, BART's elevators and escalators require major reinvestment to continue to serve passenger's needs. This CIP identifies the need for major reinvestment in elevators and escalators. Measure RR will provide critical funding for the Market Street Escalators and Canopies project. Remaining needs in this category have little identified funding.

Examples of needed capital improvements to escalators and elevators include:

- → Escalator Rehabilitation:
  - Market Street Escalators and Canopies: BART will soon award a contract to replace 20 escalators in Downtown San Francisco stations, with work beginning in 2017 and continuing through 2020. BART will also partner with the city of San Francisco to install street canopies to protect escalators on Market Street from the elements. The project will provide protective canopies for the BART/MUNI entrances at all Downtown San Francisco stations.
  - Escalator Rehabilitation Program. Beyond planned Market Street investments, original station escalators system wide are due for overhaul to improve reliability. A six-phase program is identified to renovate escalators system wide over the life of the CIP.
- → Elevator Renovations:
  - High priority Elevator rehabilitation. A high-priority near term need includes overhaul of Pleasant Hill station and parking structure elevators; and

elevators at El Cerrito del Norte, Oakland Transition structure, and Daly City Shop and Yard.

- System wide Elevator renovation program. Elevators need periodic renovation to maintain reliability. A nine-phase program is identified to renovate elevators system wide over the life of the CIP. The first phase would focus on Hayward, Concord, and Walnut Creek station parking structure elevators.

Operational Facilities

As BART stations age and experience the wear and tear of daily use, the various components that make up station areas and buildings need to be replaced. In addition to the facilities that customers experience directly, BART maintains a set of unseen facilities that support station operations.

Examples of needed capital improvements to station operational facilities are:

→ Public Address System improvements.
→ Station ventilation projects in downtown San Francisco stations.
→ Replacement and repair all facility doors and hardware system wide.
→ Worker fall protection equipment on roofs.
→ Replacement of waste management facilities.
→ Millbrae station roof repair.
→ Pigeon abatement.

BART management and staff are collaborating to meet the continuing challenge of fare evasion. The CIP identifies the need for investments of approximately $26 million to discourage fare evasion. The actual amount expended will be based on detailed plans that are now in development.

BART Metro Station Capacity

BART Metro is a concept for enhancing BART service flexibility and capacity. BART Metro includes projects designed to increase station capacity at existing core stations to ensure that more passengers can get to and from platforms and safely wait for the trains. BART anticipates the need to make major investments in additional capacity at Montgomery and Embarcadero Stations over the life of this CIP. Investments may include platform edge doors, additional platforms, and/or additional elevators to help accommodate BART's growing ridership safely and efficiently. If the region proceeds with a second Transbay rail crossing, some of these station capacity investments may not be necessary.

Station Modernization

BART's Station Modernization program that will invest resources in existing core stations and surrounding areas to advance transit ridership and enhance the quality of life around the stations. Recently completed Station Modernization projects include:

- → Powell Street Station Modernization, Phase 1: Added wayfinding and transit maps, modified youth art tile wall with glass, reconfigured the paid area of the station, added fare evasion barriers, and added public art. Additional escalator and canopy improvements for Powell Street station are scheduled to begin in 2017.
- → Ashby Station Modernization: Improved accessibility, signage, lighting, expanded bike access and storage, and upgraded finishes to improve the appearance of the station.

Current funded Station Modernization projects include:

- → 19th Street Station Modernization: This project will upgrade the station's function, safety, capacity, sustainability, and appearance. The improvements include upgrades to station lighting; repair of flooring and wall tile; new glass railings and fare barriers; public art, and expanded interior bike parking.

Over the lifetime of this CIP, BART has identified the need for modernization projects at the following stations: Embarcadero, Montgomery Street, Powell Street (Phase 2), Balboa Park, West Oakland, Richmond, El Cerrito del Norte, Downtown Berkeley, Concord, Coliseum, and Civic Center stations. BART will work with local partners to seek funding to implement these important projects.

In addition, the BART Board adopted an Art Policy in August 2015, which seeks to "implement an arts program that will enrich rider experience, strengthen station identity, connect to communities, and support a distinctive sense of place at stations and beyond." BART has already commissioned artwork for 19th Street Oakland, El Cerrito del Norte, and Powell Street stations. The BART Board has not yet decided on a funding level or specific funding strategies for the program. This CIP assumes a need for $25 million over 15 years for public art – that value will be adjusted in the future based on policy direction from the Board.

Fare Collection

Station fare collection equipment includes fare gates, Clipper card technology, change machines, add fare/parking fee equipment, and other infrastructure that enables passengers to make, and BART to collect and process, fare payments. Examples of needed capital improvements to fare collection equipment include:

- → Replacement of fare collection computer equipment.
- → Modification of existing automatic fare collection equipment to accommodate the next generation of Clipper technology (Clipper 2).
- → Installation of additional bill-to-bill change machines.
- → Software, server, and back-office updates for the automatic fare collection system.

Station Emergency Response

Emergency response infrastructure in stations ensures that BART can respond quickly to protect people and system assets in case of an emergency such as a fire. Examples of needed capital improvements to emergency response systems include:

- → Replacement of station fire alarms.
- → Replacement of sprinkler heads.
- → Rehabilitation/installation of emergency lighting.

Water Infrastructure

Water infrastructure at BART stations includes pumps, storm water drainage systems, and irrigation for station area landscaping. Examples of needed capital improvements to water infrastructure include:

- → A project to reduce water intrusion affecting elevator and escalator machine rooms.
- → Replacement of irrigation systems and maintenance of valves.
- → Replacement of sump pumps system wide.
- → Upgrades to storm water treatment system wide.

Platforms

Station platforms are the areas in BART stations where riders wait for, board, and exit trains. Platform projects include:

- → Replace platform edge detectable warning tiles system wide for new fleet.
- → Platform edge structural rehab (to remove operating envelope conflicts system wide).

Added platform edge doors are also under consideration as projects to address the goals discussed in the BART Metro Station Capacity category of this CIP.

Other Passenger Facilities

Other passenger facilities include stairs, signage, communications systems, and platforms and concourses.

In addition to escalators and elevators, stairs allow BART riders to move between the street, concourse, and platform levels. BART stairways are heavily used and require regular reinvestment. Identified needs include:

- → Replacement of handrails and guardrails.
- → Replacement of station stair treads to keep passengers from slipping.

BART station signage includes station name signs and directional signage. Identified needs in this subcategory include installing new signage to help passengers better navigate within the stations and get oriented before they exit (wayfinding). Identified capital improvements include:

- → Additional real time arrival displays at the six downtown San Francisco and Oakland stations.
- → Wayfinding Improvement Program Phase 4 - Wayfinding sign improvements on street level, concourse level and platform level at 14 stations.

Communication systems at the station level include infrastructure and technology to convey information to passengers. Examples of projects stations communications projects in the CIP include:

- → Replacement of the public address system BART uses to make announcements.
- → Replacement of the destination signs on station platforms.

Station concourses include both unpaid and paid areas within the station. Identified need in this category includes rehabilitation of concourse floors system-wide.

Traction Power and Electrical Systems

BART trains run on 100% electric power. The infrastructure that distributes electricity throughout the system and propels BART trains by providing electricity to BART's third rail, known as the traction power system, is supported through a set of 118 substations, over 700 high voltage circuit breakers and switchgears, over 1.5 million linear feet of cabling, and other electrical equipment. Electrical infrastructure includes generators, backup power supplies, equipment that supports BART's traction power system, and related infrastructure.

This infrastructure, much of which is original to the BART system, is aging and in need of major refurbishment. This CIP identifies the need for a group of projects to replace power and electrical infrastructure to maintain and improve service reliability. Measure RR will provide significant funding for these investments.

Needed investments include:

- → System Renewal: The majority (98%) of the identified need in this category is for critical system reinvestment, with most expenditure directed toward renewal of original traction power infrastructure and electrical systems.
- → System Enhancement: An estimated 2% of investment in this category is for five new traction power substations that would be required for full implementation of the Transbay Corridor Core Capacity Program.

Traction Power Substation Renovation

BART has 62 traction power substations that convert electricity to the proper voltage and deliver it to the third rail to power trains. Many of these substations are original to the system and require constant attention to keep them operational and safe. Using funds made available through Measure RR, BART has begun the first phase of a 9-phase program to replace and renovate substations.

34.5kv Traction Power Cable Renovation

A network of 35.5kv power cables distributes traction electricity throughout the BART system. Many of these cables are original to the system and are at growing risk of failure. BART has begun engineering work on a major program of investments to repair and replace approximately 90 miles of original power distribution infrastructure.

Traction Power Controls Renovation

The control and protection systems that support traction power delivery require renovation. Major example projects in this category include:

- → Installation of fiber optic cable network and supporting infrastructure to allow communication between adjacent traction power facilities after new substations are installed.
- → A three-phase project to replace gap breaker stations throughout the BART system that have exceeded their intended design life. Gap Breaker stations are critical in providing redundancy power to third rail segments. These locations have equipment that has exceeded its estimated design life.

Electrical Systems

Electrical infrastructure includes generators, backup power supplies, equipment that supports BART's traction power system, and related infrastructure. Examples of needed investments in this category include:

- → Replacement and upgrade of backup power supplies. Safe, reliable train operations require an uninterrupted supply of power at BART facilities. BART has identified the need to replace the aging emergency generator at its central operations control center, and the backup power supplies that ensure continuous power to train control equipment, communication equipment, and emergency lighting at multiple BART stations.
- → Replacement of breakers and wiring for ventilation fans system wide.
- → Replacement of electrical switchgear, secondary panels, and subpanels to improve reliability of power for operations system wide. Existing equipment is past its estimated design life.

Core Capacity Traction Power Substations

Full implementation of the Transbay Corridor Core Capacity Program will require five new electrical substations supplying electricity to power additional Transbay service frequency.

Electrical Facility Upgrades

Important electrical infrastructure is housed in substations at various locations around the BART system. These facilities require reinvestment during the period of the CIP, including:

- → Rehabilitation of roofs and exterior walls of electrical substations.
- → Renewal of positive pressure systems for underground facilities, including substations and train control rooms.
- → Renewal of HVAC equipment in electrical facilities system wide.

Train Control and Communications

A train control system consists of both hardware and software that are used to control speed and movement on the rail network, keeping trains running smoothly and eliminating any possibility of a collision. The system BART uses today is a modified version of the original system put in place 45 years ago, and it has two major limitations. First, aging components of the system are a major cause of train delay. Second, the system was not built to handle the demands of 2017 and beyond; it can safely accommodate no more than one train every 2.5 minutes on all lines combined through the Transbay Tube.

BART's communications systems support train control and other operational functions. They include the Operations Control Center, supporting fiber optic cable network, the trunked radio system, and CCTV cameras.

Train Control Modernization Program

The Train Control Modernization Program is a major investment that would replace the aging train control equipment with a Communications-Based Train Control (CBTC) system that will improve the reliability of the system, decrease the run time of trains between stations, and enhance maintenance efficiency. CBTC will allow trains to operate at more closely-spaced intervals and at faster speeds. At the same time, a new train control system will decrease train control-related delays and enhance safety by upgrading the reliability of the technology that prevents train collisions. Train Control Modernization is an essential part of the Transbay Corridor Core Capacity Program.

Train Control System Renovation

The Train Control Modernization Program is a complex effort that will take years to fully implement. In the meantime, BART will need to invest in renovations to the existing aging train control system to ensure safe and reliable operations.

Communication Systems

BART service relies on a number of important communications systems.

BART's Operations Control Center (OCC) functions as the nerve center of the system, performing supervisory control of train operations and remote control of electrification, ventilation, and emergency response systems. Within the CIP timeframe, BART's existing OCC facility will need to replaced and modernized to support expanded BART service.

A set of communications systems supports supervisory and control functions of the OCC, and ensures that OCC staff can monitor activity throughout the BART system 24 hours a day. This infrastructure includes the fiber optic cable plant and computer systems that control and route all commands to the field from the OCC.

BART's communications networks also include the trunked radio system, which is used for a variety of daily functions, and closed-circuit television (CCTV) infrastructure, which supports both operational oversight and security functions. Asset Management Plans identify the risks associated with communications, such as insufficient storage capacity of the VCR/DVR for CCTV

and obsolescence of most analog CCTV cameras, and many of the aged communications systems.

Improvement projects for communication systems in the CIP include:

- → New BART Transit Operations Facility.
- → Renewal and upgrade of CCTV infrastructure.
- → Replacement of trunked radio equipment system wide.
- → Replace the 50-year old HVAC and ventilations systems that support computer and communications systems at operations facilities.

Integrated Computer Systems (ICS) and Related Infrastructure

BART's Integrated Computer System is a major component in the train control and supervisory system, along with the OCC, the train control system, and on-board train operation computers. ICS, together with the communications network, allows the OCC to control and monitor the systems and devices that run BART trains. Identified needs in this subcategory include:

- → Replacement of the ICS Central Computer that is nearing the end of its useful life.
- → Several upgrades and improvements to expand the ability of the ICS in guiding train control operations.

Maintenance Shops and Yards

BART's five maintenance facilities support the upkeep and repair of the BART system. Four rail car maintenance facilities, located near the Hayward, Concord, Richmond, and Daly City stations, are used for preventive and unscheduled maintenance, with heavy rail car maintenance performed at Hayward. The Oakland Shop is used to maintain BART's fleet of non-revenue support vehicles. BART's maintenance facilities require both reinvestment to renew aging equipment, and upgrades to serve the expanding fleet of rail cars.

Maintenance Shops and Yards projects in the CIP include:

- → System Renewal: Approximately 82% of the identified Maintenance Shops and Yards investment need is for critical renewal of existing facilities and tools, as well as construction of an expanded maintenance facility in Hayward (Hayward Maintenance Complex) to serve the planned fleet of 775 rail cars.
- → System Enhancement: Approximately 18% of identified Maintenance Shops and Yards investment need would support additional system capacity. Specifically, for full implementation of the Transbay Corridor Core Capacity Program, a second phase of the Hayward Maintenance Complex would be required to serve the larger fleet of 1,081 rail cars.

Existing Maintenance Buildings and Facilities

Maintenance facilities and yards include several types of buildings, including component shops, paint shops, fueling stations, storage areas, and offices for staff. Existing buildings require

reinvestment and renovation, and expanded facilities will be required to serve a larger fleet of rail cars. Major investment needs include:

- → Construction of a non-revenue vehicle light duty maintenance shop that will expand the existing maintenance shop in Oakland so that it can serve to maintain BART's fleet of non-revenue vehicles, including rail grinders and other rail maintenance equipment.
- → Rehabilitation and upgrades of existing maintenance shops.
- → Maintenance facility roof replacement.
- → Emergency response projects including replacing 50-year old fire protection water piping and control wiring at Concord, Hayward, Richmond, and Daly City yards.
- → Periodic repaving of access roads and parking area.
- → Upgrade and replacement of key electrical systems at maintenance facilities.
- → Improved lighting, and upgrades to fixtures in storage yard areas and in shop buildings.
- → Renewal of existing HVAC facilities at BART maintenance shops.

Hayward Maintenance Complex Phase 1

Hayward Maintenance Complex (HMC), Phase 1 will expand and upgrade BART's existing maintenance facility in Hayward to accommodate the planned fleet of 775 rail cars. It will reconfigure the existing yard, and construct a larger primary repair shop, a new component repair shop, a vehicle overhaul shop, a new central parts warehouse, and a new maintenance and engineering repair shop.

Hayward Maintenance Complex Phase 2

Hayward Maintenance Complex, Phase 2 is the second phase of the HMC project that will further expand the facility to allow BART to store and maintain a fleet of 1,081 rail cars. Phase 2 is part of the Transbay Corridor Core Capacity Program, and is contingent upon securing funding for the full program, including an additional 306 rail cars.

Shop Equipment

Shop equipment includes a variety of machines and components that staff use to maintain BART rail cars and other assets, including train washers, shop heaters, overhead cranes, and units for large-scale washing. Identified needs in this subcategory include:

- → Replacement of existing rail car lifts.
- → New car lifts at Richmond and Daly City shops to allow for more efficient maintenance.
- → New wheel truing facility at the Concord Shop that will support BART and eBART.
- → New train washer and overhaul of existing train washing equipment.

This subcategory also includes general tools and equipment used by BART maintenance staff to complete their duties in a variety of fields, including systems and power/mechanical maintenance. Required investment includes periodic replacement of these tools.

Water Infrastructure

Water infrastructure at maintenance shops and yards includes water and sewage connections and pumps, as well as treatment plans for wastewater created at each of the four BART yards. Examples of projects in this subcategory include:

- → Replacement of storm drain lines at all yards.
- → Replacement of aging backflow preventers.
- → Replacement of industrial waste pumps.

Station Access

BART's existing station access facilities and Station Access Policy (adopted June 2016), are described in detail in Chapter 2. Consistent with that policy, BART will invest in opportunities for all access by all modes, with a focus on increasing pedestrian and bike access, improving transit connections, and strategic investment in parking. This CIP also identifies the need to renew and rehabilitate existing access infrastructure.

Access projects in the CIP include:

- → System Renewal: 37% of identified station access need is for renewal of existing access facilities. Identified funding will cover some but not all of this need.
- → System Enhancement: The remainder of station access need is for investment in new facilities. BART's parking revenue and Measure RR will fund some of this need. For the remainder, sources have not yet been identified. BART will work with partner communities to seek funding for needed access facilities.

Accessibility

Like all transit agencies across the United States, BART is required by the Americans with Disabilities Act (ADA) to ensure that all patrons may safely access BART.

Accessibility projects currently underway include installation of new accessible faregates, improved accessible signage, and improved navigation systems for sight impaired riders.

Examples of other accessibility projects in the CIP include:

- → Access Compliance program: Over the next 15 years, this CIP identifies the need to invest in a program to bring all original BART facilities, construction of which predated passage of ADA, into compliance with current accessibility rules.
- → Accessibility Improvement Program: BART has also identified the need for an expanded program of investments to improve accessibility over and above what ADA requires.

Transit and Share Mobility

Bus Intermodal facilities are areas where BART riders can access connecting transit services such as AC Transit, Muni, and SamTrans buses. Examples of intermodal facility improvements in the CIP include repaving of station intermodal areas, which endure daily wear and tear from constant use, as well as comprehensive redesign of intermodals to improve bus drop-off areas including circulation, lighting, bus shelters, and real-time information.

Drive and Park Access

Thirty-four of BART's 46 stations have on-site parking facilities, including both multi-story parking garages and surface lots that provide over 48,000 parking spaces. These facilities, and the infrastructure that supports them, requires ongoing capital maintenance.

Major identified needs include:

- → Major investment program to rehabilitate 14 parking structures.
- → Improvements to lighting in and around parking areas.
- → Painting and restriping of parking facilities.

Active Access

BART's pedestrian infrastructure includes the sidewalks, plazas, crosswalks, pedestrian countdown signals that serve the station areas. BART riders who walk and/or cycle to a station also use street networks under control of local jurisdictions. Consistent with the adopted Access Policy, BART will be investing in improving pedestrian and bicycle infrastructure serving BART to improve safety and walkability in the station areas.

Examples of access investment needs include:

- → Investments in regional pedestrian and bicycle connections, and other station area improvements.
- → Intersection improvements to improve bicycle and pedestrian comfort and safety.
- → Bicycle parking, including secure bike stations and lockers.
- → Bicycle stair channels.
- → Plaza improvements, including active projects at West Dublin and Downtown Berkeley stations.

Transit-Oriented Development

BART's station parking lots are prime locations for transit-oriented, mixed-use developments. To achieve board-adopted goals as discussed in Chapter 2, BART is working with partners on several transit-oriented development projects.

TOD projects include executed agreements at Fruitvale, MacArthur, Millbrae, Pleasant Hill, Richmond, San Leandro, South Hayward, Walnut Creek, and West Dublin/Pleasanton stations; and future potential projects at West Oakland, Balboa Park, El Cerrito Plaza, and Lake Merritt

stations. BART also anticipates development of least two additional projects beyond these known projects prior to 2026.

System Support

There are a variety of activities behind the scenes that support BART service, such as information technology equipment, customer service, and planning studies. This category includes capital investment required to support these essential BART functions.

FTA Core Capacity Project Contingency, Financing, and Program Management

BART is applying for funding from the Federal Transit Administration to fund the Transbay Corridor Core Capacity Program. In addition to the estimated cost of the individual projects that make up the program (described elsewhere in this plan), BART's Core Capacity Financial Plan includes:

- → Program Management ($6 million).
- → Unallocated Program Contingency ($310 million – required by FTA).
- → Finance Charges ($104 million).

Climate Change Adaption

BART has identified the need for significant investment over the 15-year period of the plan for programs and projects to address sea level rise and other potential flooding impacts to the BART system associated with climate change. Specific infrastructure investments are under study.

Information Technology

BART's Office of the Chief Information Officer (OCIO) oversees BART's administrative computer networks. OCIO projects include investments in asset management and computer hardware and software upgrades.

BART Police

BART's police department provides security at all stations and facilities. The department's capital investment needs include:

- → Rehabilitation of staff facilities.
- → Rehabilitation of lighting and ventilation at BART police work facilities.
- → Ongoing renewal of BART police department capital assets, including service dogs and firearms.

Office of External Affairs

BART's Office of External Affairs primarily oversees media relations and public information programs. Capital projects for the Office of External Affairs include funding for the maintenance and replacement of equipment used for communications activities.

Customer Service

BART's customer service activities include providing customer information through paper brochures, signage at stations, and information on a variety of online platforms. This CIP includes a capital project to remodel BART's Transit Information Center at Lake Merritt Station.

BART System Expansion

In addition to reinvesting in core system infrastructure, BART is also working to complete ongoing system expansion projects and working with partners to study the possibility of future expansion. Current system expansion needs in the CIP include a set of investments to complete current projects that are in their final stages, and a set of planning processes and studies that are fully funded.

eBART

eBART is a 10-mile, two station extension of BART that will create a link from Pittsburg/Bay Point to Antioch in eastern Contra Costa County. The project will use a cost-effective technology called diesel multiple unit (DMU) trains that run with clean-diesel technology and can carry 300 to 400 people in each two-vehicle train. eBART is expected to begin service in May 2018.

Warm Springs Extension

The Warm Springs extension (WSX) is a 5.4-mile extension from the existing Fremont station to a new station in the Warm Springs District of South Fremont. Construction is complete and service to Warm Springs – South Fremont Station began on March 25, 2017. Costs in this category represent the project's final capital expenditures.

Silicon Valley Berryessa Extension (No net cost to BART)

The Silicon Valley Berryessa Extension (SVBX) will link the Warm Springs/South Fremont station to Milpitas and Berryessa near San Jose. The SVBX is being constructed through a partnership between BART and the Santa Clara Valley Transportation Authority (VTA), and VTA will pay all capital and net operating costs of this project, including any impacts the BART's core system. SVBX is expected to open in 2018.

System Expansion Planning

BART is working with partners to study the possibility of further expansion. Because these projects have not been finalized or approved for development by BART's board, construction costs nor identified funding is included in this CIP. Projects under consideration include:

- → BART to Livermore Environmental Studies: A potential system extension from Dublin/Pleasanton station into the city of Livermore is in environmental study. The BART Board will consider project alternatives when the study is complete. Alameda County's Measure BB includes $400 million in funding for a potential Livermore system extension.
- → Irvington Station: BART staff are refining plans for a potential infill station in the Irvington area of Fremont, between the existing Fremont and Warm Springs/South

Fremont stations. This project, should it move forward, would be carried out in partnership with the city of Fremont. Alameda County's Measure BB includes $100 million in funding for Irvington Station.

→ Crowding Relief Projects: Measure RR includes funding to design and engineer future projects to relieve crowding. While study of such opportunities is ongoing, this CIP anticipates that the majority of the Measure RR funding for such projects will occur outside the 15-year timeframe of this plan. This CIP includes an estimate $6.9 million for an initial engineering study.

→ BART Silicon Valley - Phase II Extension: BART is partnering with VTA on environmental studies and design for VTA's BART Silicon Valley - Phase II Extension Project, to extend BART service an additional six miles to downtown San Jose and Santa Clara. In December 2016, FTA and VTA circulated a Draft Supplemental Environmental Impact Statement/Report (SEIS/SEIR) to address environmental effects of the proposed project. VTA is responsible for funding this project.

5.3 Capital Funding

BART has identified a total of approximately $11.9 billion in available capital funding over the 15 years of the CIP from a variety of federal, state, regional, and local sources. This plan identifies future funding sources either as "committed" or "discretionary." Committed and discretionary funding opportunities are shown in Figure 5-4.

Committed funds are those already allocated to BART, identified in an agreement, or that are committed to BART from future funding sources. BART has identified $8.0 billion in committed capital funding over the next 15 years to meet the needs identified in the CIP. Committed funding sources include Measure RR; federal transportation funds and regional bridge tolls distributed through MTC funding programs; other BART sources, including earthquake safety bonds; allocations from BART's operating budget that will provide local match for FTA funds; and local sources, including committed county funding. Included in committed funding is $615 million that has already been received by BART or has previously been allocated from BART's operating allocations to capital, referred to as "previously committed" sources.

An additional $3.9 billion in funding opportunities are discretionary (not yet secured). They include the additional funds that BART anticipates allocating from its operating budget ($1.4 billion), elements of the Transbay Corridor Core Capacity Program funding plan that are not yet committed, and other state and regional funding that may be available. BART is working closely with partners in the region and at FTA to secure discretionary funding to address the needs in the CIP.

Figure 5-4 Capital Funding Sources

($M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	Total FY17-31
COMMITTED FUNDS																
TOTAL PREVIOUSLY COMMITTED FUNDS	533	93	22	11	5	4	4	4	4	1	-	-	-	-	-	$680
Federal and Regional Funding Allocated Through MTC Programs	53	105	679	599	345	105	66	251	73	74	81	82	88	80	66	$2,747
MTC Transit Capital Priorities - State of Good Repair (FTA 5337)[1]	53	53	53	53	54	55	56	57	58	59	61	62	63	64	66	$866
MTC Transit Capital Priorities - 775 Rail Cars (FTA Section 5307 and 5337)[2]	1	0	0	36	122	0	0	0	0	0	0	0	0	0	0	$158
MTC Transit Capital Priorities - 775 Rail Cars (MTC-provided bond proceeds)[2]	0	15	581	395	0	0	0	0	0	0	0	0	0	0	0	$991
MTC Transit Capital Priorities - 775 Rail Cars (AB664 and RM2 Bridge Tolls)[2]	0	13	40	0	0	0	0	0	0	0	0	0	0	0	0	$53
MTC Transit Capital Priorities - 775 Rail Cars (STP & CMAQ)[2]	0	25	0	53	32	0	0	0	0	0	0	0	0	0	0	$110
MTC Transit Capital Priorities - 775 Rail Cars (STP & CMAQ held in reserve account)[2]	0	0	0	57	132	44	0	0	0	0	0	0	0	0	0	$233
MTC Transit Capital Priorities - 306 Rail cars [15]	0	0	0	0	0	0	0	179	0	0	0	0	0	0	0	$179
MTC Transit Capital Priorities - Train Control Modernization (FTA/STP)[3]	0	0	5	5	5	6	10	15	15	15	20	20	25	16	0	$157
BART	**93**	**266**	**375**	**330**	**322**	**342**	**255**	**253**	**253**	**253**	**253**	**254**	**254**	**254**	**254**	**$3,995**
BART Measure RR Bonds [6]	25	165	250	238	238	238	238	238	238	238	238	238	238	238	238	$3,300
BART Earthquake Safety Program Bonds [7]	49	88	81	78	70	90	3	0	0	0	0	0	0	0	0	$458
BART Operating to Capital Allocations - Local Match[13]	13	13	13	13	13	14	14	14	15	15	15	15	16	16	16	$200
AATC Funds	6	0	31	0	0	0	0	0	0	0	0	0	0	0	0	$37
Local	**19**	**44**	**73**	**65**	**64**	**41**	**31**	**44**	**43**	**51**	**58**	**32**	**9**	**9**	**9**	**$590**
Contra Costa County Measure J[8]	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	$15
Alameda County Measure BB[9]	9	9	9	9	9	9	9	29	29	29	29	29	9	9	9	$229

($M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	Total FY17-31
Santa Clara VTA Contributions (New Rail Cars)[10]	9	29	46	40	37	13	1	1	1	0	0	0	0	0	0	$178
Santa Clara VTA Contributions (Train Control Modernization)[10]	0	0	9	8	10	11	12	10	9	18	26	0	0	0	0	$112
Santa Clara VTA Contributions (New OCC)[10]	0	5	5	5	5	5	5	0	0	0	0	0	0	0	0	$27
San Francisco Prop A GO Bond[11]	0	0	3	3	3	3	3	3	3	3	3	3	0	0	0	$30
State	**0**	**14**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**$19**
California State Transportation Improvement Program (STIP)[12]	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	$5
California LCTP Cap and Trade Funding	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	$13
TOTAL COMMITTED FUNDS	**698**	**523**	**1,149**	**1,006**	**737**	**494**	**355**	**551**	**373**	**380**	**392**	**367**	**351**	**343**	**313**	**8,031**
DISECRETIONARY FUNDS																
Other BART Allocations to Capital [13]	96	125	100	114	115	117	119	103	105	101	49	48	73	74	76	1,431
New Starts Core Capacity Grant Program [14]	0	0	50	100	100	100	100	100	100	100	100	100	100	100	100	$1,250
GANS Financing for Core Capacity[14]	0	0	142	0	0	0	234	0	0	0	(79)	(82)	(84)	(83)	(97)	($49)
MTC - Potential New Bridge Tolls/RM3 [14]	0	0	8	8	135	150	150	0	0	0	0	0	0	0	0	$450
California - Cap & Trade Funds (TIRCP) [14]	0	0	45	45	85	85	85	40	40	0	0	0	0	0	0	$424
County CMA Funding - 306 Rail Cars [14]	0	0	0	75	75	75	75	0	0	0	0	0	0	0	0	$300
MTC Transit Performance Initiative[5]	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	$64
OBAG Grant Program (STP/CMAQ) [15]	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	$31
TOTAL DISCRETIONARY FUNDS	**102**	**130**	**350**	**347**	**516**	**533**	**768**	**249**	**251**	**207**	**77**	**73**	**97**	**99**	**102**	**3,901**
TOTAL SOURCES	**800**	**653**	**1,499**	**1,353**	**1,253**	**1,026**	**1,124**	**801**	**624**	**587**	**469**	**440**	**447**	**442**	**415**	**$11,932**

NOTES for Figure 5-4:

1 FTA Section 5337 amounts for FY17 through FY20 reflect MTC Preliminary Transit Capital Priorities Programming Amounts. FTA revenues projected to increase 2% annually to FY22 then at a rate of 3% annually per TFWG Memorandum, October 7, 2015. Score 16 projects: Revenue vehicle rehabilitation/replacement, train control, traction power, fixed guideway rehab/replacement. Other eligible projects: security, fare collection equipment, ADA, other SOGR.

2 Rail car project funding sources as per MTC Preliminary Transit Capital Priorities Programming Amounts, December 2016. Total MTC Rail Car funding committed in MTC Resolution No. 4126 revised on January 27, 2016; MTC Resolution 4123 revised on January 27, 2016; BART Resolution 5134, adopted April 22, 2010.

3 Originally $150M for new rail cars from Core Capacity Grant Program, reduced to $110M, per revised Resolution No. 4123, January 13, 2016.

4 $3,726,000 reprogrammed from STIP to BART Modernization Program per STIP Amendment 14S-19 dated May 28, 2015.

5 TSP - TPI estimate per MTC Programming and Allocations Committee Memorandum, October 10, 2012. FTA revenues projected to increase 2% annually to FY22 then at a rate of 3% annually per TFWG Memorandum, October 7, 2015. Eligible projects increase ridership or productivity.

6 BART Measure RR - System Renewal Plan. Total Funding, $3.5 billion over 18 years. CIP assumes $3.3 billion from FY17-FY31. This issuance schedule is proposed and may change based on District needs and obtaining the lowest cost of capital for the District's taxpayers.

7 This category includes all remaining funds from GO bonds in BART's Earthquake Safety Program, including bonds already issued ($218 million) and those still to be issued ($240 million).

8 Assumes $15M remaining Contra Costa County Measure J allocation to BART spread over 10 years (2017-2026). Source MTC TFWG Attachment A March 5, 2013.

9 Includes Measure BB authorized funding: $100M for BART Metro/Bay Fair Connection, $90M for Station Modernization/Capacity, $38 million for BART Maintenance. Measure BB funding for capital programs still under evaluation, planning, and engineering are not including in this forecast ($400M for BART to Livermore Phase I and $120 for Irvington BART Station).

10 VTA commitments include $60 million for CTBC conversion of the SVBX segment, $177 million for 60 rail cars to operate the SVBX segment, and $27 million for the new Transit Operations Facility.

11 San Francisco GO Bond passed in 2014, $30M set aside for BART Market Street escalator canopies/head house.

12 STIP (State Transportation Improvement Program) award for Walnut Creek TOD Project.

13 BART Operating to Capital Allocations are detailed in Chapter 4 of this SRTP/CIP. Forecast allocations are not guaranteed--they depend on numerous factors that will affect BART's operating budget, including actual ridership, fare revenue, sales tax revenue, and operating costs.

14 Estimated discretionary sources for BART Core Capacity program is included in MTC's draft Regional Transportation Plan update and BART's FTA Core Capacity Application funding plan.

15 Assumes $2M per year from 2017-2026 from competitive OBAG program.

5.3.1 Committed Funds

Measure RR: BART's System Renewal Program ($3.3 billion)

In November 2016, BART District voters approved Measure RR, the BART System Renewal Program. The measure authorizes the sale of $3.5 billion in general obligation bonds to invest in renewal and renovation of the BART system. The CIP assumes that the bonds will be sold over 18 years, and that the first $3.3 billion in bond funding will be available during the 15 years of the CIP. Actual bond sales will depend on the pace of Measure RR funded work, and will be timed to minimize transaction and interest costs. The major elements of the System Renewal Plan include:

- → Repair and replace critical safety infrastructure: BART will renew the basic infrastructure that comprises the core of the BART system, including tracks, power infrastructure, tunnels, and mechanical and electrical systems.
- → Relieve crowding: BART will implement a package of projects that will allow it to meet growing peak period demand. Projects include modernizing and replacing major portions of the aging train control system, upgrading power infrastructure that limit BART's ability to provide service, and expanding maintenance facilities to store and service a larger fleet of rail cars.
- → Improve station access: BART will invest in improving and modernizing stations by improving station safety and security, adding elevators, and overhauling escalators to ensure fast and convenient access to platforms. BART will also make investments to improve accessibility of stations for people with disabilities and add more station access opportunities via upgraded bus facilities, bicycle facilities, and parking.

Together, these investments will maintain and improve safety, improve reliability, and provide more system capacity to relieve crowding during peak times. This important funding source will ensure that the most critical projects are advanced to the forefront.

Figure 5-5 Measure RR System Renewal Plan - Summary of Investments

Project Category	Planned Investment ($M)	% Total of Program
Repair and Replace Critical Safety Infrastructure	**$3,165**	**90%**
Renew Track	$625	18%
Renew Power Infrastructure	$1,225	35%
Repair tunnels and structures	$570	16%
Renew mechanical infrastructure	$135	4%
Replace train control and other major system infrastructure to increase peak period capacity	$400	11%
Renew stations	$210	6%
Relieve crowding, reduce traffic congestion, and expand opportunities to safely access stations	**$335**	**10%**

Project Category	Planned Investment ($M)	% Total of Program
Expand opportunities to safely access stations	$135	4%
Design and engineer future projects to relieve crowding	$200	6%
Total	**$3,500**	**100%**

BART Earthquake Safety Funds ($458 million)

In November 2004, Bay Area voters approved a bond measure to fund BART's Earthquake Safety Program. Funds from that bond have been invested in maintaining the safety of the BART system, including its elevated structures, stations, maintenance facilities, and other buildings. The program has upgraded critical elements of BART's infrastructure to current seismic design standards in support of the safety of BART riders and BART employees. The Earthquake Safety Program has also achieved $350 million in construction savings that BART was able to reinvest in the program to further strengthen the system.

Remaining ESP funds total $458 million, including $218 million in bonds already issued and $240 million still to be issued. The majority of the remaining bond funds will be dedicated to planned work on the Transbay Tube, which is ongoing. This project will also receive funds from Measure RR.

Federal and Regional Funding Allocated through MTC Programs ($2.7 billion)

Under federal law, MTC, along with other Metropolitan Planning Organizations (MPOs), is required to submit to the FTA a Regional Transportation Plan (RTP) every four years. Projects must be included in an RTP to receive federal funds. MTC's current RTP, *Plan Bay Area*, will be adopted in July 2017 for the 2040 planning horizon.

Based on policy set in the RTP, MTC distributes both federal transportation funds and regional bridge toll funds through a set of competitive regional programs: Transit Capital Priorities (TCP) and the Transit Performance Initiative (TCI). Combined, these programs make up the second largest source of committed capital funding for the CIP after Measure RR. This section reviews the sources of federal and regional funds, and then describes how the funds will be allocated to BART through MTC's capital funding programs.

Federal Fund Sources

On December 4, 2015, then-President Obama signed into law new federal transportation legislation, the Fixing America's Surface Transportation (FAST) Act. The legislation will guide surface transportation funding through FY20. The major federal funding sources distributed to BART are:

- → FTA Formula Funds
  - Section 5307 – Urbanized Area Formula. This federal program distributes funds to regions based on an urbanized area formula. FTA identifies 12 urbanized areas in the Bay Area—five large and seven small. BART is eligible

to receive federal formula funds in three urbanized areas: San Francisco-Oakland, Concord, and Antioch.

- FTA Section 5337 – State of Good Repair. This program provides grants to maintain transit systems in a state of good repair. These funds may be used only for equipment replacement or rehabilitation, or other capital projects needed to keep transit systems in good repair. These funds are distributed to BART through MTC's Transit Capital Priorities program for specific types of system renovation and repair projects.

→ Surface Transportation Program: BART is eligible for the Federal Surface Transportation (STP) Program funds, which are programmed by MTC on a two or three-year cycle, administered by the Federal Highway Administration (FHWA). Eligible projects include regional planning, regional operations, regional bicycle program, transportation for livable communities, and transit capital rehabilitation. MTC allocates STP funds through the competitive Transit Capital Priorities program.

→ Congestion Mitigation and Air Quality: BART is eligible to receive federal funds from the Congestion Mitigation and Air Quality (CMAQ) program. The CMAQ program, which is jointly administered by FHWA and FTA, provides funding to state departments of transportation, MPOs, and transit agencies to invest in projects that reduce air pollution in areas that do not meet the National Ambient Air Quality Standards, which are referred to as "nonattainment areas." MTC allocates CMAQ funds through the competitive Transit Capital Priorities program.

Regional Fund Sources

→ AB664 Bridge Tolls: Assembly Bill 664 designated MTC to allocate certain bridge tolls for projects that relieve congestion on the southern bridges (Bay Bridge, San Mateo Bridge, and Dumbarton Bridge) of the Bay Area. These funds are split 70% for East Bay and 30% for West Bay projects. In the past, BART has used AB664 bridge toll funding primarily to match federal formula grants. In the future, MTC plans to allocate BART's share of AB 664 funding toward new rail cars, as discussed below.

→ Regional Measure 2: Voters in 2004 approved Regional Measure 2, raising the toll on the region's seven state-owned toll bridges by $1 (the Golden Gate Bridge is not included as it is owned by a special district). Referred to as RM2, the measure established a Regional Traffic Relief Plan to help finance highway, transit, bicycle and pedestrian projects in the bridge corridors and their approaches, and to provide operating funds for key transit services. In the past, RM2 has helped to fund the Transbay Tube seismic retrofit, BART-to-Oakland International Airport, and the Warm Springs extension.

MTC-Controlled Capital Funds Committed to BART

MTC allocates funding from the above-described sources to Bay Area transit operators through a set of competitive regional funding programs. BART expects to receive approximately $2.8 billion from MTC-controlled funding sources over the next 15 years, primarily for the first 775 rail cars in the Fleet of the Future and state of good repair investments.

MTC's Transit Capital Priorities program allocates limited federal and regional transit dollars to the highest priority projects for the region based on scoring criteria. According to MTC's guidelines, the process aims to fund basic capital requirements, maintain reasonable fairness to all operators, and complement other MTC transit funding programs. BART expects to receive Transit Capital Priorities funding for the following uses:

→ Rail Car funding: MTC has directed approximately $1.3 billion in federal and regional funds over the next 12 years toward 775 new rail cars through the Transit Capital Priorities program. This funding, which is committed to the BART rail car procurement project in MTC resolutions 4126 and 4123, will be drawn from:

- Federal funds, including FTA 5307 and 5337 revenues, and previously received STP and CMAQ funds banked by MTC on BART's behalf.
- Regional funds, including AB 664 Bridge Tolls, as well as MTC financing against expected future bridge toll revenue.

A further $179 million in Transit Capital Priorities funding toward the next 306 rail cars is included in BART's Transbay Corridor Core Capacity Project Financial Plan.

→ State of Good Repair Funding: MTC has committed to BART approximately $52.6 million per year in Federal 5537 funding between FY17 and FY20 toward BART's state of good repair needs in the following categories: traction power; train control; rail, way and structures; and automatic fare collection equipment. Based on guidance from MTC's Transit Finance Working Group, BART expects to receive the same level of funding, escalated by 3% annually for the remaining years of the CIP.

Local Funding ($590 million)

VTA Contribution to Major BART Projects

Voters in Santa Clara County approved a sales tax measure in 2000 designed to fund transit service and the future extension of BART to Santa Clara, called Silicon Valley Rapid Transit (SVRT). The first phase of the SVRT program, a two-station extension to Berryessa called the Silicon Valley Berryessa Extension (SVBX), is now under construction and is scheduled to begin revenue service in FY18.

VTA and BART reached agreement in November 2001 regarding the relationship between the two organizations for the duration of the planning, building, and operation of the BART system in Santa Clara County. The agreement commits VTA to fund the purchase of new rail cars needed to serve the SVRT project, including 60 rail cars for SVBX. Approximately $178 million in VTA funds are anticipated for this purpose over the next 10 years.

VTA would also fund the portion of the Train Control Modernization program that will upgrade the SVRT segment to Communications-Based Train Control. $112 million in VTA funds is forecast for this purpose over the next 10 years. Finally, VTA has agreed to contribute $27 million to fund the planned new Transit Operations Facility.

Under the terms of the Comprehensive Agreement between the two agencies, VTA will pay for all state of good repair costs within Santa Clara County and also be responsible to pay the capital

cost of any impact that the extension may have on the BART system outside of Santa Clara County.

Alameda County Measure BB Sales Tax

In November 2004, Alameda County voters approved Measure BB, which authorized $100 million for the BART Metro/Bay Fair Connection, $90 million for Station Modernization/Capacity and $38 million for BART Maintenance projects. Measure BB funding for capital programs that are still in evaluation, planning, and engineering stages are not including in this forecast. Measure BB projects that are not in the CIP include $400 million for BART to Livermore Phase I and $120 million for an Irvington BART Station. These projects will be added to the CIP when it is reasonable certain that the projects will be constructed.

Contra Costa Measure J Sales Tax

In November 2004, Contra Costa County voters approved Measure J, which took effect in 2009. BART received funding from Measure J for eBART, which received $150 million in 2004, as well as $41 million for "Parking, Access, and Other Improvements" projects. Of that total, $15 million remains unallocated. This plan assumes that BART will receive the remaining Contra Costa County Measure J allocation of $15 million, which will be spread over 10 years.

San Francisco Measure A GO Bond

In November 2014, San Francisco voters approved a general obligation bond to fund transportation improvements in the city. The bond included $30 million to help fund the new canopies to provide weather protection for the escalators serving BART/Muni Stations on Market Street.

State Funding ($19 million)

BART expects to receive an additional $5 million in state funds over the lifetime of the CIP from the State Transportation Improvement Program (STIP). California's STIP is the biennial five-year plan adopted by MTC for future allocations of certain transportation funds for state highway improvements, intercity rail, and regional highway and transit improvements. The STIP is updated every two years, with each new STIP adding two new years to prior programming commitments. BART expects to receive approximately $5.1 million from the STIP, which is specifically programmed toward a planned Transit Oriented Development project at Walnut Creek Station. BART also expects to allocate approximately $13 million of LCTOP revenue to capital programs in FY18.

State transit capital funding opportunities over the next 10 years are expected to be more limited than they have been in the recent past. California voters have made significant resources available for transportation capital projects through propositions, including Proposition 1B (the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act in 2006), and Proposition 1A (the Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century in 2008). All funds awarded through these programs have been allocated and are now supporting BART investments in the Warm Springs Extension, eBART, Station Modernization, HMC, rail cars, and security programs.

5.3.2 Discretionary Funds

Discretionary funding sources are reasonably expected but not yet committed to BART. They include a range of potential funding sources, including BART's planned operating allocations, federal funding available through the Core Infrastructure Grant Program, as well as a group of state and regional funds that may become available to BART over the life of this plan.

BART Operating Allocations

Since the 1970s, BART has reinvested annual operating revenues into its capital program. These annual allocations are used for many critical capital projects that do not qualify for grant funding or for which other funding sources may not be available. These are fully described in Chapter 4.

Allocations from BART's operating revenue could provide up to $1.6 billion over 15 years to fund rail car replacement, renewed and expanded maintenance facilities, and other investments in state of good repair. The availability of these funds, while reasonably expected, is uncertain because it depends upon factors that affect BART's operating budget, including ridership, fare revenue, sales tax revenue, inflation, and operating costs.

Based on current forecasts, BART hopes to distribute future operating allocations as follows, subject to the availability of funds and the timing of the capital needs:

- → Approximately $367 million over the life of the plan could be directed toward the Big 3 (new rail cars, Train Control Modernization Program, and the Hayward Maintenance Complex) and other high-priority capital needs.
- → Approximately $415 million over the 15 years of the plan could be directed to state of good repair projects, primarily to provide the required 20% match to federal funds.
- → An estimated $125 million from BART parking fees over the life of the plan could be directed toward investments in customer access facilities.
- → Another $16 million over the life of the plan is set aside for specific projects including BART-to-OAK capital maintenance.

FTA Core Capacity Grant Program

In 2014, MTC approved Resolution No. 4123, which committed to a funding strategy to invest in new transit capacity for the core of the Bay Area. This 15-year program, called the Core Capacity Challenge Grant Program, makes funding available to the three largest transit operators – BART, Muni, and AC Transit. It includes funding for fleet replacement and enhancement, facilities upgrades, and fixed guideway infrastructure. Through this program, BART has worked with MTC to develop a funding plan for the Transbay Corridor Core Capacity Program. The plan relies on a range of discretionary federal, state, and local funding sources for which the BART projects must compete for funding. In total, the plan includes $3.5 billion in funding.

To provide additional funding for this initiative, BART has applied for $1.25 billion in funding through the FTA's Core Infrastructure Grant Program. BART is one of three operators that has been accepted into the program, and is working with FTA to refine the scope, schedule, and funding plan for the full set of projects. If fully funded, FTA funding would provide a total of

$315 million for 306 additional rail cars, $242 million for train control modernization, $222 million toward HMC Phase 2, $80 million toward traction power upgrades, and $389 million toward the project's unallocated contingency and financing costs.

The remainder of the Core Capacity funding plan relies on state, local, and regional funding partners. The discretionary elements of the program are described in the remainder of this section.

Bridge Toll Funding/Regional Measure 3

Regional Measure 1 (RM1) and Regional Measure 2 (RM2) were approved by voters in 1988 and 2004, respectively. Consistent with the investment strategy in *Plan Bay Area*, the CIP assumes that in FY19 there would be a $1 increase in the non-carpool vehicle toll on all state-owned bridges in the Bay Area under a new Regional Measure 3 (RM3). Regional bridge toll revenues are based on projected travel demand on the region's seven state-owned toll bridges. Beginning in FY19, *Plan Bay Area* programs approximately $450 million from such a measure for BART's Transbay Corridor Core Capacity Program. The details of RM3 have not been finalized. MTC is evaluating a range of options that include toll increases of $1, $2, and $3.

County Congestion Management Authorities

Full implementation of BART's Transbay Corridor Core Capacity Program would require participation from the Congestion Management Authorities in Alameda, Contra Costa, and San Francisco Counties. The CIP estimates the required contribution to be $300 million in total over the lifetime of the program. BART and MTC will work with these partner agencies to develop mutually agreeable funding strategies.

Cap-and-Trade/Transit and Intercity Rail (TIRCP) Program

In 2013, California officially launched its Cap-and-Trade program for greenhouse gas emissions. California Carbon Allowances (CCAs) are auctioned by the State's Air Resources Board on a quarterly basis to fund the program.

California's Transit and Intercity Rail Capital Program (TIRCP) will provide grants from the state's Greenhouse Gas Reduction Fund for transformative capital improvements that will modernize California's intercity, commuter, and urban rail systems, and bus and ferry transit systems to reduce emissions of greenhouse gases by reducing congestion and vehicle miles traveled throughout California. The program will seek to fund projects that reduce greenhouse gas emissions; expand and improve rail service to increase ridership; integrate the rail service of the state's various rail operations; and improve safety.

TIRCP funds are competitive. BART expects to compete for approximately $424 million in TIRCP funds over the 15-year period of the plan, and these funds are designated for the Transbay Corridor Core Capacity Program in the Regional Transportation Plan.

MTC's Transit Performance Initiative (TPI)

MTC's Transit Performance Initiative is a pilot program that directs federal formula funds toward low-cost capital investments that can be implemented quickly and efficiently, and are designed to increase ridership and productivity. Based on forecasts from MTC's Transit Finance Working

Group, BART expects to receive $3.5 million per year with a 3% annual increase each year, for total funding of $64 million over 15 years. These funds will be directed toward the highest priority projects that increase productivity and ridership.

One Bay Area Grant Program

MTC's One Bay Area Grant program (OBAG), established in 2012, directs federal funds toward regional transportation priorities while also advancing the Bay Area's land-use and housing goals. OBAG is a competitive funding source that is open to localities as well as transit operators. BART expects to compete for a limited amount of OBAG funding. BART estimates that it will receive approximately $2 million per year from this competitive funding source, for a total of $30 million over the 15 years of the CIP.

APPENDIX A: ACRONYM LIST

Acronym	Description
AB	Assembly Bill
ADA	Americans with Disabilities Act
AMP	Asset Management Program
BFS	BART Facilities Standards
BPA	Bonneville Power Administration
BPD	BART Police Department
BSP	BART Strategic Plan
CalPERS	California Public Employee Retirement System
CARP	Capital Asset Replacement Program
CBTC	Communication-Based Train Control
CCA	California Carbon Allowances
CCRP	Commercial Communications Revenue Program
CCTV	Closed-Circuit Television
CIO	Office of the Chief Information Officer
CIP	Capital Improvement Program
CMA	Congestion Management Agencies
CMAQ	Congestion Mitigation and Air Quality
COPPS	Community Oriented Policing and Problem Solving
CPI	Consumer Price Index
CPTED	Crime Prevention Through Environmental Design
CPUC	California Public Utilities Commission
DCC	Doppelmayr Cable Car
DMU	Diesel Multiple Unit
DOL	Department of Labor
eBART	East Contra Costa Bart Extension
EBPC	East Bay Paratransit Consortium
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	Fiscal Year
GO	General Obligation
HMC	Hayward Maintenance Complex

Acronym	Description
HVAC	Heating, Ventilation, And Air Conditioning
ICS	Integrated Computer Systems
LCFS	Low Carbon Fuel Standard Program
LCTOP	Low Carbon Transit Operations Program
LEP	Limited-English-Proficiency
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MTBSD	Mean Time Between Service Delays
MTC	Metropolitan Transportation Commission
NCPA	Northern California Power Agency
O&M	Operations and Maintenance
OAK	Oakland International Airport
OCC	Operations Control Center
OPEB	Other Post Employment Benefit
PEPRA	California Public Employees' Pension Reform Act
PG&E	Pacific Gas and Electric Company
RGG	Resource Governance Group
RM1	Regional Measure 1
RM2	Regional Measure 2
RM3	Regional Measure 3
RS&S	Rolling Stock and Shops
RTP	Regional Transportation Plan
SFIA or SFO	San Francisco International Airport
SFMTA	San Francisco Municipal Transportation Agency (Muni)
SFO	San Francisco International Airport
SMP	Strategic Maintenance Plan
SRTP	Short Range Transit Plan
STA	State Transit Assistance
STP	Surface Transportation Program
SVBX	Silicon Valley Extension
SVRT	Silicon Valley Rapid Transit
TCMP	Train Control Modernization Program
TIP	Transportation Improvement Program
TNC	Transportation Network Companies

Acronym	Description
TOD	Transit-Oriented Development
TPI	Transit Performance Initiative
TSP	MTC Transit Sustainability Project
VTA	Santa Clara Valley Transportation Authority
WSX	BART to Warm Springs Extension