A Meeting of the Bond Oversight Committee will be held on Friday, December 21, 2018, at 9:30 a.m. The Meeting will be held in Conference Room 2100, 300 Lakeside Drive, 21st Floor, Oakland, California.

AGENDA

1. Call to Order
   A. Roll Call

2. Introduction of Committee Members

3. Introduction of BART Staff

4. Selection of New Chairperson and Vice Chairperson (Action)

5. Meeting Minutes: June 1, 2018 & September 21, 2018 (For Discussion/Action)

6. Presentation: Measure RR Update (For Discussion)

7. Presentation: Earned Value Management (For Discussion)

8. Setting next meeting agenda scheduled for March 15, 2019 (For Discussion)

9. Public Comment

Please refrain from wearing scented products (perfume, cologne, after-shave, etc.) to this meeting, as there may be people in attendance susceptible to environmental illnesses.

BART provides service/accommodations upon request to persons with disabilities and individuals who are limited English proficient who wish to address Committee matters. A request must be made within one and five days in advance of Board/Committee meetings, depending on the service requested. Please contact the Office of the District Secretary at (510) 464-6083 for information.
**Agenda**

- February 10, 2018 Board Workshop:
  Program Update provided to Board

- June 20, 2018 Board Meeting:
  Bond Oversight Committee Annual Report provided to Board

- December 6, 2018 Board Meeting:
  Program Update provided to Board with Mid- & Long-Term Outlook

- Accomplishments to Date

- Program Update
  - Hiring
  - Small Business
  - Outreach

- Mid-Term & Long-Term Outlook
Major Accomplishments to Date

• $132.5M expended. On target to surpass the $300M 1st tranche work objective by June 2020.

• 82% of all RR expenditures have been spent on the Renew Track & Renew Power programs:
  
  — RENEW TRACK
    • 22/90 miles of rail replaced (14.5 miles replaced Jan 17-June ‘18)
    • 68/214 miles of rail reprofiled (Jan ‘17-June ‘18)
    • 1030 ft of new restraining rail installed (June ‘18)

  — RENEW POWER
    • 4/100 miles of cable installed – Downtown Oakland (Washington St to 19th St) installation in progress (Jan ‘17-June ‘18)
    • 4/43 rectifiers renewed systemwide (Jan ‘17-June ‘18)
    • Traction power substation replaced in Richmond Yard (June ‘18)
Major Accomplishments to Date (cont’d)

• Held 58 small business outreach events. 21% of RR expenditures on contracted work have gone to small businesses.

• Hired 206 positions out of the 309 FY18-19 headcount goal.

• Secured additional space on the 8th Floor, populated by RR staff.

• Secured Hayward warehouse to house RR inventory.

• Established the Bond Oversight Committee (BOC) and held five BOC meetings. The first BOC Annual Report was completed and presented to the Board in June 2018.
Program Update – Hiring

FY18 SUMMARY
- FY18 Head-count goal was 162
- By year-end 90% of those positions were hired/selected

CURRENT PROGRESS
- FY18+19 Head-count goal is 309
- Bond measure to date: 206 selected/hired
- On target to meet FY19 goal
### Program Update – Small Business

<table>
<thead>
<tr>
<th>Program</th>
<th>Total RR Commitments</th>
<th>Total RR SB Commitment</th>
<th>SB Commitment %</th>
<th># of SB Contracts</th>
<th>Total RR Payments on RR Contracts</th>
<th>RR Payments to SBs</th>
<th>SB Payment %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew Track</td>
<td>$39,623,183</td>
<td>$7,989,342</td>
<td>20%</td>
<td>46</td>
<td>$14,208,951</td>
<td>$1,790,084</td>
<td>13%</td>
</tr>
<tr>
<td>Renew Power</td>
<td>$142,657,318</td>
<td>$75,707,108</td>
<td>53%</td>
<td>129</td>
<td>$25,889,206</td>
<td>$8,645,236</td>
<td>33%</td>
</tr>
<tr>
<td>Repair Tunnels &amp; Structures</td>
<td>$59,857,935</td>
<td>$7,786,683</td>
<td>13%</td>
<td>46</td>
<td>$15,029,137</td>
<td>$938,435</td>
<td>6%</td>
</tr>
<tr>
<td>Renew Mechanical</td>
<td>$14,465,578</td>
<td>$2,275,053</td>
<td>16%</td>
<td>24</td>
<td>$797,115</td>
<td>$420,259</td>
<td>53%</td>
</tr>
<tr>
<td>Replace Train Control/Increase Capacity</td>
<td>$555,394</td>
<td>$9,699</td>
<td>2%</td>
<td>1</td>
<td>$0</td>
<td>$0</td>
<td>---</td>
</tr>
<tr>
<td>Renew Stations</td>
<td>$4,108,146</td>
<td>$1,801,617</td>
<td>44%</td>
<td>11</td>
<td>$2,200,621</td>
<td>$495,845</td>
<td>23%</td>
</tr>
<tr>
<td>Expand Safe Access to Stations</td>
<td>$3,925,268</td>
<td>$1,376,440</td>
<td>35%</td>
<td>44</td>
<td>$1,133,972</td>
<td>$240,878</td>
<td>21%</td>
</tr>
<tr>
<td>Design/Engineer to Relieve Crowding</td>
<td>$5,697,420</td>
<td>$1,509,231</td>
<td>26%</td>
<td>13</td>
<td>$1,592,336</td>
<td>$342,395</td>
<td>22%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$270,890,243</strong></td>
<td><strong>$98,455,174</strong></td>
<td><strong>36%</strong></td>
<td><strong>314</strong></td>
<td><strong>$60,851,338</strong></td>
<td><strong>$12,873,132</strong></td>
<td><strong>21%</strong></td>
</tr>
</tbody>
</table>

Notes: All amounts are based on RR fund percent only. Amounts are updated to October 31, 2018. Includes formal contracts only; does not include informal purchases or work performed by BART’s own forces. SB totals include DBEs, MSBEs, SBs, and LSBs. Sources: RR commitments are based on RR Requisitions report, Procurement Sealed Bids Report and PeopleSoft Work Plans application. RR% for each project is based on Financial Analysts’ report, RR Funds / Total Project Budget. Payments based on PeopleSoft and VPT.
• 58 outreach events have been held throughout the Bay Area since inception (September 2017)
  – 38 events (2018); 20 events (2017)
  – Targeted advertisements for Small Businesses by industry and location
  – OCR staff has participated in 12 workshops, fairs, or events organized by other organizations or agencies

• Over 600 participants have attended outreach events representing a variety of business types

• Positive survey responses received from participants
  – 80% of surveys stated that participants are more likely to bid on BART work after attending the event
• Additional roll-out of programs to assist small businesses
  – Mentor-Protégé Program: has its first participants with several additional contracts in the pipeline
  – Small Business Supportive Services: soon to provide comprehensive services to Small Businesses (five-year agreement)

• Upcoming events (in development)
  – Building to Bid: The purpose of this outreach event is to navigate Small Businesses through BART’s bidding process to increase bid preparedness
  – Power Pitch: LGBTBE firms will receive technical assistance and have the opportunity to introduce their businesses and products to BART representatives
## Investment Summary

<table>
<thead>
<tr>
<th>Summary of Investments</th>
<th>$ Millions</th>
<th>% of Total Bond</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REPAIR AND REPLACE CRITICAL SAFETY INFRASTRUCTURE</strong></td>
<td>$3,165</td>
<td>90%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Renew track</td>
<td>$625</td>
<td>18%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Renew power infrastructure</td>
<td>$1,225</td>
<td>35%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Repair tunnels and structures</td>
<td>$570</td>
<td>16%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Renew mechanical infrastructure</td>
<td>$135</td>
<td>4%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Renew stations</td>
<td>$210</td>
<td>6%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Replace train control and other major system infrastructure to increase peak period capacity</td>
<td>$400</td>
<td>12%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td><strong>RELIEVE CROWDING, REDUCE TRAFFIC CONGESTION, AND EXPAND OPPORTUNITIES TO SAFELY ACCESS STATIONS</strong></td>
<td>$335</td>
<td>10%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Design and engineer future projects to relieve crowding, increase system redundancy, and reduce traffic congestion</td>
<td>$200</td>
<td>6%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Expand opportunities to safely access stations</td>
<td>$135</td>
<td>4%</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$3,500</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>
Measure RR - Scope & Spending (SHORT-TERM) CUMULATIVE

BART Measure RR Program - SHORT-TERM (3-Year Planned Work, thru June 2020)

*Requirement to Spend $300M by June 2020*

Actual Completed Scope thru Oct 2018

June 2020 – Planned $300M Scope Complete

Dec 2019 – Current Projected $300M Scope Complete

$132.5

$71.9
Measure RR – Self-Perform vs. Contract
INCREMENTAL (Monthly) thru FY18

BART Measure RR Program - FY18
Baseline vs. Actual Cash Flow (Incremental - Per Month)

Month/Calendar Year
(Fiscal Year Quarter)

Cash Flow - Incremental [per month] (in millions)

- Baseline - Contracted
- Actual - Contracted
- Baseline - Self-Performed
- Actual - Self-Performed

- 7/2017 (FY18 Q1)
- 8/2017 (FY18 Q1)
- 9/2017 (FY18 Q1)
- 10/2017 (FY18 Q2)
- 11/2017 (FY18 Q2)
- 12/2017 (FY18 Q2)
- 1/2018 (FY18 Q3)
- 2/2018 (FY18 Q3)
- 3/2018 (FY18 Q3)
- 4/2018 (FY18 Q4)
- 5/2018 (FY18 Q4)
- 6/2018 (FY18 Q4)
# Measure RR Cashflow ($ Millions) – Mid-Term & Long-Term Outlook

<table>
<thead>
<tr>
<th>Program</th>
<th>SHORT-TERM (thru June 2020)</th>
<th>MID-TERM (thru 2025)</th>
<th>LONG-TERM (thru End of Bond)</th>
<th>Expended (thru Oct 2018)</th>
<th>% Expended out of Total Bond Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew Track</td>
<td>$190</td>
<td>$400</td>
<td>$625</td>
<td>$60.2</td>
<td>10%</td>
</tr>
<tr>
<td>Renew Power Infrastructure</td>
<td>$125</td>
<td>$608</td>
<td>$1,225</td>
<td>$49.0</td>
<td>4%</td>
</tr>
<tr>
<td>Repair Tunnels &amp; Structures</td>
<td>$24</td>
<td>$268</td>
<td>$570</td>
<td>$7.9</td>
<td>1%</td>
</tr>
<tr>
<td>Renew Mechanical</td>
<td>$23</td>
<td>$65</td>
<td>$135</td>
<td>$4.1</td>
<td>3%</td>
</tr>
<tr>
<td>Replace Train Control/Increase Capacity</td>
<td>$20</td>
<td>$286</td>
<td>$400</td>
<td>$2.4</td>
<td>1%</td>
</tr>
<tr>
<td>Renew Stations</td>
<td>$21</td>
<td>$148</td>
<td>$210</td>
<td>$2.6</td>
<td>1%</td>
</tr>
<tr>
<td>Expand Safe Access to Stations</td>
<td>$15</td>
<td>$86</td>
<td>$135</td>
<td>$2.6</td>
<td>2%</td>
</tr>
<tr>
<td>Design/Engineer to Relieve Crowding</td>
<td>$22</td>
<td>$69</td>
<td>$200</td>
<td>$3.7</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$440</strong></td>
<td><strong>$1,930</strong></td>
<td><strong>$3,500</strong></td>
<td><strong>$132.5</strong></td>
<td><strong>4%</strong></td>
</tr>
</tbody>
</table>
Renew Track
STATUS & MILESTONES

EXPENDED Thru 10/2018: $60.2
FORECAST Thru 6/2020: $190
FORECAST Thru 2025: $400
FORECAST Thru End: $625

STATUS – Renew Track

<table>
<thead>
<tr>
<th># Projects in Planning</th>
<th># Projects in Design</th>
<th># Projects in Bid/Award</th>
<th># Projects in Construction</th>
<th># Projects Completed</th>
<th>TOTAL # Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6</td>
<td>11</td>
<td>0</td>
<td>2</td>
<td>19</td>
</tr>
</tbody>
</table>

MILESTONES

SHORT-TERM
Thru June 2020

- Design complete
  - C35 interlock
  - R65 interlock
- Construction complete
  - M03 interlock
  - Rail relay – 22 miles
  - C55, Phase 1
  - Restraining rail replacement – M103
- Construction complete
  - C25, C55 & C35 interlocks
  - Oakland Yard project
- Design complete
  - System joint elimination construction
  - A65/A75/A77 interlocks
- Continue DF pad installation

MID-TERM
Thru 2025

- Design complete
  - K-Line interlocks
  - Richmond Yard turn outs
  - Friction modification implementation
- Construction complete
  - C25 interlock
  - A65/A75/A77 interlocks
  - Rail relay of 40 miles
  - R65 interlocks
  - DF pad installation
  - Restraining rail replacement – C101, C102
- Begin construction of system joint elimination

LONG-TERM
Thru End of Bond

- Construction complete
  - K-Line interlocks
  - System joint elimination
  - Richmond Yard turn outs
- Begin implementation friction modification
### Renew Power

**STATUS & MILESTONES**

### STATUS – Renew Power Infrastructure

<table>
<thead>
<tr>
<th># Projects in Planning</th>
<th># Projects in Design</th>
<th># Projects in Bid/Award</th>
<th># Projects in Construction</th>
<th># Projects Completed</th>
<th>TOTAL # Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>25</td>
</tr>
</tbody>
</table>

### MILESTONES

#### SHORT-TERM

**Thru June 2020**

- Design complete – Station Fire Alarm Replacement – Phase 2
- Construction in progress for 34.5 kV cable
  - K-Line & M-Line
- Awarded
  - M-Line 34.5 kV Cable Replacement
  - San Leandro Traction Power Substation Replacement
  - Tunnel Lighting M-Line
- Station Emergency Lighting Ph 2 to BOD 11/2018
- Install complete traction power substation in Richmond Yard
- Design complete 34.5 kV cable replacement
  - A, C & R-Lines
  - Willow Pass Road high voltage bulk supply transformer
  - Multi-functional protective relays and rectifiers
  - Cast coil transformers & differential protection schemes
  - Uninterruptible Power Supplies (UPS) – 24 Train Control Rooms
- On going Installation
  - M-Line tunnel lighting
- Begin installation
  - Station Fire Alarm Replacement – Phase 2
  - Third rail replacement – A-Line
  - Transbay Tube (TBT) emergency generator

#### MID-TERM

**Thru 2025**

- Installation complete
  - Station Emergency Lighting – Phase 2
  - Tunnel lighting – TBT & Walnut Creek tunnel
  - TBT emergency generator
  - Station Fire Alarm Replacement – Ph 2
  - Met G generator replacement
  - Cast coil transformer & differential protection
  - Traction power substations at Civic Center & Montgomery
  - Willow Pass Road high voltage bulk supply transformer replacement
- Continued construction
  - 34.5 kV cable replacement – systemwide
  - Traction power substation replacement – systemwide

#### LONG-TERM

**Thru End of Bond**

- Construction complete
  - 34.5 kV cable replacement – systemwide
  - Traction power substation replacement – systemwide

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**EXPENDED Thru 10/2018:** $49.0  
**FORECAST Thru 6/2020:** $125  
**FORECAST Thru 2025:** $608  
**FORECAST Thru End:** $1,225

---

# Projects in Planning: 1  
# Projects in Design: 15  
# Projects in Bid/Award: 2  
# Projects in Construction: 6  
# Projects Completed: 1  
TOTAL # Projects: 25
# Renew Mechanical

## STATUS & MILESTONES

### EXPENDED Thru 10/2018:
- $4.1

### FORECAST Thru 6/2020:
- $23

### FORECAST Thru 2025:
- $65

### FORECAST Thru End:
- $135

## STATUS – Renew Mechanical

<table>
<thead>
<tr>
<th># Projects in Planning</th>
<th># Projects in Design</th>
<th># Projects in Bid/Award</th>
<th># Projects in Construction</th>
<th># Projects Completed</th>
<th>TOTAL # Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>

## MILESTONES

### SHORT-TERM
- Thru June 2020
- ✓ Awarded Coverboard Enhancement contract
- ✓ Procurement of Standpipe contract (L-Line tunnel)
  - Design complete
    - Fire hose cabinets, L-Line tunnel & yard fire services
    - Turntables & vacuum system
    - Backflow preventers, sewage pumps & rotoclones
    - LMA Liebert unit
  - Installation complete – Coverboard enhancement systemwide

### MID-TERM
- Thru 2025
  - Installation complete
    - Turntable replacement (OCY, ORY), vacuum system (OKS) & hydraulic truck lift cylinders (OHY, ORY)
    - Fire protection systemwide (yards, stations & L-Line tunnel)
    - HVAC & control tower replacement (OCY, ORY)
    - LMA Liebert unit
  - Continued installation – Storm water treatment systemwide

### LONG-TERM
- Thru End of Bond
  - Installation complete
    - LMA computer room fire protection
    - Transbay Tube dampers overhaul
  - Continued installation – Storm water treatment systemwide
**Tunnels & Structures**

**STATUS & MILESTONES**

EXPENDED Thru 10/2018: $7.9
FORECAST Thru 6/2020: $24
FORECAST Thru 2025: $268
FORECAST Thru End: $570

### STATUS – Repair Tunnels & Structures

<table>
<thead>
<tr>
<th># Projects in Planning</th>
<th># Projects in Design</th>
<th># Projects in Bid/Award</th>
<th># Projects in Construction</th>
<th># Projects Completed</th>
<th>TOTAL # Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>21</td>
</tr>
</tbody>
</table>

**MILESTONES**

**SHORT-TERM**

- Rehabilitation complete – Platform edge – MacArthur Station
- Design complete – Aerial fall protection A-Line
  - Advertise & award
    - Caldecott BART Tunnel (CBT) Creep Repair
    - Safety Barriers – systemwide
    - M-Line Water Intrusion (Phase1)
    - M-Line Aerial Fall Protection
  - On going Retrofit
    - Transbay Tube (TBT) internal seismic – invert tube segments 21-53
    - TBT internal – electrical substations complete at pump stations #3 & #4
    - Substation exterior walls - systemwide

**MID-TERM**

- Design complete
  - Aerial fall protection on C, R &L Lines
  - Renew catwalks on aerials (A-Line)
  - Rehab expansion joints (aerial structures)
  - Water intrusion through trackway & platform joints at stations on C & R-Lines
  - Slope stabilization – MW012
- Construction complete
  - CBT Creep Repair
  - Safety Barriers
  - M-Line Water Intrusion (Phase1)
  - M-Line Aerial Fall Protection
  - TBT internal retrofit
  - Slope stabilization – MW012

**LONG-TERM**

- Construction complete
  - Aerial fall protection on C, R &L-Lines
  - Renew catwalks on aerials (A-Line)
  - Rehab expansion joints (aerial structures)
  - Water intrusion through trackway & platform joints at stations on C & R-Lines
## Replace Train Control

### STATUS & MILESTONES

**EXPENDED Thru 10/2018:** $2.4M
**FORECAST Thru 6/2020:** $20M
**FORECAST Thru 2025:** $286M
**FORECAST Thru End:** $400M

### STATUS – Replace Train Control / Increase Capacity

<table>
<thead>
<tr>
<th># Projects in Planning</th>
<th># Projects in Design</th>
<th># Projects in Bid/Award</th>
<th># Projects in Construction</th>
<th># Projects Completed</th>
<th>TOTAL # Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

### MILESTONES

**SHORT-TERM**
Thru June 2020

- Completed supplemental qualification of systems equipment installers
- Completed pre-proposal meetings
- Completed outreach to local, small & DBE businesses
- Prequalified Communication Based Train Control (CBTC) system providers & CBTC system equipment installers (9-month delay due to protest & reopen installer contractor qualification)
- Received technical proposals
  - Identify competitive range & issue Best and Final Offer (BAFO)
  - Award to CBTC supplier
  - Issue enabling works contracts (new switch & station power supply)
  - Issue CM & DSDC Contracts
  - Update & prepare BART Integrated Computer System (ICS) for the new Automated Train Supervision (ATS) System
  - Mobilize co-located project team (BART, Consultant, CBTC System Supplier)

**MID-TERM**
Thru 2025

- Develop new Automatic Train Supervision (ATS) system
- Prove CBTC on the test track
- Integrate new CBTC equipment on all vehicles
- Install CBTC equipment on the revenue trackway
- Train operators, controllers & maintainers on the new CBTC system and equipment
- Begin migration and operation of the new CBTC system into revenue service

**LONG-TERM**
Thru End of Bond

- Complete migration through the Transbay Tube (TBT) and the Oakland Wye
- Increase the frequency of service through the TBT
- Complete the CBTC Contract
## Renew Stations

### STATUS & MILESTONES

#### EXPENDED Thru 10/2018:
$2.6

#### FORECAST Thru 6/2020:
$21

#### FORECAST Thru 2025:
$148

#### FORECAST Thru End:
$210

### STATUS – Renew Stations

<table>
<thead>
<tr>
<th># Projects in Planning</th>
<th># Projects in Design</th>
<th># Projects in Bid/Award</th>
<th># Projects in Construction</th>
<th># Projects Completed</th>
<th>TOTAL # Projects</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

### MILESTONES

#### SHORT-TERM

- Thru June 2020

- Advertised
  - Escalator contract
  - 19th St Station Modernization

- Award & begin construction
  - Escalator contract
  - 19th St Station Modernization

- Construction complete – El Cerrito del Norte Modernization

- Prepare Station Modernization conceptual plan at 2 stations

#### MID-TERM

- Thru 2025

- Continued construction – Escalator contract

- Construction complete – 19th St Station Modernization

#### LONG-TERM

- Thru End of Bond

- Construction complete – Escalator contract
**Station Access**

**STATUS & MILESTONES**

**STATUS – Expand Safe Access to Stations**

|----------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|

<table>
<thead>
<tr>
<th># Projects in Planning</th>
<th># Projects in Design</th>
<th># Projects in Bid/Award</th>
<th># Projects in Construction</th>
<th># Projects Completed</th>
<th>TOTAL # Projects</th>
</tr>
</thead>
<tbody>
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<td>4</td>
<td>13</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>22</td>
</tr>
</tbody>
</table>

**MILESTONES**

### SHORT-TERM
Thru June 2020

- Advancing design
- Active access at multiple stations
- Bicycle stair channels at 7 stations
- Accessibility Improvement Projects (AIP) Phase 1&2
- Ongoing construction – Active access projects at 2 stations
- Planning/design secure bike parking 5 stations & modernize 2 bike stations
- Initiated hearing loop installation of agent booths at 3 stations & Customer Service Center at Lake Merritt
- Initiated platform edge tile replacement at 6 stations
  - Construction complete
    - El Cerrito del Norte
    - MacArthur
    - Elevator lobby LED lights -10 stations
    - Station Public Address (PA) system improvements pilot
  - Begin construction
    - Regional trail connections
  - Implement/modernize secure bike parking and bike stair channels at multiple stations
  - Advance Safe Routes to BART program
  - Intermodal / Passenger drop off design
  - Complete hearing loop installation at agent booths
  - Strategic parking expansion

### MID-TERM
Thru 2025

- Design complete – AIP Phases 4 and 5
- Construction complete
  - Regional trail connections
  - AIP Phases 1 and 2
- Design & construction complete – AIP Phase 3
- Continued construction – Active access projects/secure bike parking
- Implement
  - Wayfinding and real time arrival information
  - Safe Routes to BART projects
  - Dynamic intermodal/drop-off redesign
  - Strategic parking expansion

### LONG-TERM
Thru End of Bond

- Construction complete
  - Active access projects/secure bike parking
  - AIP Phases 4 and 5
  - AIP fare gate audio modifications
  - Complete station PA system improvements Phase 3
- Design & construction complete – AIP Phase 6
- Implement
  - Wayfinding and real time arrival information
  - Safe Routes to BART projects
  - Dynamic intermodal/drop-off redesign
STATUS – Design / Engineer to Relieve Crowding

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td># Projects in Planning</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>0</td>
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<tr>
<td># Projects in Design</td>
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<td># Projects in Bid/Award</td>
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<td># Projects in Construction</td>
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<tr>
<td># Projects Completed</td>
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<tr>
<td>TOTAL # Projects</td>
<td>8</td>
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MILESTONES

<table>
<thead>
<tr>
<th>SHORT-TERM Thru June 2020</th>
<th>MID-TERM Thru 2025</th>
<th>LONG-TERM Thru End of Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Advertised</td>
<td>• Construction complete</td>
<td>• New Transbay Rail Crossing</td>
</tr>
<tr>
<td>✓ Civic Center Platform Stairs</td>
<td>– Embarcadero Station Platform Elevator</td>
<td>– TBD based upon funding and results of prior work</td>
</tr>
<tr>
<td>✓ New Transbay Rail Crossing – Strategic Advising and Program Management</td>
<td>– Platform Screen Door Pilot at 12th St Station</td>
<td>• Platform Screen Door Pilot program – based upon funding/pilot results: Install at downtown stations &amp; other locations TBD</td>
</tr>
<tr>
<td>✓ Advancing design</td>
<td>• HMC Phase 2</td>
<td>• Core Capacity project – Project completion</td>
</tr>
<tr>
<td>✓ Embarcadero Station Platform Elevator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ Platform Screen Door Pilot program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ HMC Phase 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ Core Capacity Project PM - completed environmental &amp; submitted all materials for FTA entry to engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Award – New Transbay Rail Crossing – Strategic Advising and Program Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Award &amp; begin construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Civic Center Stair Platform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Advertise &amp; award</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Embarcadero Station Platform Elevator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Platform Screen Door Pilot at 12th St Station</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Complete HMC Phase 2 - Trackwork procurement</td>
<td></td>
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</tr>
</tbody>
</table>
• Under Development:

  — Planning of second tranche – Fine-tune scope, schedule, and budget for mid-term project activities

  — Standardized RR Program Reporting

  — Earned Value Management
Earned Value Management

✓ Method to **objectively** assess a project’s progress

- Defined in the beginning = **Baseline**
- Define the value of each piece of work = **Schedule of values (SOV)**
- Define when work is expected to be progressed = **Planned Value (PV)**
- Measure the progress at a given time = **% Complete**
- Calculate the value of the work completed = **Earned Value (EV)**
A Schedule of Values is proportioning budget across work elements to validate % complete.

Each project can have its own schedule of values depending on verifiable pieces of the work:

### Example 1

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Project Name/ID</th>
<th>Total Project Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>15TC004</td>
<td>Water Intrusion in Train Control Room</td>
<td>$7,059,154</td>
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</tbody>
</table>

- **FINAL DESIGN (WF0345A0700)** $1,932,294
- 35% Design (20%) (Includes Assessment) $386,459
- 65% Design (30%) $579,688
- 95% Design (35%) $676,303
- 100% Design (10%) $193,229
- IFB Submittal (5%) $96,615
- CONTRACT PROCUREMENT / GENERAL SUPPORT $390,048
- CONSTRUCTION / INSTALLATION / CLOSEOUT $4,736,812
- CONTINGENCY $1,764,788
- TOTAL PROJECT W/ CONTINGENCY $8,823,942

### Example 2

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Project Name/ID</th>
<th>Total Project Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>15CQ011</td>
<td>A65/A75 Interlocking (Replacement)</td>
<td>$18,600,000</td>
</tr>
</tbody>
</table>

- **FINAL DESIGN (WF0103A0700)** $500,000
- 65% - 95% $350,000
- IFB Submittal $150,000
- CONSTRUCTION / INSTALLATION / CLOSEOUT $18,100,000
- BUS BRIDGE A65 $1,000,000
- BUS BRIDGE A75 $1,000,000
- TRAIN CONTROL SUPPORT $50,000
- CONSTRUCTION $16,050,000
How is EV Calculated and Used

The Earned Value (EV) is equal to the Physical % Complete multiplied by the budget for the current work element.

- If Design is 30% complete and the budget for design is $900,000 then the EV=$900,000*.3 or $270,000

Cost Performance Indicator (CPI) compares the Earned Value (EV) with the Actual Cost (AC)

- Less than 1 indicates actual $ spent is more than the value of the work completed. If the actual cost to perform 30% design is $400,000 the $270,000/$400,000 = 0.675

Schedule Performance Indicator (SPI) compares the Earned Value (EV) with the Planned Value (PV)

- Less than 1 indicates the value of the work completed is less than what was expected at this time in the project.
When to take Action and What Action

Earned Value is a **snapshot in time**.

Project is less than 25% spent:
- Drastic differences in CPI and SPI - <.5 or > 1.5 – may indicate a fault in the baseline set up and planning.

Project after 25% spent:
- CPI/SPI should hover around 1.0. <.8 or > 1.2 should elicit further scrutiny

Project between 25% and 90%,
- Trends over multiple periods should be evaluated for minimal fluctuation in CPI/SPI.

Project Milestones:
- Baselines (and Forecasts) should be reevaluated at significant milestones such as between planning and design, at 90% Design, once bids are received.

For a true indication of the health of a project, Earned Value must be combined with an Estimate to Complete.
When Design is 50% complete, the Earned Value (EV) = $1.2M or 50% of $2.4M.

For the Cost Performance Index (CPI):
If the Actual Cost (AC) is less than $1.2M (EV) the project is currently under spending. If AC is greater than $1.2M (EV), the project is over spending.

For the Schedule Performance Index (SPI): If the amount the team expected to spend to get to 50% (Planned Value (PV)) is less than $1.2M (EV) the project is currently on, or ahead of schedule; and if the PV is greater than $1.2M (EV), the project is potentially behind schedule.

- For this example, Earned Value is measured on two work products only - Design and Construction
- More work products (ie design packages, procurement) to measure against equal a more accurate Earned Value Analysis
- More work products to measure against equal a more complicated and time consuming analysis
- The key is to find the balance of work products
- How work completed is measured (% complete) can be different for each project or work product ie Design can be measured by 35%, 60% etc, while procurement and/or construction of track can be measured by miles or quantity
**Project X = $13.08M ($13.08 M is the budget = Planned Value)**

**Design = $2.48M**

- 35% $0.6M
- 65% $0.6M
- Final $1.28M

**Construction = $10.6M**

- Procurement Cable 17 Miles $3M
- Install Cable 17 Miles $6.6M
- CM – 12 Mo $1M

### Date of Earned Value Analysis

<table>
<thead>
<tr>
<th>Work Product</th>
<th>Budget</th>
<th>Planned value at Month 12</th>
<th>Unit of Measure</th>
<th>Total Units</th>
<th>Units complete</th>
<th>% Complete</th>
<th>Earned Value</th>
<th>Actual Cost</th>
<th>CPI</th>
<th>SPI</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>$ 2.48</td>
<td>$ 2.48</td>
<td>% of Design</td>
<td>100%</td>
<td>100%</td>
<td>100.00%</td>
<td>$ 2.48</td>
<td>$ 2.60</td>
<td>0.95</td>
<td>1.00</td>
<td>Design is complete - ran over slightly but expect to make up with procurement cost savings</td>
</tr>
<tr>
<td>Procurement</td>
<td>$ 3.00</td>
<td>$ 2.65</td>
<td>Mile</td>
<td>17</td>
<td>15</td>
<td>88.24%</td>
<td>$ 2.65</td>
<td>$ 2.60</td>
<td>1.02</td>
<td>1.00</td>
<td>Procurement of Cable cost savings due to economy of scale - 15 Miles procured</td>
</tr>
<tr>
<td>Install Cable</td>
<td>$ 6.60</td>
<td>$ 1.10</td>
<td>Mile</td>
<td>17</td>
<td>2</td>
<td>11.76%</td>
<td>$ 0.78</td>
<td>$ 0.80</td>
<td>0.97</td>
<td>0.71</td>
<td>Expected to install 1.5 mi per month for a total of 3 mi but only 2 miles installed</td>
</tr>
<tr>
<td>Construction Mgmt</td>
<td>$ 1.00</td>
<td>$ 0.17</td>
<td>Months</td>
<td>12</td>
<td>2</td>
<td>16.67%</td>
<td>$ 0.17</td>
<td>$ 0.15</td>
<td>1.11</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

**Project Total:** $13.08 $ 6.40 46.41% $ 6.07 $ 6.15 0.99 0.95
Program Rollup

Rollup Calculation:

- Each project calculates EV by % complete * Project Budget
- Earned values are added together within a program to calculate an overall Program EV
- Program EV divided by Program Budget creates Program % complete
Q&A