

Caltrain Electrification

PROPOSED SERVICE PLAN FOR FALL 2024

Caltrain Technology,
Operations, Planning, and
Safety Committee (TOPS)

September 27, 2023

Agenda Item 10



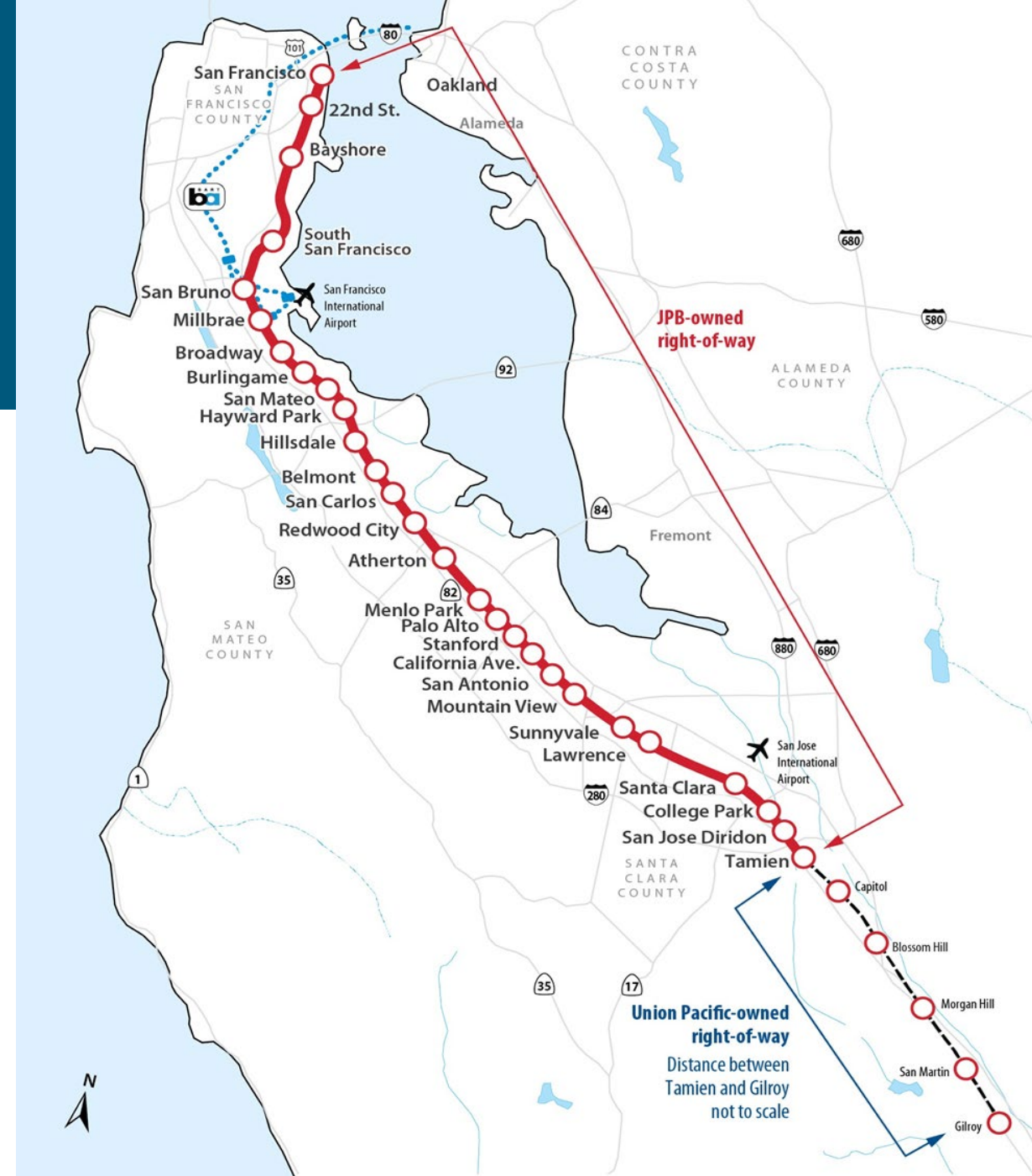
Agenda

Today's Meeting

1. **Electrification Update**
2. **Service Planning Process**
3. **Market Analysis Summary**
4. **Proposed Electrified Service Plan**
5. **Next Steps**

About Electrification

- Caltrain has been working diligently with its partners and the local communities to complete the Electrification Project.
 - 51 miles from San Francisco to San Jose (Tamien Station) along JPB-owned right-of-way
 - Electrification has three components:
 - Overhead contact system
 - Traction power facilities
 - Electric trains (19 trainsets by end of 2024; 23 trainsets by 2027)
- First new electric trains have arrived & testing is underway through the next year
- **Caltrain's new electrified service will launch in September 2024 with a completely new schedule!**



Compared to Diesel Service, How Will Electrification Improve Rail Service?



Faster Trains

Electric trains can accelerate/decelerate much faster than diesel trains

Passenger boarding will take less time with more doors available on each train



Improved Frequency

Stations can receive more frequent service throughout the day and express trains during peaks while maintaining competitive travel times



Enhanced Comfort

Smoother, quieter, modern, new electric trains

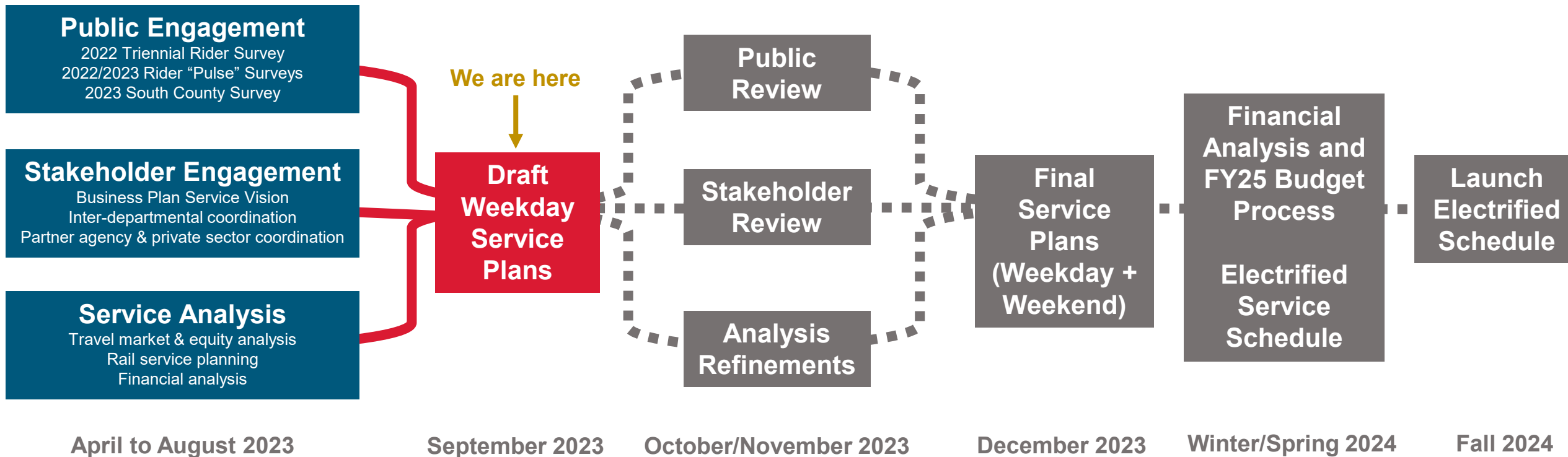


Sustainability

Reduced greenhouse gas emissions and improved air quality

Electrified Service Planning Process

Caltrain launched its electrified service planning process earlier this year, building upon recent and ongoing engagement, policy, and planning efforts.



Electrified Service: Goals & Outcomes

Vision

**Long-Range
Service Vision**
(Caltrain Business Plan)

Goals

Equity

Connectivity

**Recovery &
Growth**

Outcomes

**More Frequent
Service**

Tailor station frequency to market demand and equity goals

**Competitive
Travel Times**

Offer competitive travel times for major markets compared to autos

**Enhanced Off-
Peak Service**

Build ridership markets outside of typical commute trips

**Coordinated
Transfers**

Coordinate connections with BART and other transit operators

**Simplicity &
Legibility**

Provide a schedule that is easy to understand

What Constraints Remain?



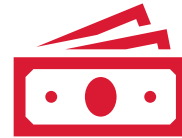
Infrastructure

Caltrain serves a mostly two track corridor with constrained terminal operations, which limits how it can provide service.



Fleet

Caltrain's mixed fleet of diesel and electric trains constrains what kinds of train service can be offered



Operating Budget

Caltrain's constrained operating budget and lower ridership/farebox revenue currently limit service expansion opportunities



Service Coordination

Reduced BART frequency (starting fall 2023) at Millbrae presents challenges for timing transfers

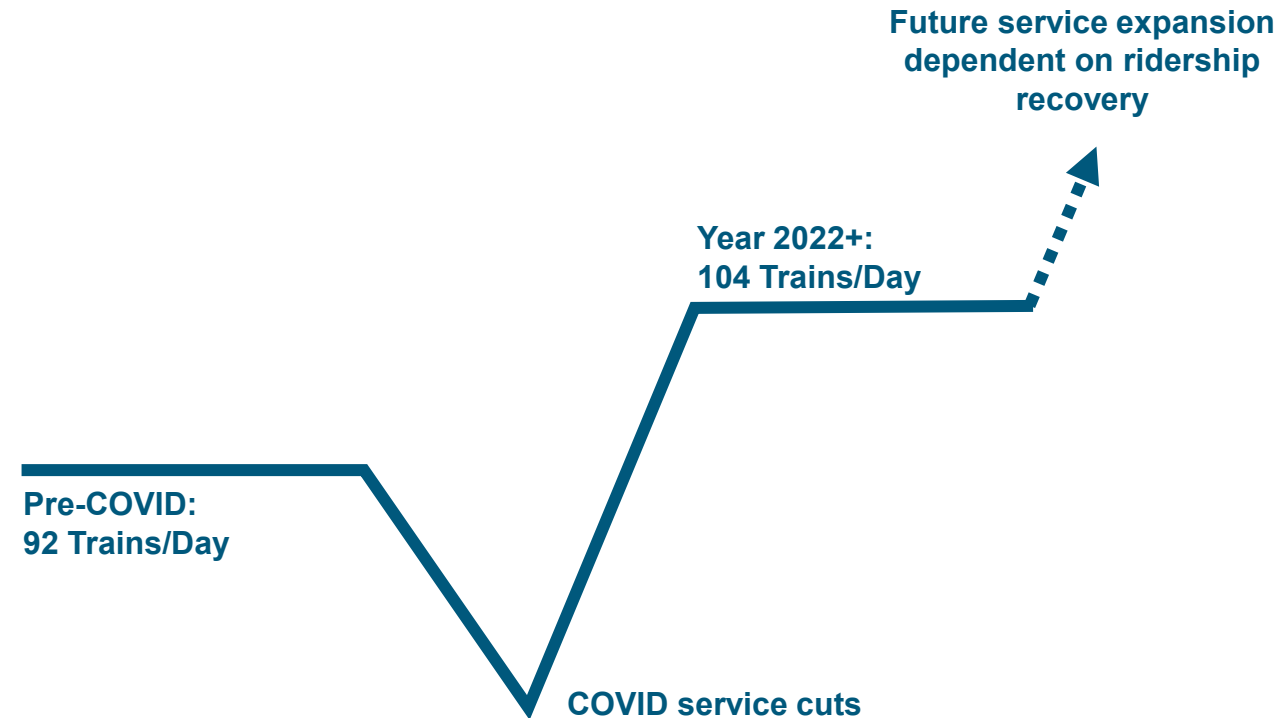
Weekday Electrification Service Levels

Caltrain's budget for FY24-25 (July 2023 – June 2025) is for 104 trains per weekday.

Consistent with the budget, in September 2024, Caltrain's new electrified service will provide 104 trains per weekday (4 trains per peak hour per direction) – with a completely new stopping pattern.

With ridership still recovering from the effects of the pandemic, Caltrain is requesting a waiver from the Federal Transit Administration (FTA) to delay further service expansion until ridership returns. Discussions with FTA have been positive and Caltrain expects to receive the waiver in fall 2023.

Change in Weekday Service Levels over Time



Market Analysis Approach

Results from the market analysis can help inform decision-making about additional station stops – beyond the base level of service – during the peak periods.



Ridership Analysis

Considers current and pre-COVID ridership patterns



Land Use Analysis

Total population and jobs near stations, including recently-completed or under construction projects*



Equity Analysis

Connections to low income and/or minority communities



Transit Connections

Presence of high frequency rail, bus, and shuttle connections

*Based on a review of projects listed on City planning websites in Spring 2023

Candidate Stations for Service Expansion

Based on market analysis, the following stations demonstrate the strongest need for additional service frequency during the peak periods:

- South San Francisco
- San Mateo
- Hillsdale
- Menlo Park
- Sunnyvale
- Lawrence
- Santa Clara

The results of this analysis were incorporated into the service planning process alongside operational considerations.

Stations already at maximum peak service level (4 TPHPD)	Stations demonstrating the strongest need for increased peak service frequency
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Station	2023 Caltrain Ridership	Land Use Near Stations	Equity Need	Transit Connections
San Francisco	Light Blue	Light Blue	Light Blue	Light Blue
22nd Street	Light Blue	Light Blue	Light Blue	Light Blue
Bayshore	Light Blue	Light Blue	Light Blue	Light Blue
South San Francisco	Light Blue	Light Blue	Light Blue	Light Blue
San Bruno	Light Blue	Light Blue	Light Blue	Light Blue
Millbrae	Light Blue	Light Blue	Light Blue	Light Blue
Burlingame	Light Blue	Light Blue	Light Blue	Light Blue
San Mateo	Light Blue	Light Blue	Light Blue	Light Blue
Hayward Park	Light Blue	Light Blue	Light Blue	Light Blue
Hillsdale	Light Blue	Light Blue	Light Blue	Light Blue
Belmont	Light Blue	Light Blue	Light Blue	Light Blue
San Carlos	Light Blue	Light Blue	Light Blue	Light Blue
Redwood City	Light Blue	Light Blue	Light Blue	Light Blue
Menlo Park	Light Blue	Light Blue	Light Blue	Light Blue
Palo Alto	Light Blue	Light Blue	Light Blue	Light Blue
California Ave	Light Blue	Light Blue	Light Blue	Light Blue
San Antonio	Light Blue	Light Blue	Light Blue	Light Blue
Mountain View	Light Blue	Light Blue	Light Blue	Light Blue
Sunnyvale	Light Blue	Light Blue	Light Blue	Light Blue
Lawrence	Light Blue	Light Blue	Light Blue	Light Blue
Santa Clara	Light Blue	Light Blue	Light Blue	Light Blue
San Jose	Light Blue	Light Blue	Light Blue	Light Blue
Tamien	Light Blue	Light Blue	Light Blue	Light Blue
Capitol	Light Blue	Light Blue	Light Blue	Light Blue
Blossom Hill	Light Blue	Light Blue	Light Blue	Light Blue
Morgan Hill	Light Blue	Light Blue	Light Blue	Light Blue
San Martin	Light Blue	Light Blue	Light Blue	Light Blue
Gilroy	Light Blue	Light Blue	Light Blue	Light Blue



Proposed Weekday Peak Period Service Concept

(San Francisco to San Jose)

Faster service *and* more stops with all-electric trains

- 4 trains per hour per direction
- Alternating express and local trains
- SF-SJ travel times of 59 to 75 minutes*
- 20% increase in stops at stations

Weekday Peak Hour

Approximately

6:30am-9:30am and 3pm-7pm

San Francisco
4th & King

San Jose
Diridon



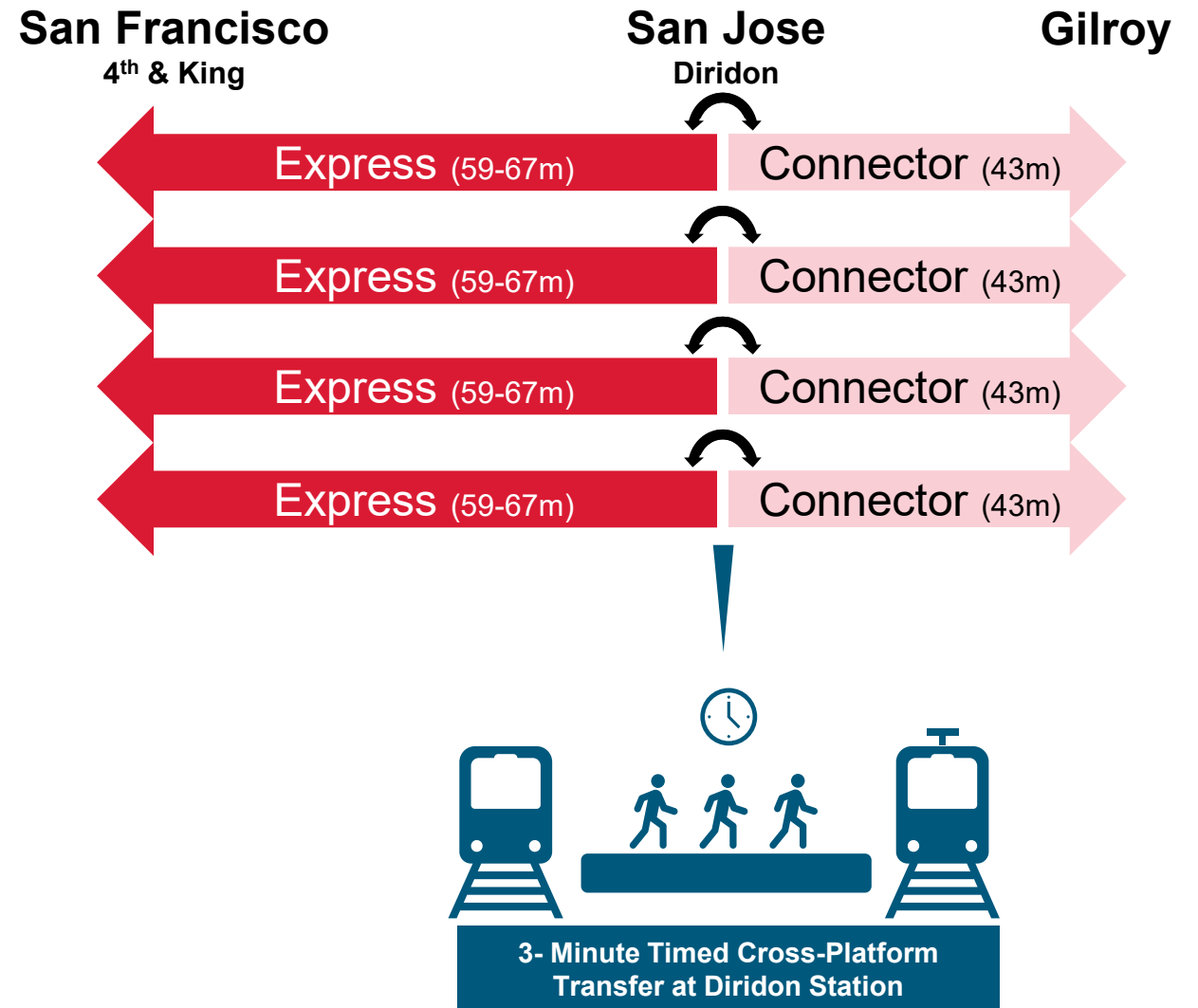
*Travel times subject to change pending further testing as new electric trains arrive and are prepared for revenue service.

Proposed Weekday Peak Period Concept for South County Connector (San Jose to Gilroy)

Service Tailored to Community Needs

- 4 daily roundtrips (schedules tailored to survey feedback from South County residents in June 2023)
- Timed cross-platform transfer to Express Trains (3-minute connection) at Diridon Station
- SF-Gilroy travel times of 102-110 minutes, a reduction of up to 28 minutes compared to existing service
- Maximizes flexibility within constraints imposed by agreement with Union Pacific

4 Daily Roundtrips with Timed Cross-Platform Connection



*Travel times subject to change pending further testing as new electric trains arrive and are prepared for revenue service.

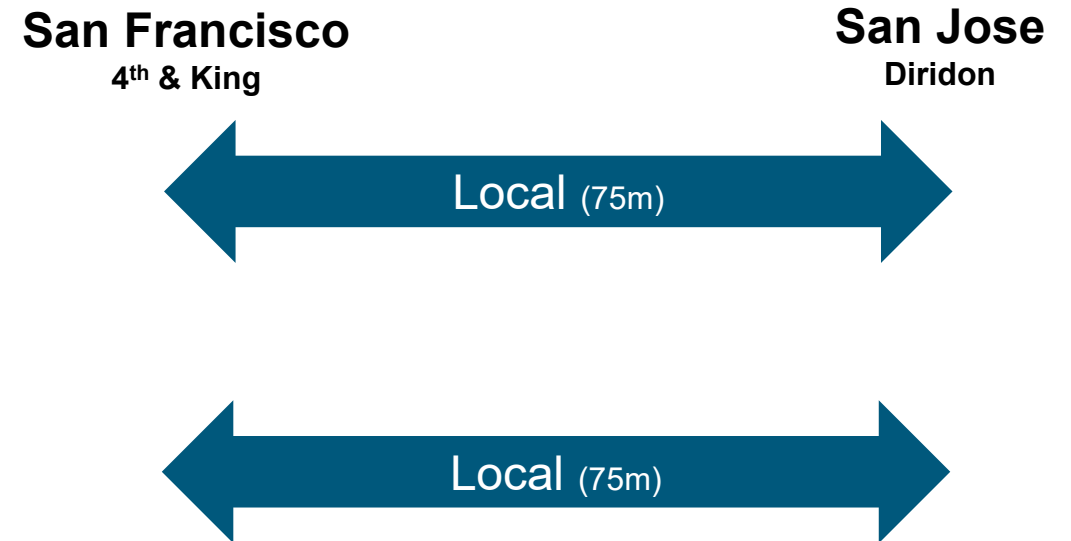
Proposed Weekday Off-Peak Service Concept

(San Francisco to San Jose)

Half-Hourly Off-Peak Service at All Stations

- All stations receive half-hourly local service throughout the day
- SF-SJ travel times of 75 minutes
- Fully electrified service – all electric trains

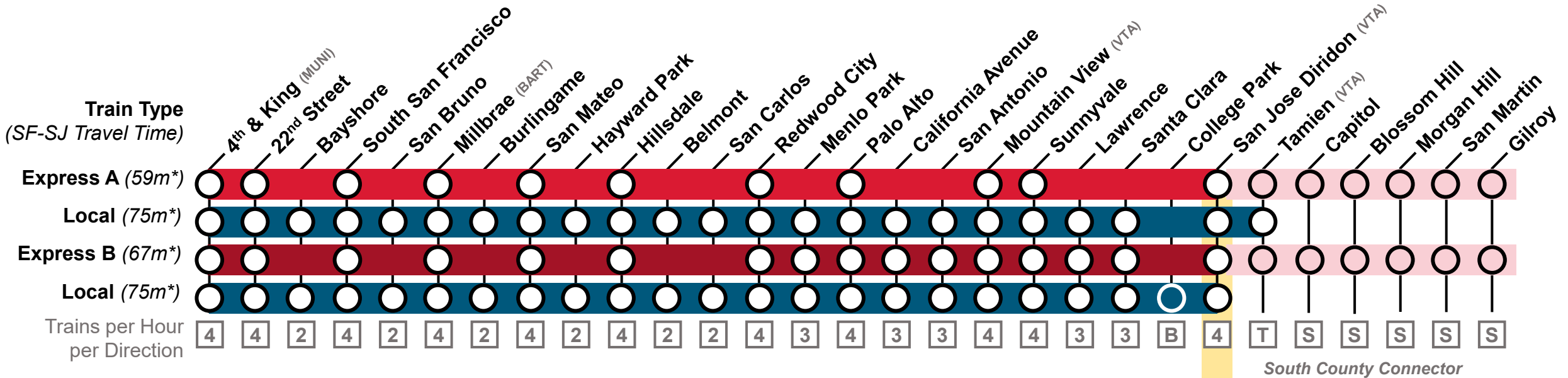
Weekday Off-Peak Hour
Approximately 5-6:30am,
9:30am-3pm, and
7pm-1am



*Travel times subject to change pending further testing as new electric trains arrive and are prepared for revenue service.

Proposed Weekday Peak Hour Station Service Levels

Peak periods vary by station, generally covering 6:30am-9:30am and 3-7pm on weekdays



Timed Cross-Platform Connection
Between South County Connector trains and Express trains in both directions

LEGEND

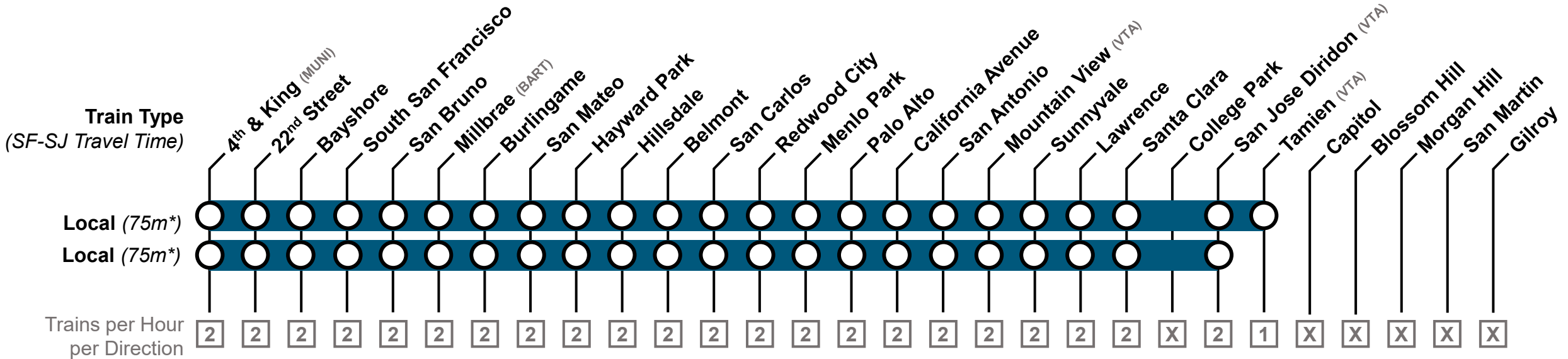
- Stop (one per hour per direction)
- # Stops per hour per direction
- T Tamien Service
2 to 3 stops per hour in peak direction, 1 stop per hour in reverse-peak direction
- B Bellarmine Service
2 stops per day per direction
- S South County Connector Service
4 stops per day per direction with 1-2 trains per hour in the peak direction



*Travel times subject to change pending further testing as new electric trains arrive and are prepared for revenue service.

Proposed Weekday Off-Peak Hour Station Service Levels

Off-peak periods generally 5am-6:30am, 9:30am-3pm, and 7pm-1am



LEGEND

- Stop (one per hour per direction)
- # Stops per hour per direction
- X No Service
Peak Period service only

*Travel times subject to change pending further testing as new electric trains arrive and are prepared for revenue service.



Faster Service



Note: Top speed remains 79 MPH but enhanced acceleration / deceleration capabilities improve overall speed

Express Service

- San Francisco to San Jose <60 mins (rush hour drive time ~90 mins)
- Increase from 7 to 11 Express stations

Local Service

- Save 25 mins from San Francisco to San Jose

Gilroy/Morgan Hill Service

- Save up to 28 mins to San Francisco

*Travel times subject to change pending further testing as new electric trains arrive and are prepared for revenue service.

More Train Stops



Note: These high-performance electric trains accelerate/decelerate faster than diesel trains, which enables Caltrain to provide more stops without additional trains.

- Show up and go, don't need a schedule all day/evening
- 20 percent more stops at individual stations
- 11 stations: 4 trains per peak hour
- 5 stations: 3 trains per peak hour
- All stations: train at least every 30 mins
- Equity benefits:
 - 27% more stops at equity priority stations
 - 23% more stops at stations serving minority riders
 - 16% more stops at stations serving low-income riders

Clean, Green, & Serene



*Zero emission corridor planned for the future
Gilroy/Morgan Hill service with Battery EMUs

- Reduces Caltrain's greenhouse gas emissions by 250K MTCO₂ per year
- Improved air quality
- Quieter trains

1st Class Experience For Everyone

- Technology: Free Wi-Fi, outlets at every seat, digital displays
- Quality: Well-designed environment, smoother ride, secure, pleasant lighting, better storage, and spacious bathroom (with a baby changing table)
- Convenient: Simplified schedule, faster, and reliable



Next Steps

2023

September

- Proposed Service Plan shared with stakeholder groups and at community events.

October

- Proposed Service Plan shared with Caltrain Board.
- More community tabling events to share Proposed Service Plan.
- Feedback used to revise service ideas for Final Service Plan.

November – December

- Final Service Plan shared with the public and Caltrain Board.

2024

Spring

- Corridor fully electrified, electric train testing, FY25 budget process, finalizing electrified service schedule.

Summer

- Service plan testing, more electric trains arrive.

Fall

- Electrified service open for riders, using new Final Service Plan!

FOR MORE INFORMATION

WWW.CALTRAIN.COM



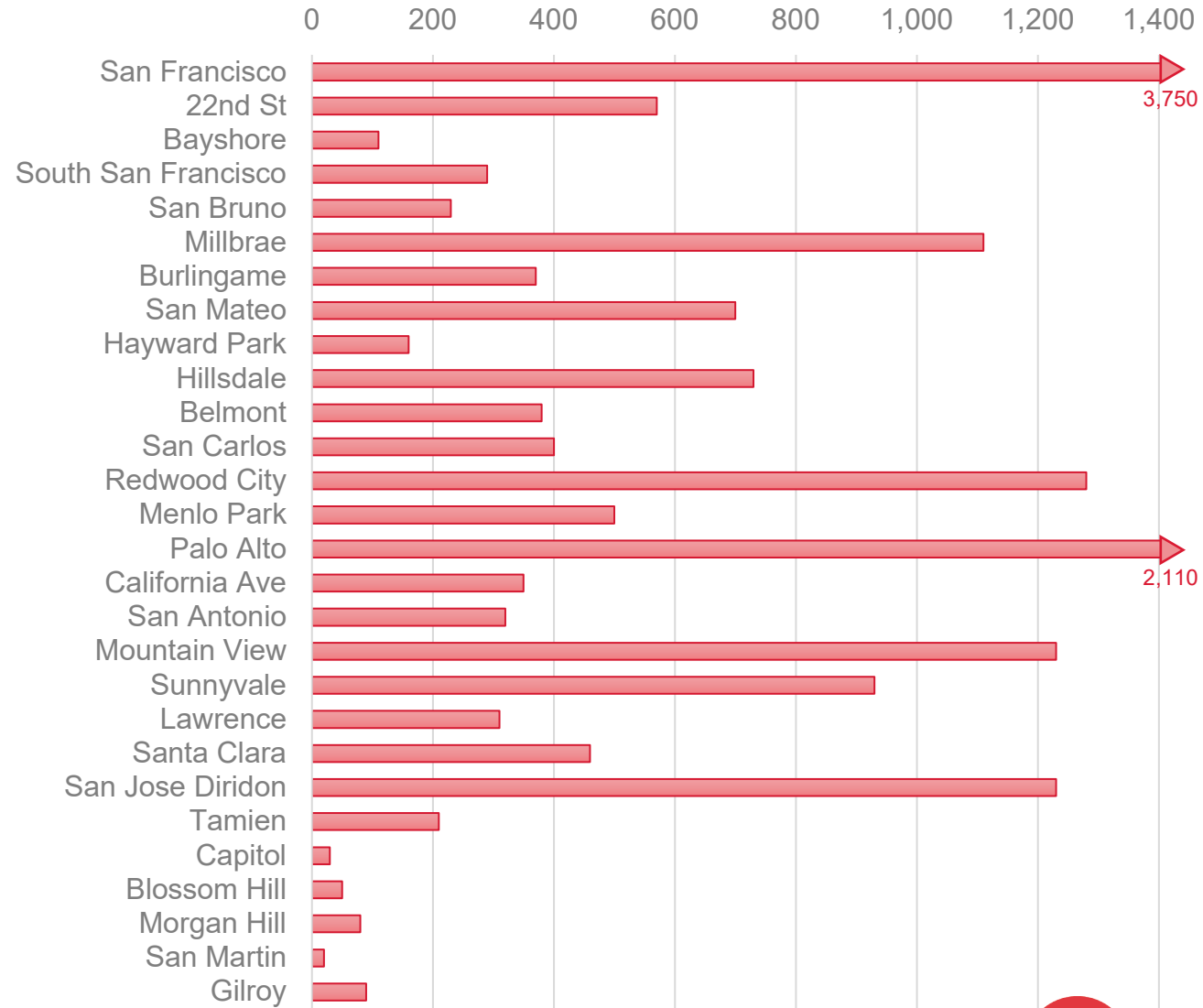
Appendix

Ridership Analysis

Caltrain's current ridership remains focused around key stations:

- San Francisco
- Millbrae
- Redwood City
- Palo Alto
- Mountain View
- Sunnyvale
- San Jose Diridon

Average Weekday Ridership by Station (2023)



Ridership estimates based on Clipper data and limited conductor counts Jan-Mar 2023

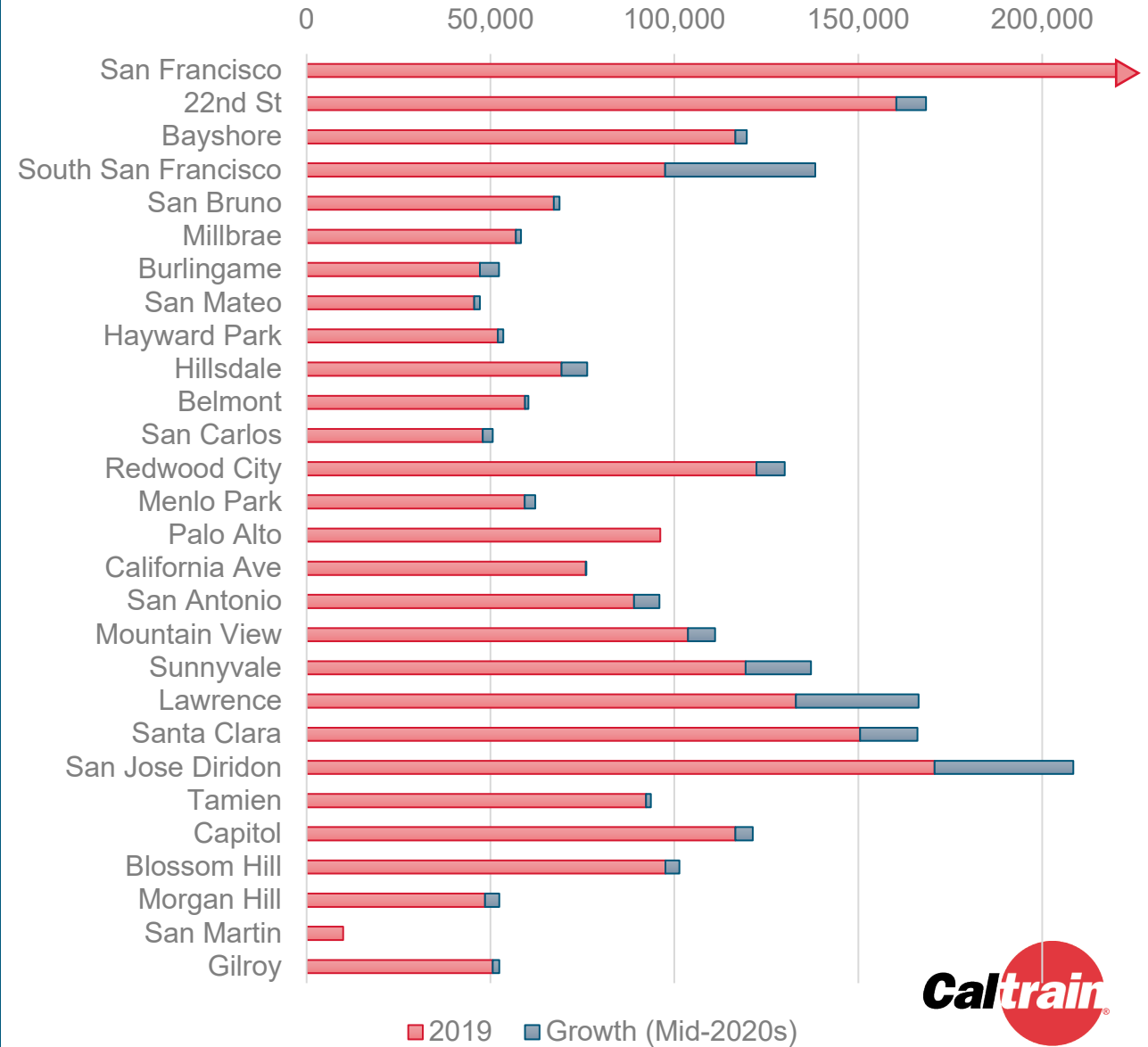
Land Use Analysis

Proximity to population and jobs is an indicator of potential latent demand for Caltrain.

Some Caltrain station areas are experiencing substantial growth, particularly:

- South San Francisco
- Sunnyvale
- Lawrence
- Santa Clara
- San Jose Diridon

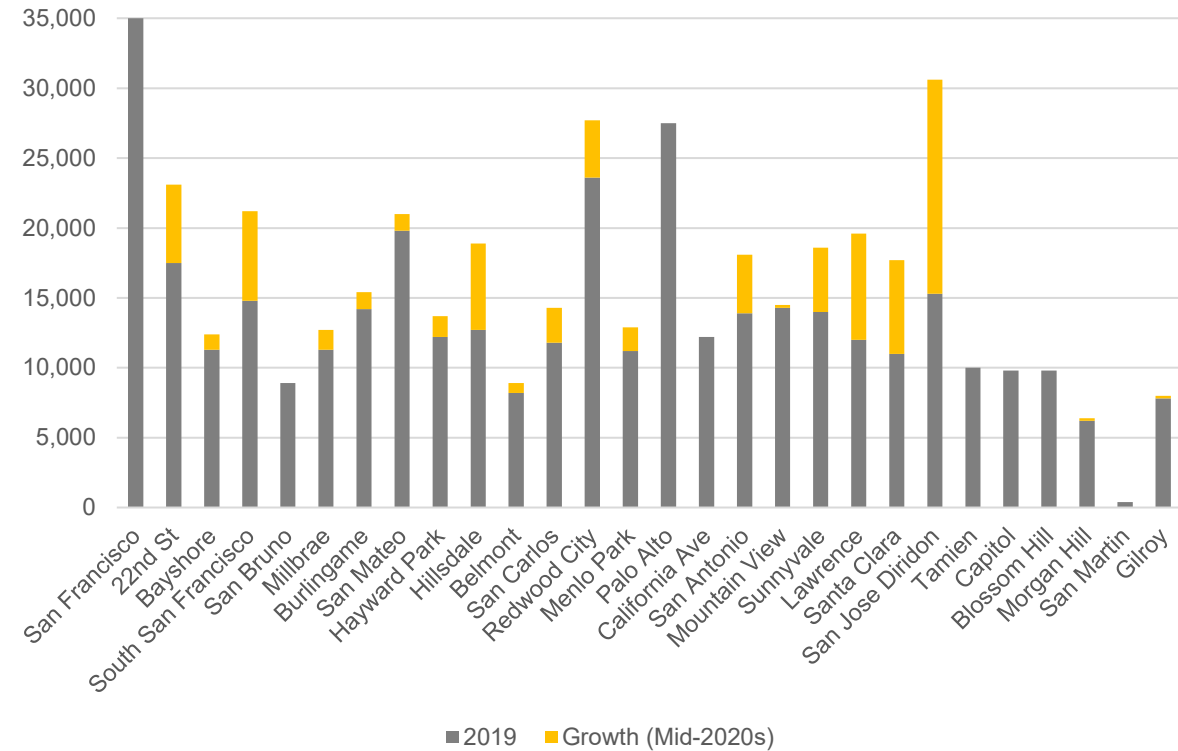
Population and Jobs within 2 Miles of Caltrain Stations: Mid-2020s Estimate



Growth based on inventory of projects under construction or completed since 2019

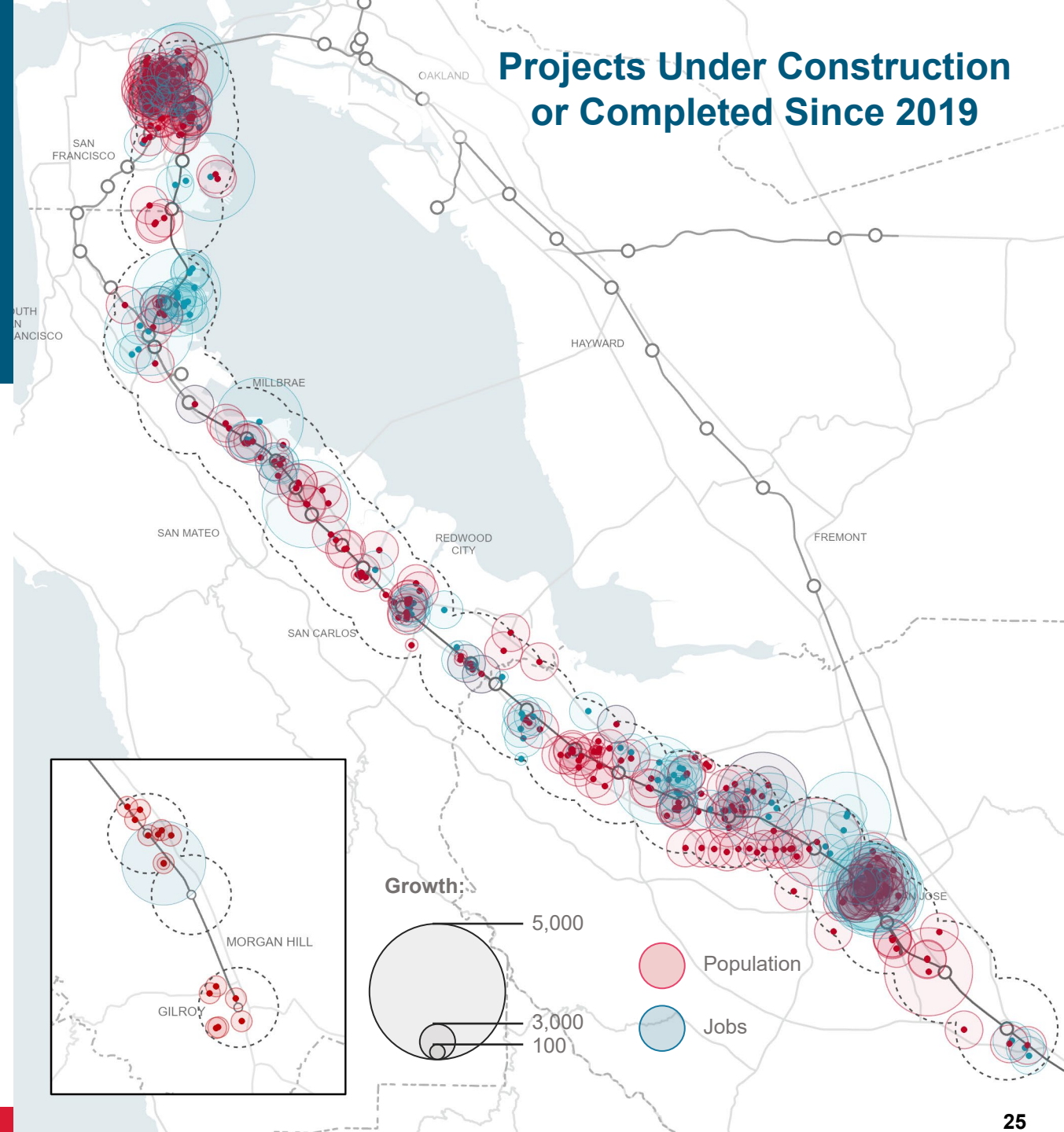
Corridor Development Inventory

Population and Jobs within ½ Mile of Caltrain Stations:
Mid-2020s Estimate



Growth based on inventory of projects under construction or completed since 2019

Projects Under Construction or Completed Since 2019

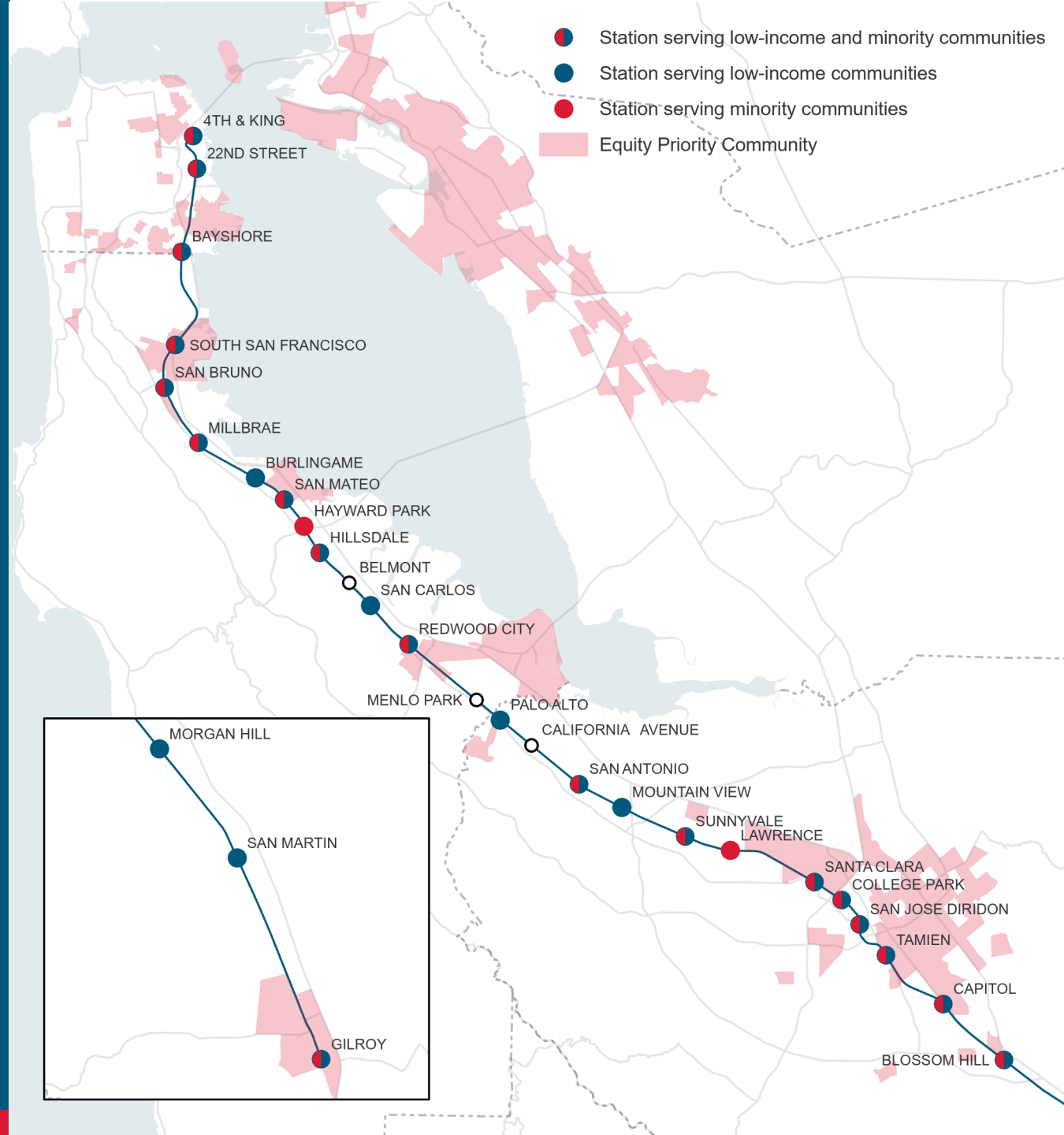


Equity Need

The Metropolitan Transportation Commission designates Equity Priority Communities across the region. Caltrain also identifies specific stations that serve minority or low-income riders for Title VI purposes.

Caltrain has historically underserved the following stations that serve equity priority populations:

- Bayshore
- South San Francisco
- San Bruno
- San Mateo
- Menlo Park
- Sunnyvale
- Lawrence
- Santa Clara
- Tamien
- Capitol
- Blossom Hill
- Gilroy



Transit Connections

Most Caltrain stations include connections to other transit operators that serve communities along the Caltrain corridor, including but not limited to:

- ACE
- BART
- Capitol Corridor
- Commute.org
- SamTrans
- SFMTA
- VTA

Caltrain Station	Connecting Transit Operator(s)	Other Transit Operators' Peak Hour Trips per Direction
San Francisco	SFMTA	28
22nd Street	SFMTA	7
Bayshore	Commute.org	3
South San Francisco	SamTrans, Commute.org, City Shuttle	17
San Bruno	SamTrans	2
Millbrae	BART, SamTrans, Commute.org	17
Burlingame	SamTrans	2
San Mateo	SamTrans	4
Hayward Park	Commute.org	1
Hillsdale	SamTrans, Commute.org	13
Belmont	SamTrans	6
San Carlos	SamTrans	6
Redwood City	SamTrans, Commute.org	22
Menlo Park	SamTrans, City Shuttle	10
Palo Alto	VTA, SamTrans, Stanford, Dumbarton	68
California Ave	VTA	1
San Antonio	VTA	2
Mountain View	VTA, MVGO Shuttle	36
Sunnyvale	VTA	13
Lawrence	-	-
Santa Clara	VTA, ACE, Capitol Corridor	24
San Jose Diridon	VTA, ACE, Capitol Corridor, Highway 17 Express	27
Tamien	VTA	9
Capitol	VTA	7
Blossom Hill	VTA	2
Morgan Hill	VTA	7
San Martin	VTA	6
Gilroy	VTA, County Express	11

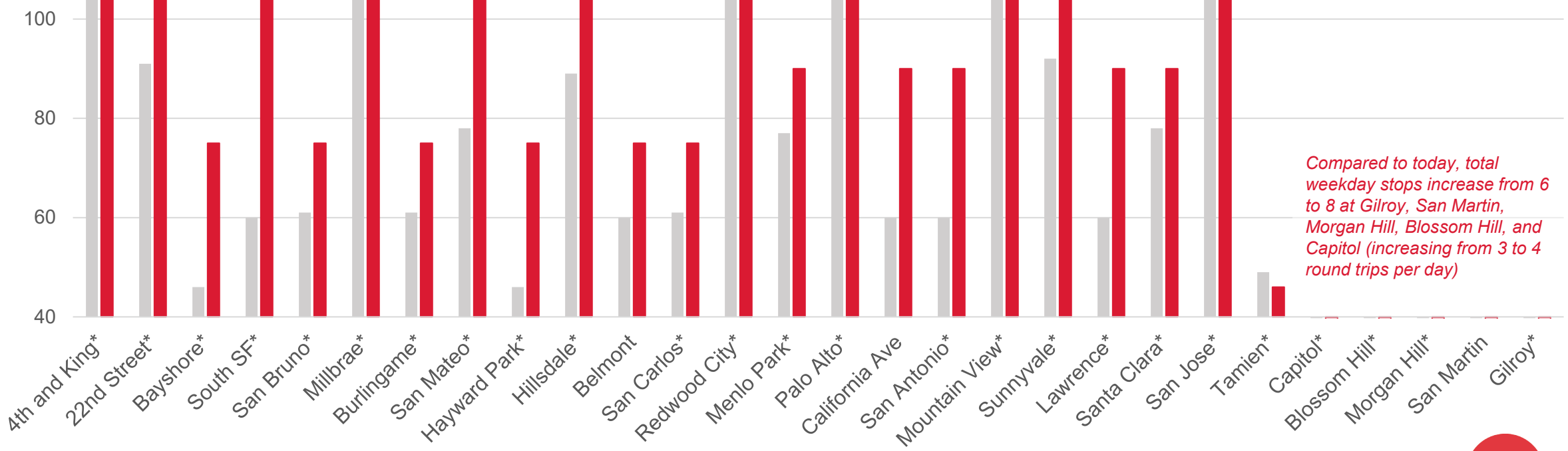
Gray = Caltrain stations with greater than 10 peak hour trips from connecting transit operators

Weekday Stop Frequency by Station

Total weekday stops increase by 20% corridor-wide

Weekday Stops per Station (Draft Service Plan vs. Existing Service Today)

Stops per Weekday



Compared to today, total weekday stops increase from 6 to 8 at Gilroy, San Martin, Morgan Hill, Blossom Hill, and Capitol (increasing from 3 to 4 round trips per day)

* Station serving minority, low income, or Equity Priority Community

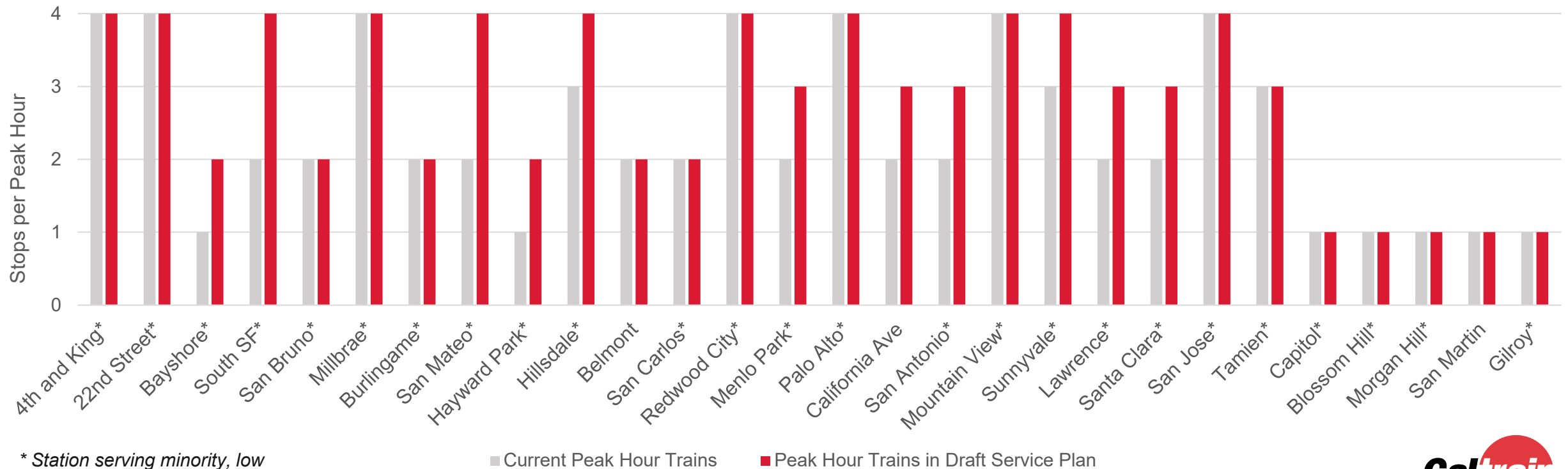
■ Current Trains per Day ■ Draft Service Plan Trains per Day



Weekday Peak Hour Stop Frequency

Total peak hour stops increase by 20% corridor-wide

Weekday Peak Hour Stops per Station (Draft Service Plan vs. Existing Service Today)



* Station serving minority, low income, or Equity Priority Community

■ Current Peak Hour Trains ■ Peak Hour Trains in Draft Service Plan

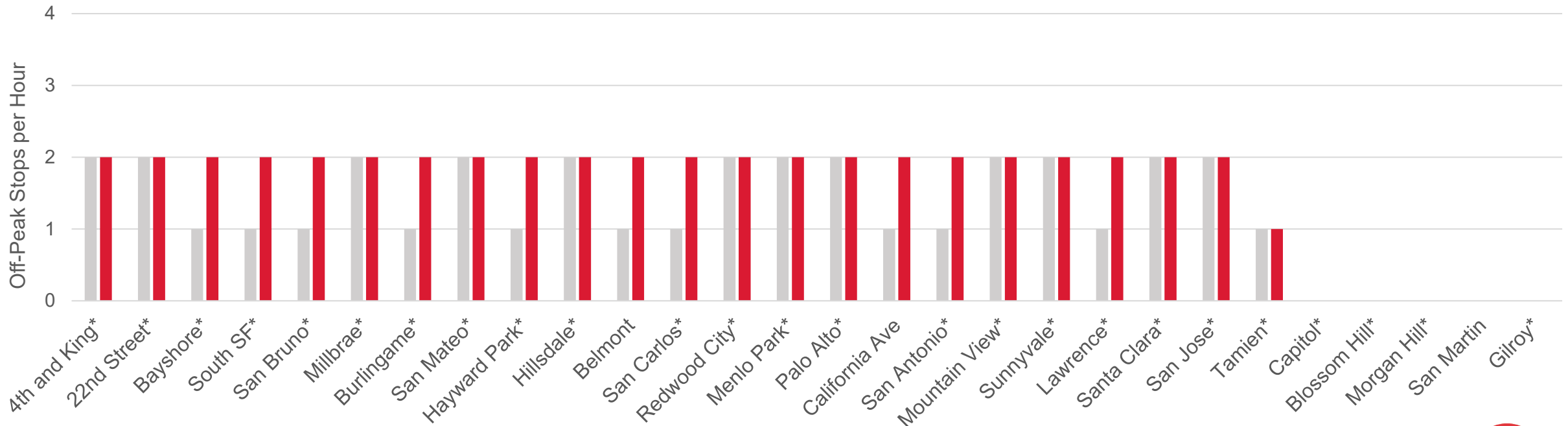


*22nd St: 4 TPH peak direction, 2 TPH reverse-peak direction. Tamien: 2-3 TPH peak direction, 1 TPH reverse-peak direction.

Off-Peak Stop Frequency

Total off-peak stops per hour increase by 30% corridor-wide

Draft Service Plan Off Peak Trains per Hour



* Station serving minority, low income, or Equity Priority Community

■ Current Off-Peak Trains per Hour

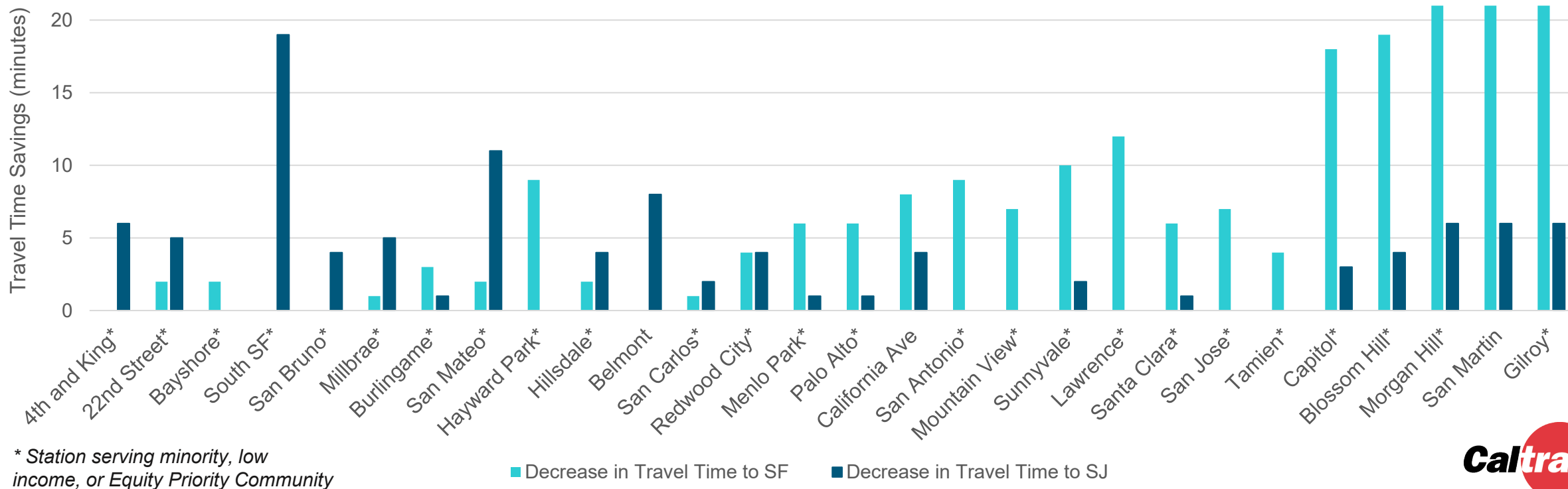
■ Off-Peak Trains per Hour in Draft Service Plan



Travel Time Savings to SF & SJ

Most stations will see 3 to 5 minutes of savings to San Francisco or San Jose (comparing the fastest trains)

Reduction in Travel Time for Fastest Trip (Draft Service Plan)



* Station serving minority, low income, or Equity Priority Community



Southern Santa Clara County Corridor Survey: **Priorities**

- Online survey for South County was conducted in June 2023 and targeted residents in those communities; 1,552 responses received
- Respondents ranked frequency, later morning service, and shorter travel time as top priorities
- 85% of passengers traveled within Santa Clara County or southern San Mateo County (<10% traveled to San Francisco)*

Service Improvement Preferences in Ranking Order

	Frequency	Earlier AM service	Later AM service	Earlier PM service	Later PM service	Shorter trip time	One seat ride
Capitol	1	4	3	6	7	2	5
Blossom Hill	1	5	2	4	7	3	6
Morgan Hill	1	5	2	6	4	3	7
San Martin	1	5	2	4	6	3	7
Gilroy	1	4	2	5	6	3	7

Ranking Order: 1=most requested improvement; 7=least requested improvement



*Data from 2022 Triennial Survey