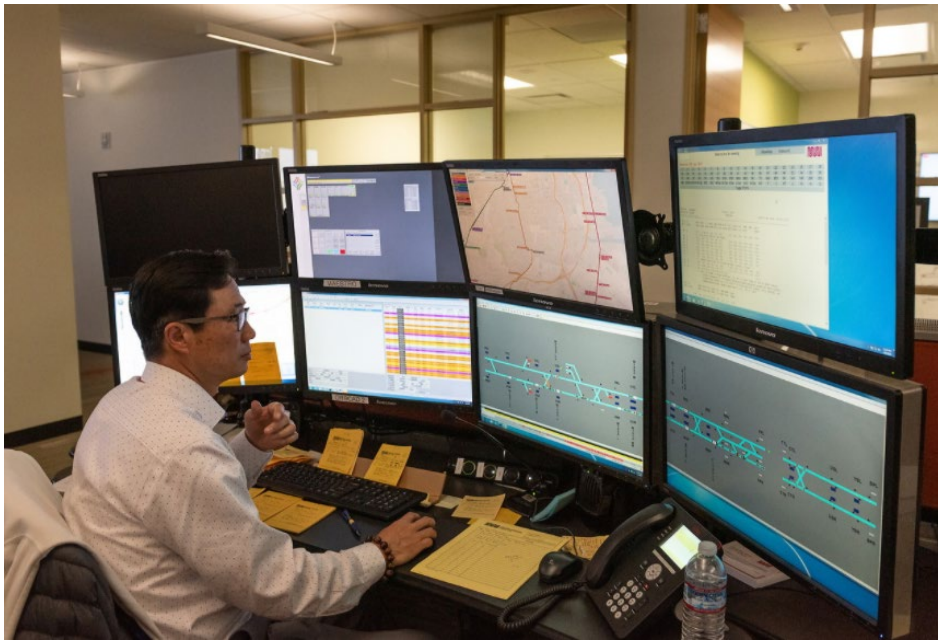
SFMTA

Train Control Upgrade Project

SFMTA Board Project Subcommittee

December 2, 2022

- Project Update
- Risk Assessment
- Peer Examples
- Funding
- Schedule



Reduced delays: Customers no longer "stuck" on trains between stations due to subway congestion or slow-moving trains with a communication failure

Reduced travel times: Trips on Muni will be faster as trains will not have to wait for traffic lights on the surface – the train control system will talk to the signals and let them know a train is coming

Improved reliability: More consistent arrival times that match the advertised frequency of trains, which makes trip-planning more reliable

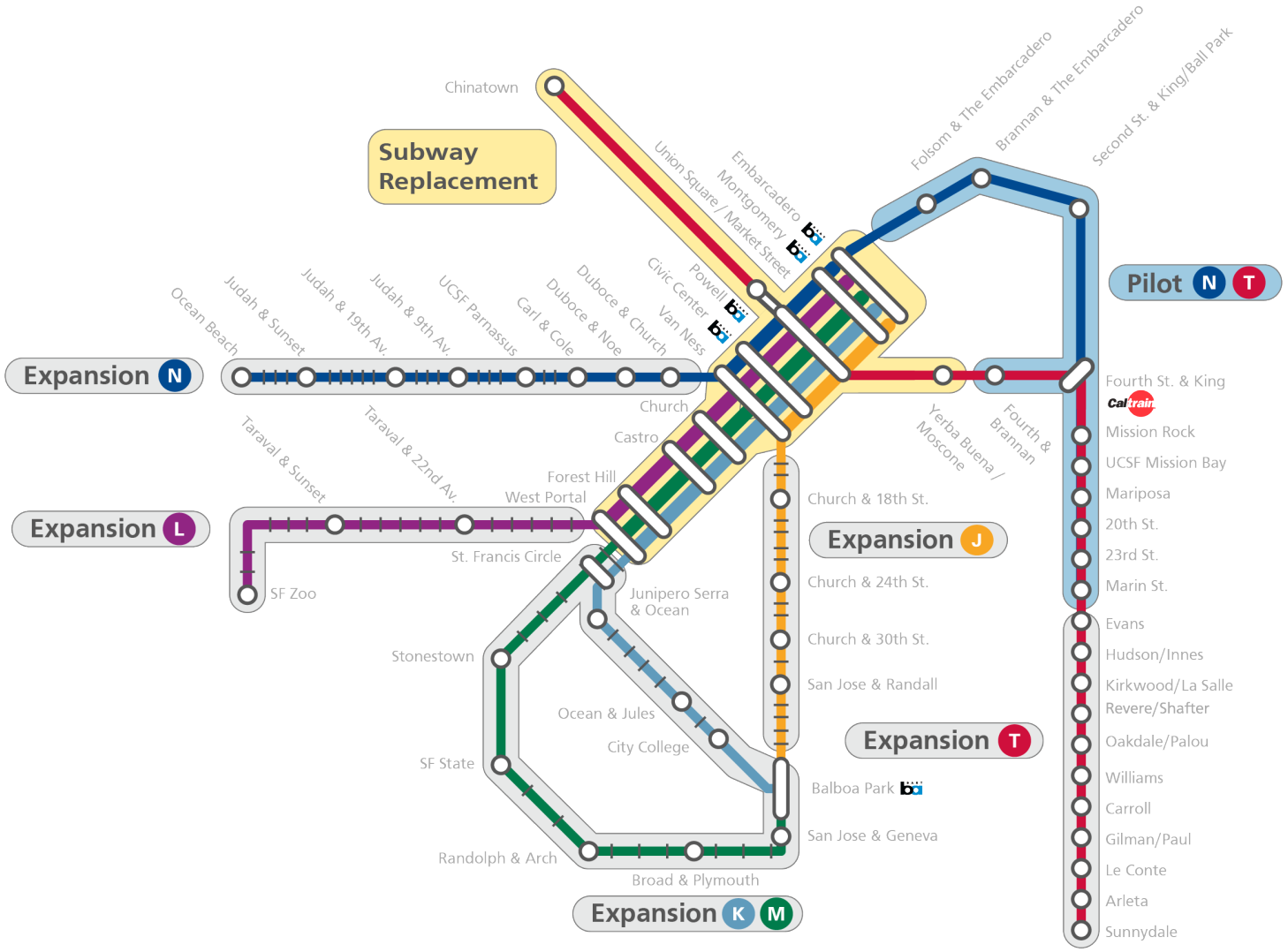
Better service: the new system will give train controllers more flexibility to manage bunching and gaps

Project strategy centered on culture of risk mitigation

Focused on proactive management and risk mitigation from onset

- Decision to embark on competitive upgrade based on risk analysis of doing nothing and limitations of sole source upgrade path
- Project phasing developed to minimize risk
- Contracting strategy ensures beneficial partnership with supplier
- Risk assessment performed early and incorporated into RFP and project team will continue to update risk assessment at key project milestones

New communications-based train control (CBTC) system upgrade to improve Muni light rail service



Contracts

Supplier

System Design, Procurement and Support

Technology system procurement best fit for selection criteria and enables long-term performance-based support

SBE/DBE goal: 5%

Initial RFP

Installer(s)

System Installation

Separating the installation contracts enables a more refined construction scope and allows us to maximize SBE/DBE

SBE/DBE goal: 100% (preliminary)

Multiple future RFPs

Consultant

Delivery Support

Technical consulting contract to support project management and leverage outside train control expertise to ensure we deliver the best system possible

SBE/DBE goal: 15% (preliminary)

Single future RFP

Pursuing multi-year contract and negotiated procurement

Improves price and terms because firms are in competition with peers

Key elements linked to strategic goals:

- Performance-based support fee creates contractual elements for supplier to build reliability into initial design
- Vendor-Managed Spares Inventory designed to incentivize reduced parts replacement
- Regular software updates keeps hardware and software up to date

Legislative progress

Budget and Finance Committee

Ordinance continued at 10/19 meeting, advanced to full Board with recommendation to support at 11/19 meeting

Continuance

Potential continuance built into schedule, so this did not cause project delay

Board of Supervisors

First reading 11/29, second reading 12/6

Mayor and waiting period

Mayor signs ordinance within 10 days, starting 30-day waiting period

Lessons Learned

SFMTA draws from multiple sources of "lessons learned" to set up Train Control for success including:

Major SFMTA capital projects like
Central Subway and Van Ness BRT

Peer agencies – North America and Europe

Past SFMTA technology projects

Current ATCS system

1. Risk Assessment Process

- Risk Assessment conducted by project consultant WSP
- Informed by information collected from CBTC suppliers during summer industry sounding
- Focus was on front-end of project process: procurement and contracting risk
- Draft report reviewed and feedback provided by City Attorney, Contracts and Procurement, and CTO

Risk-minded approach baked into culture of project since day 1. This rigorous risk assessment process is an example of this and will continue to be evaluated and updated throughout the life of the project

2. Risk Assessment Results

28 individual risks identified across 6 different risk categories

- Risks divided between RFP and contract
- Risks categorized **Low, Medium, High** factoring in **Impact** and **Probability**
- Recommended mitigations bring all **High** risk items down to **Low** or **Medium**

1. **Evaluation**
2. **Cost**
3. **Competition**
4. **Protest**
5. **Delay**
6. **Operational**

Example risk matrix:

After mitigation

Risk	Impact	Probability
Low	Medium	Low

Before mitigation

Risk	Impact	Probability
High-medium	Medium	High

3. Project Team Response

Project team actions based on risk assessment:

Reviewed and implemented mitigation measures
- **20+** High risk items mitigated to **zero** High risk items

Added negotiated procurement to ordinance under consideration by Board of Supervisors:
- Reduced risk across almost every category
- Especially reduces risk during RFP process by allowing for better communication and transparency with bidders

Next steps:

- Focus was on front-end of the process to reduce immediate risks to the RFP and evaluation
- Longer-term risks were also evaluated and mitigation is planned
- Project team will continue to review and evolve the risk assessment as the project progresses

Example of Mitigated Risk

Suppliers decline to bid because of project risk/reward

Risk factors:

- CBTC replacement projects are considered risky by the industry
- Suppliers decide to bid on other projects available based on global portfolio
- Suppliers do not find overall project terms attractive enough to accept project risk

Mitigation actions by SFMTA:

- Industry sounding provided valuable info on expected commercial terms for suppliers
- Project staff carefully considered terms in RFP that suppliers may consider risky and modified RFP accordingly to reduce risk without compromising project success
- Introduced negotiated procurement to mitigate risk of losing qualified bidders

Risk profile before and after mitigation by SFMTA

After mitigation			*Before mitigation*		
Risk	Impact	Probability	**Risk**	Impact	Probability
Medium	High	Low	**High**	High	High

We have consulted with several American, Canadian and international agencies and our project approach is informed by our shared experiences

American peers

MBTA Green Line
BART
New York City Subway

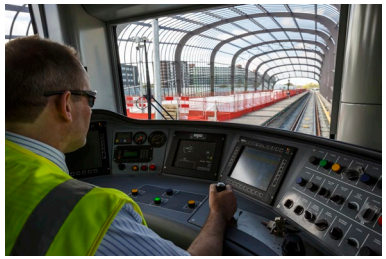
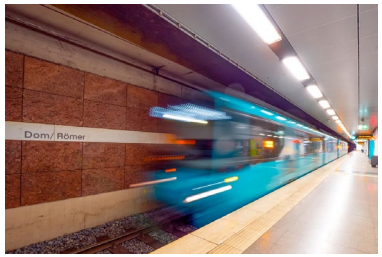


Canadian peers

Vancouver SkyTrain
Edmonton
Toronto (Eglinton LRT)


International peers

London (LU and DLR)
Amsterdam
Frankfurt VGM

BART

- Fully grade-separated
- Upgrading to CBTC

MBTA Green Line

- Pre-metro
- Uses fixed block system

NYCT

- Fully grade-separated
- Some lines fixed block, some upgrading to CBTC

Vancouver Skytrain

- Uses same Thales system as SFMTA
- Upgrading to Thales' latest product. Fully grade-separated and automated system

Edmonton

- Same type of surface-subway layout as Muni
- Originally contracted with Thales, abandoned CBTC project due to technical issues

Toronto Eglinton

- Greenfield, same type of surface-subway layout as SFMTA
- Contracted with Bombardier (now Alstom) for CBTC

Docklands Light Railway (London)

- Uses same Thales ATCS as SFMTA, upgrading to Thales' latest product.
- Fully grade-separated and automated system

Amsterdam

- Similar at-grade / subway combination as SFMTA.
- Greenfield deployment using Alstom CBTC solution.

Frankfurt VGF

- Similar at-grade/subway combination as SFMTA.
- Using combination of Siemens CBTC and V2X infrastructure in the street

Funding approach commits to project and prioritizes discretionary sources

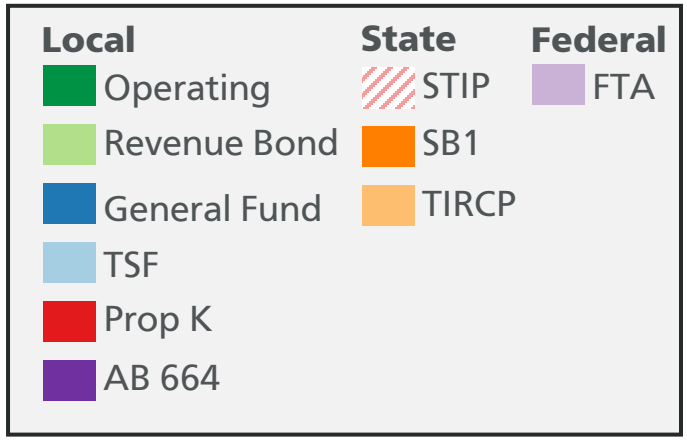
Project has been successful in competitive grants and discretionary funding sources

The 10-year funding plan presented on the following slides shows commitment to the project and is necessary to issue the RFP and compete for discretionary sources

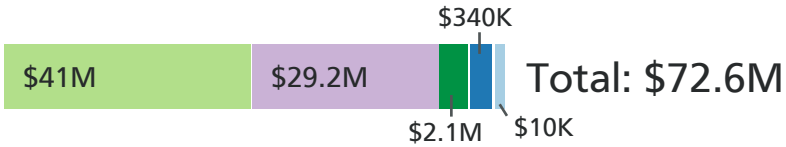
This funding plan competes with other Fixed Guideway programs for funding in later years. However, staff anticipate using the strength of this project to continue to attract competitive discretionary funding sources and local opportunities

- CIP FY23 - 27 Funding Plan: **$285M**
- Full Funding Plan: **$606M**

Funding Source	FY23-27 CIP	Project Total
Operating (prior)	N/A	$2,095,000
Revenue Bond (prior)	N/A	$5,405,000
General Funds (prior)	N/A	$340,000
Transp. Sustainability Fee (prior)	N/A	$10,000
Revenue Bond	$35,595,000	$35,595,000
Prop K	$41,077,378	$41,077,378
General Funds	N/A	$25,830,132
Transportation Sustainability Fee	N/A	$8,785,609
Operating Fund	N/A	$8,000,000
AB 664	N/A	$7,490,752
Caltrans (STIP)	$15,793,794	$24,394,000
Caltrans (TIRCP)	$28,364,282	$100,576,000
SB1 – State of Good Repair	N/A	$30,000,000
FTA (Transit Capital Priorities)	$165,001,159	$317,054,941
Grand Total	**$285,831,613**	**$606,653,812**



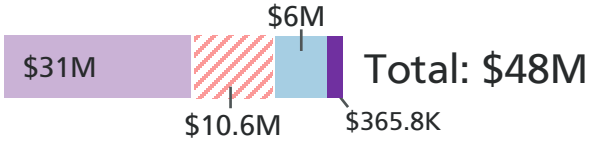
Planning & Preliminary Engineering
2018 – Summer 2025



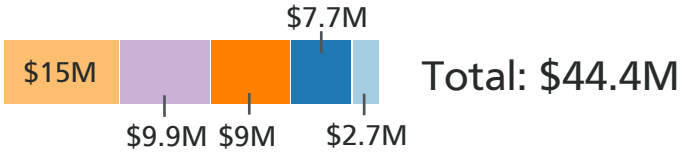
Phase 1 – Pilot (Embarcadero & 3rd St)
Summer 2025 – Summer 2027

Phase 2 - Subways
Late 2025 – Spring 2029

Phase 3 – N Surface Expansion
Fall 2026 – Summer 2029

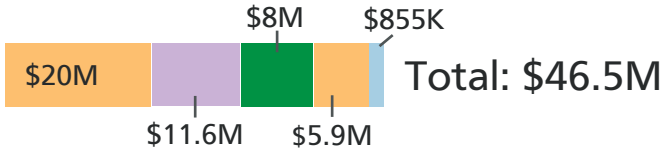


Phase 4 – T Surface Expansion
Spring 2027 – Early 2030



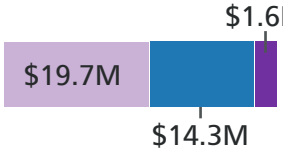
Total: $44.4M

Phase 5 – K&M Surface Expansion
Early 2028 – Summer 2030



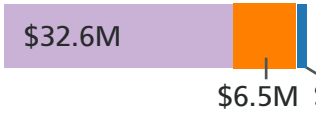
Total: $46.5M

Phase 6 – J Surface Expansion
Fall 2028 – Early 2031

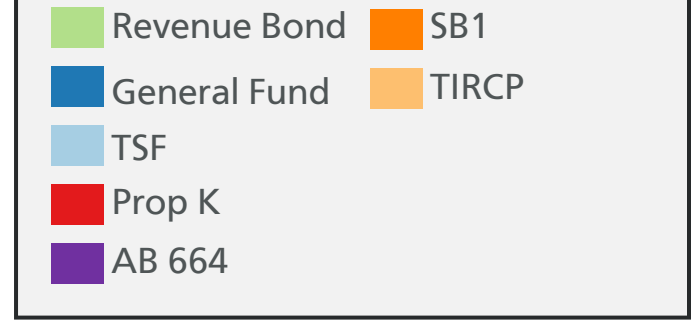


Total: $35.7M

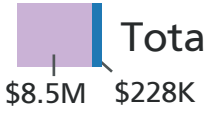
Phase 7 – L Surface Expansion
Summer 2029 – Early 2032



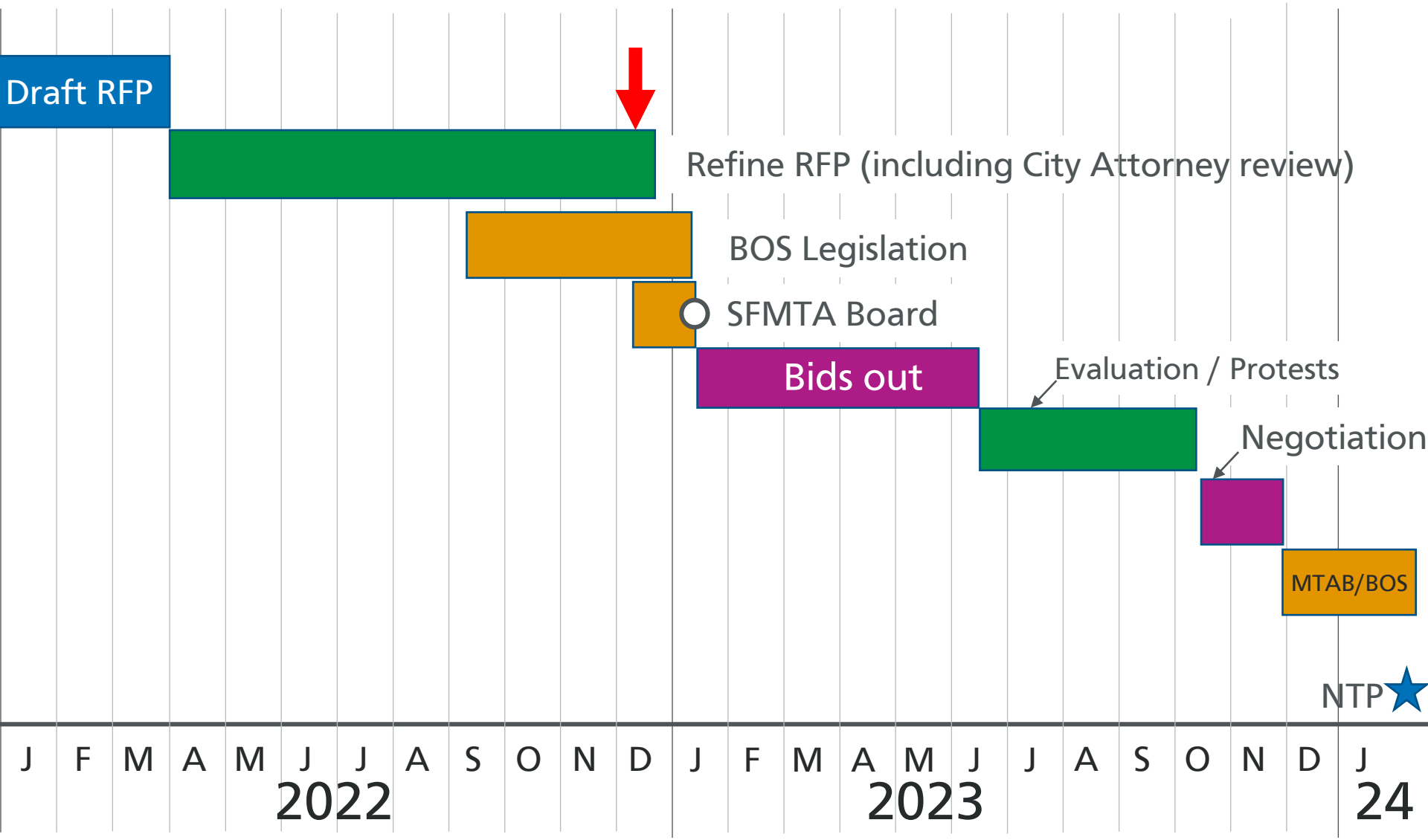
Total: $39.2M



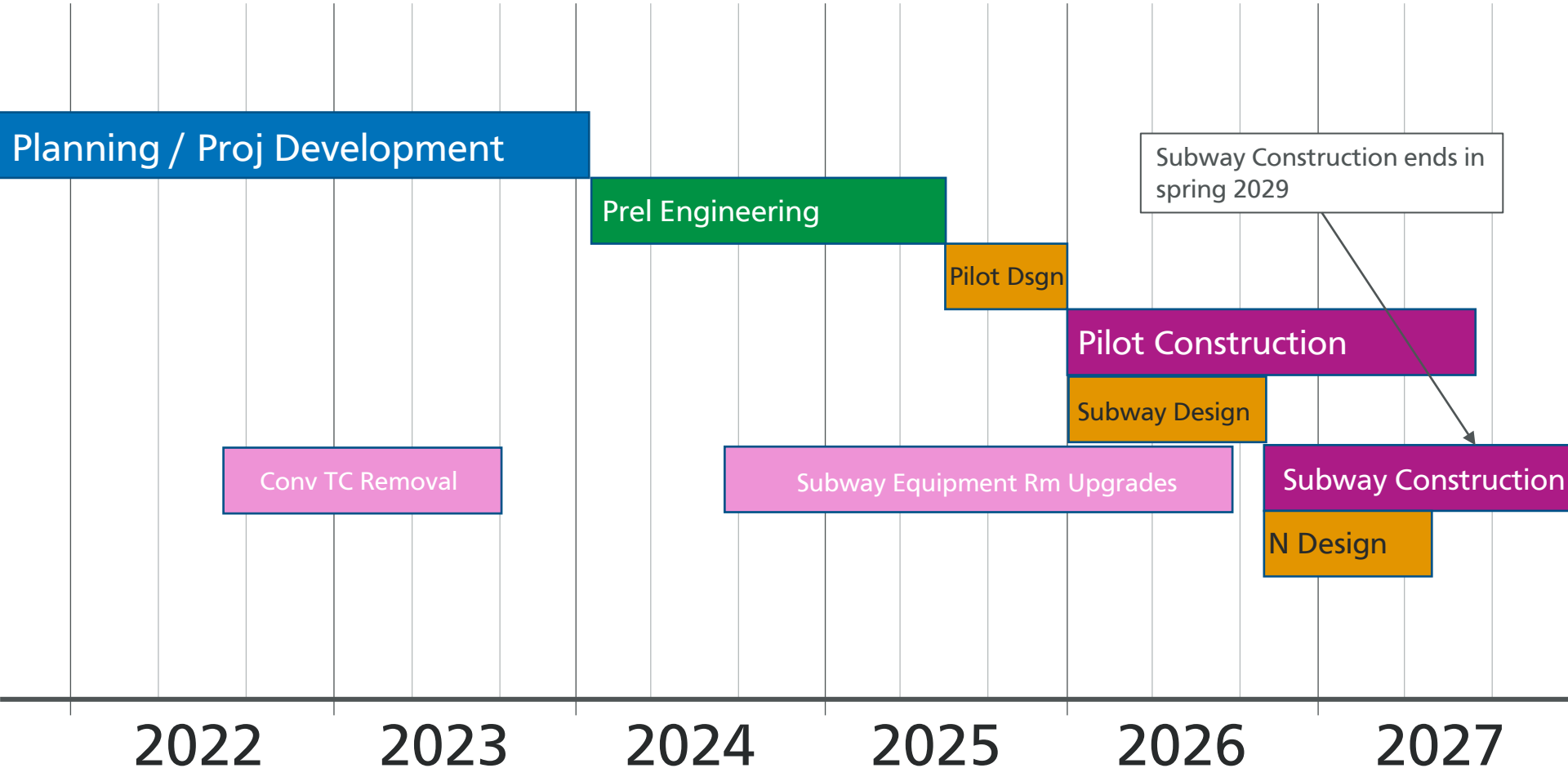
Closeout Costs
Early 2032 – Summer 2032



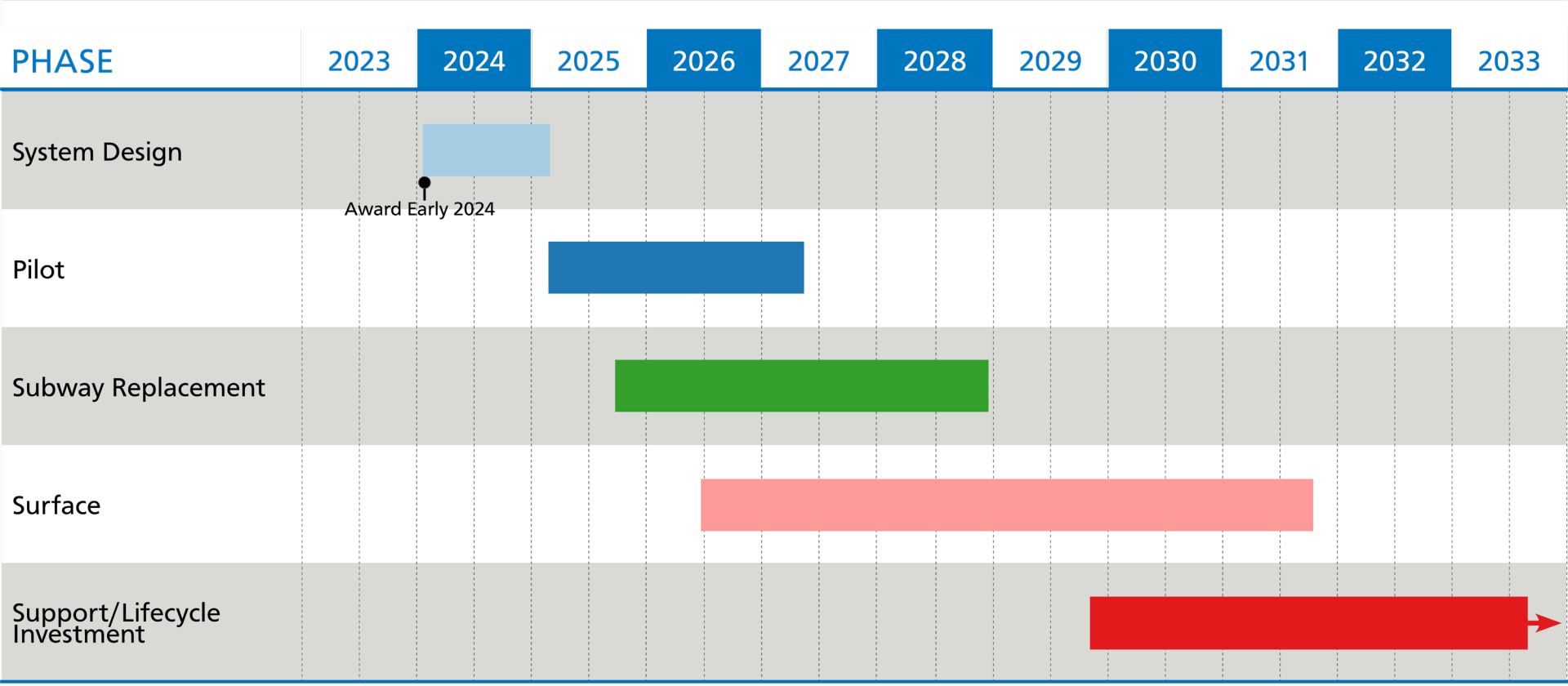
Total: $8.7M


Draft RFP
Refine RFP (including City Attorney review)
BOS Legislation
SFMTA Board
Bids out
Evaluation / Protests
Negotiation
MTAB/BOS
NTP
J F M A M J J A S O N D J F M A M J J A S O N D J
2022
2023
24

Pilot: Third St (to MME) and Embarcadero



Proposed Project Schedule



Board of Supervisors

Ordinance 1st and 2nd reading expected 11/29, 12/6

Finalize RFP

Project staff finalizing RFP revisions and review by 12/19

Approve/Advertise RFP

Expected MTAB approval action on 1/17/23

MTAB Calendar

Consent calendar or regular agenda item

Future RFPs

Consultant RFP expected in first half of 2023