LINK21

CONNECT NORTHERN CALIFORNIA

LINK21 IN THE MEGAREGION

DRAFT

May 2024

BART

CAPITOL CORRIDOR

INTENTIONALLY LEFT BLANK

Table of Contents

1. Introduction 1-1
2. A Vision for Megaregional Service 2-1
3. Connecting Markets 3-1
4. Constraints Limiting Megaregional Passenger Rail 4-1
5. Relationships to Other Investments 5-1
6. Phasing of Link21 and Megaregion Projects 6-1

Figures

Figure 2-1. Megaregional Passenger Rail Service Vision and Planned Improvements 2-3
Figure 3-1. Transbay Unmet Rail Potential 3-2
Figure 4-1. Critical Constraints Across the Existing Megaregion Rail Network 4-3
Figure 5-1. Link21 within the Context of Key Rail Investments 5-3

Tables

Table 4-1. Megaregional Passenger Rail Constraints 4-1

INTENTIONALLY LEFT BLANK

Acronyms and Abbreviations

ACRONYM/ABBREVIATION	DEFINITION
BART	San Francisco Bay Area Rapid Transit District
CCJPA	Capitol Corridor Joint Powers Authority
SFO	San Francisco International Airport
SJC	San José Mineta International Airport
SMF	Sacramento International Airport
OAK	Oakland International Airport

INTENTIONALLY LEFT BLANK

1. Introduction

The Link21 Program developed concepts for a new San Francisco Bay rail crossing and associated improvements within the context of a bigger vision for a better-connected future megaregional rail system. In fact, the Link21 Program was named to emphasize its megaregional goal of improving and enhancing train travel, and thereby benefiting people in the 21 counties that make up the Northern California Megaregion.

Early work on the program built on work done by other agencies across the Megaregion, including, but not limited to the California State Rail Plan (Caltrans), Plan Bay Area (Metropolitan Transportation Commission), Capitol Corridor Vision Plan (Capitol Corridor Joint Powers Authority), Caltrain's Long Term Service Vision (Caltrain), and Connect SF (a San Francisco multi-agency, long-range transit visioning process). Included in several of these plans and studies is the possibility of a Regional Rail/standard gauge crossing as a part of an overall future vision of rail in the Megaregion.

This report provides more details on how a Link21 Regional Rail/standard gauge crossing benefits the Megaregion. It includes a description of a megaregional service vision, and the relationships between Link21, the travel market, existing challenges, and other megaregional rail investments.

INTENTIONALLY LEFT BLANK

2. A Vision for Megaregional Service

A new transbay rail crossing is a critical component to enable the State Rail Plan service and amplify the benefits of other planned investments.

Several passenger rail improvement projects and future service priorities have been identified in various Regional Transportation Plans, rail service operator plans, and the California State Rail Plan 2023 (State Rail Plan). Taken together, they constitute an ambitious vision for an integrated statewide passenger rail and public transit network. The State Rail Plan calls for "an integrated statewide rail network that supports economic growth, improves environmental outcomes, and increases equity by providing the seamless mobility Californians need and shifts travel demand to zero-emission, high-capacity transport that supports efficient, sustainable land use."

Implementing this vision for the Northern California Megaregion (Megaregion) will require the completion of several incremental and complementary improvement projects. A new transbay rail crossing was identified as a critical component to enable the State Rail Plan and would connect to other planned and future investments. The State Rail Plan includes improved connectivity to San Francisco and Oakland, referencing pending recommendations from the Link21 Program. This section provides a summary of the megaregional service vision with Link21 and the supporting infrastructure projects that support that vision.

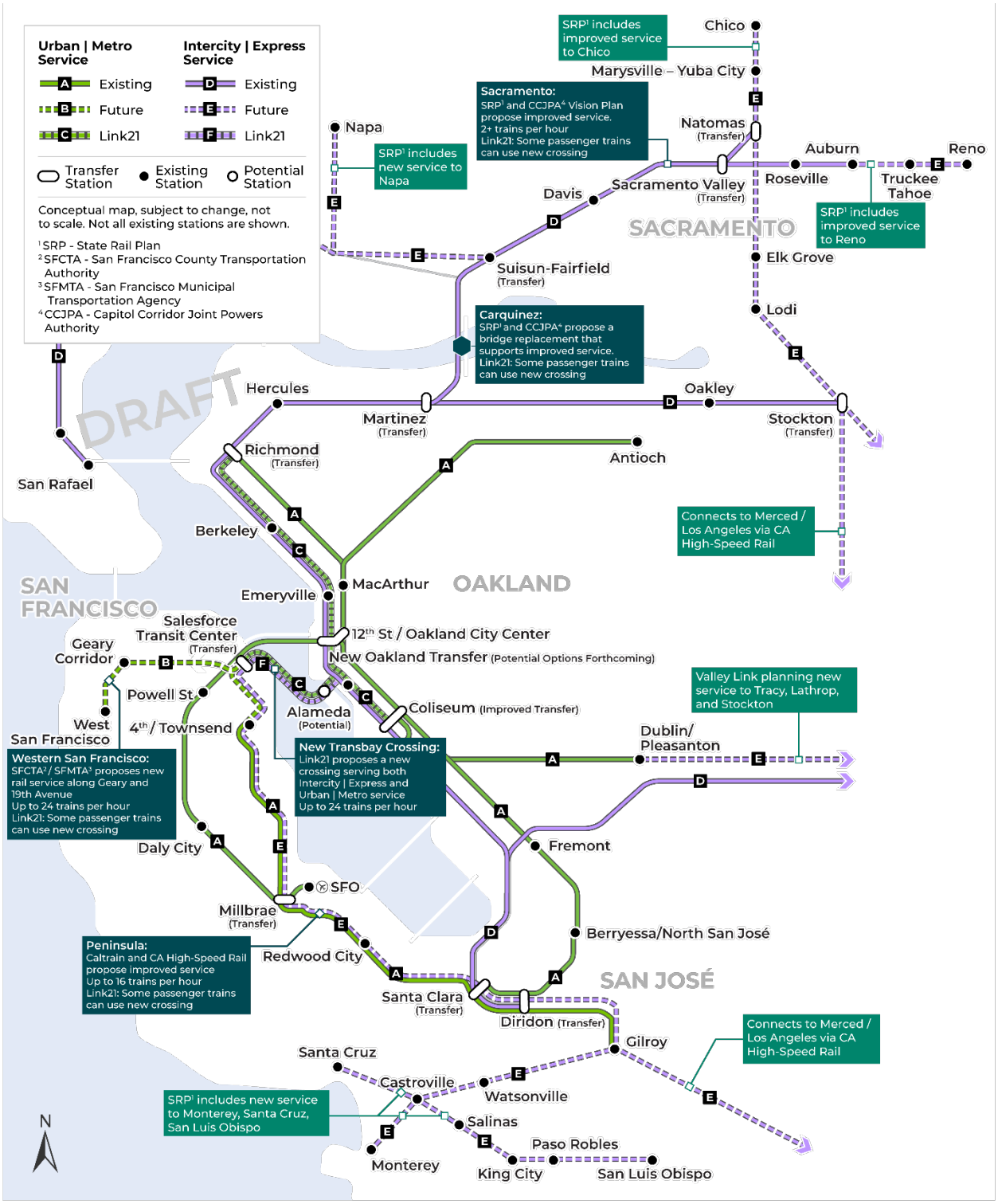
The State Rail Plan, together with the State's partner agencies, envisions several service improvements that are enabled or connected to a new transbay Regional Rail crossing. **Figure 2-1** illustrates the passenger train service that could be achieved with Link21 providing a key component of the vision, including:

- Connecting the Sacramento to San Francisco Bay Area Corridor to the San Francisco Peninsula Corridor, enabling train service between Sacramento and San Jose through San Francisco. This service is described within the State Rail Plan.
- Faster, more frequent, and more reliable intercity train service, including one seat rides, in the Sacramento and the Interstate 80 (I-80) corridor to downtown San Francisco, operating at peak frequencies of two or more trains per hour. Frequency improvements are described within the State Rail Plan, CCJPA's Vision Plan, and CCJPA's Carquinez Strait Crossing Study.
- Ability to provide intercity rail service between Stockton and downtown San Francisco and the Peninsula with a one-seat ride.
- Connecting western San Francisco to a new transbay crossing, which enables service to the Megaregion's rail network. SFCTA and SFMTA are pursuing work to plan for this rail project.

- Enabling intercity train services with new or improved rail access to a Link21 Regional Rail transbay crossing, including to Chico, Marysville/Yuba City, Reno, Napa, Sonoma, Watsonville, Santa Cruz, Monterey, Salinas, and San Luis Obispo. This service is described within the State Rail Plan.
- Improved train links between the Megaregion and Sacramento International Airport (SMF), San Francisco International Airport (SFO), Oakland International Airport (OAK), and San José Mineta International Airport (SJC).
- Improved transfers between California High-Speed Rail, Caltrain, Capitol Corridor, San Joaquins, and BART.

Additionally, Link21 provides the opportunity for increasing transbay passenger rail capacity and extending high frequency Urban | Metro train service from the Peninsula to the East Bay, including Oakland and Richmond.

Figure 2-1. Megaregional Passenger Rail Service Vision and Planned Improvements



INTENTIONALLY LEFT BLANK

3. Connecting Markets

Megaregional passenger train markets are growing, and there is a large amount of transbay demand that is not currently served by train.

Market studies have explored travel demand around the Megaregion in relation to a new San Francisco transbay crossing, pointing to the critical role that the crossing can play as part of the megaregional rail network. A study by the Bay Area Council considered demographic, location, and commute changes across the counties of Northern California, finding current and potential future trends that increase the reliance on connectivity across the bay[1]. And the Link21 program completed its own extensive analysis of "unmet transbay rail" demand, which identified how individual markets might utilize a new transbay passenger rail crossing between Oakland and San Francisco[2].

The Bay Area Council study found that:

- Population growth has blurred the boundaries between the state's metropolitan areas in Northern California.
- In 2018, 187,000 people who live outside the nine-county San Francisco Bay Area commuted daily to the nine counties for work. Most of these megaregional commuters live in San Joaquin County (37%) and Sacramento County (14%). Of the total, 22,115 are commuting to San Francisco and San Mateo counties, or 12% of the total in-commute.
- Within the Megaregion, the fastest growing home and work location pair between 2010 and 2018 (among pairs that have at least 1,000 commuters traveling between the two locations in both 2010 and 2018) originated from San Joaquin County and ended in San Francisco (up 243%), growing in number by 2,825.
- The transbay corridor, connecting San Francisco to Oakland, is a critical artery for travel. Further, this corridor has a need for added travel capacity and resilience against system delays.
- A new transbay rail crossing, serving multiple markets and connecting into the regional rail system, would have immense impacts within the transbay corridor and across the Northern California Megaregion including:
  - Reduced travel times with faster rail service and fewer transfers required.
  - Economic benefits from easier commutes, increased access to jobs, and expanded choices for locating homes and businesses.
  - Environmental benefits including reduced greenhouse gas (GHG) emissions.

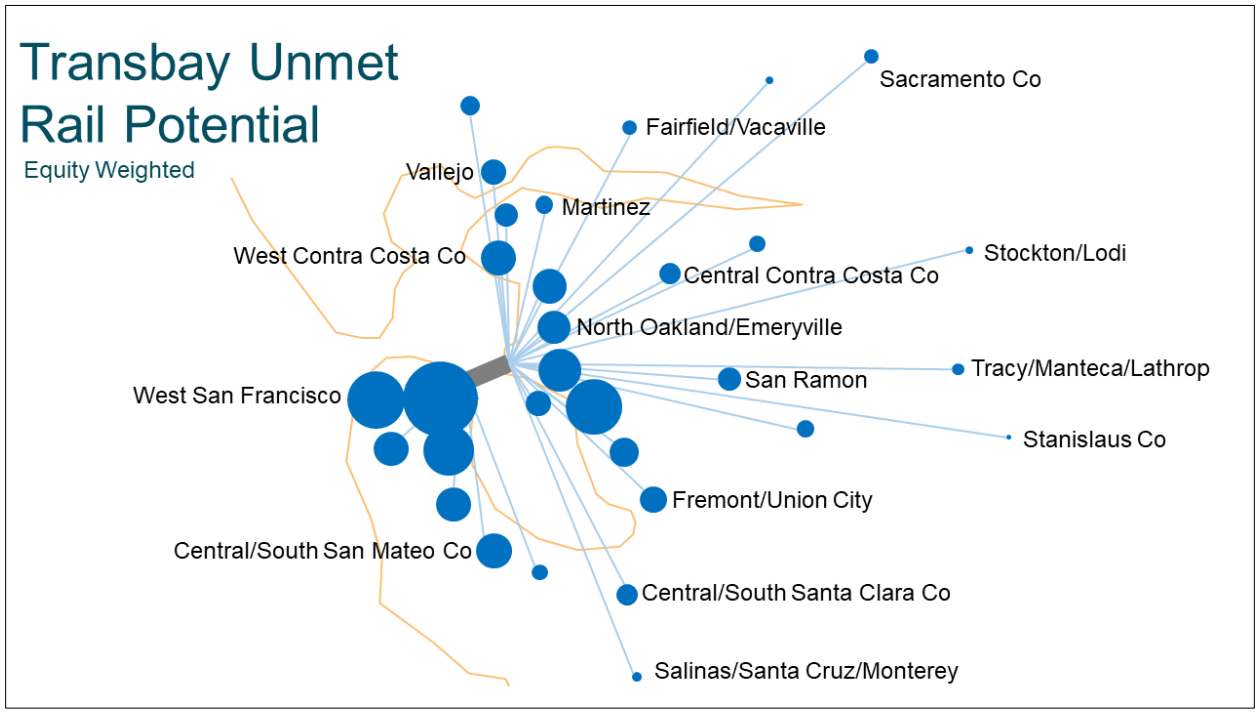
[1] BAC 2021, Megaregional Case for a Transbay Rail Crossing http://www.bayareaeconomy.org/wp-content/uploads/2021/01/FINAL_NTRCmegaregion_1.27.2021a.pdf

[2] https://link21program.org/en/program/market-analysis

The Link21 Market Analysis found multiple specific markets around the Megaregion with untapped demand for transbay travel. **Figure 3-1** provides an overview of the relative amount of unmet transbay demand by geographic market. Findings from the study include the following:

- The largest single market showing potential unmet demand for transbay train travel is San Francisco.
- There is also significant potential unmet demand for transbay train travel along the Richmond to Oakland corridor, the inner East Bay, and the northern portions of the Peninsula corridor.

Figure 3-1. Transbay Unmet Rail Potential



Source: Link21 Market Analysis, October 2022

While these findings do not imply that new and improved rail is appropriate for all of the markets, this information, alongside additional demand analyses, is being used to inform what project would best meet the goals and objectives of Link21.[3]

[3] The Market Analysis was based on travel patterns prior to the COVID-19 pandemic. Future changes in demand, including potential long-term, post-pandemic changes in travel demand are being revisited as the Link21 Program is being developed.

4. Constraints Limiting Megaregional Passenger Rail

Today's rail infrastructure, including the lack of a key link connecting Oakland and San Francisco, constrains the ability to access new markets and provide better service.

Throughout the broader Megaregion, insufficient rail access, and unreliable and unaffordable service, leaves residents with inadequate options beyond driving with many struggling to access jobs and other key destinations and opportunities by rail (Link21 Strategic Case Framework's Problem Statement[4]). Passenger train service for intercity trips is constrained by infrastructure or service limitations. **Table 4-1** and **Figure 4-1** summarize these challenges.

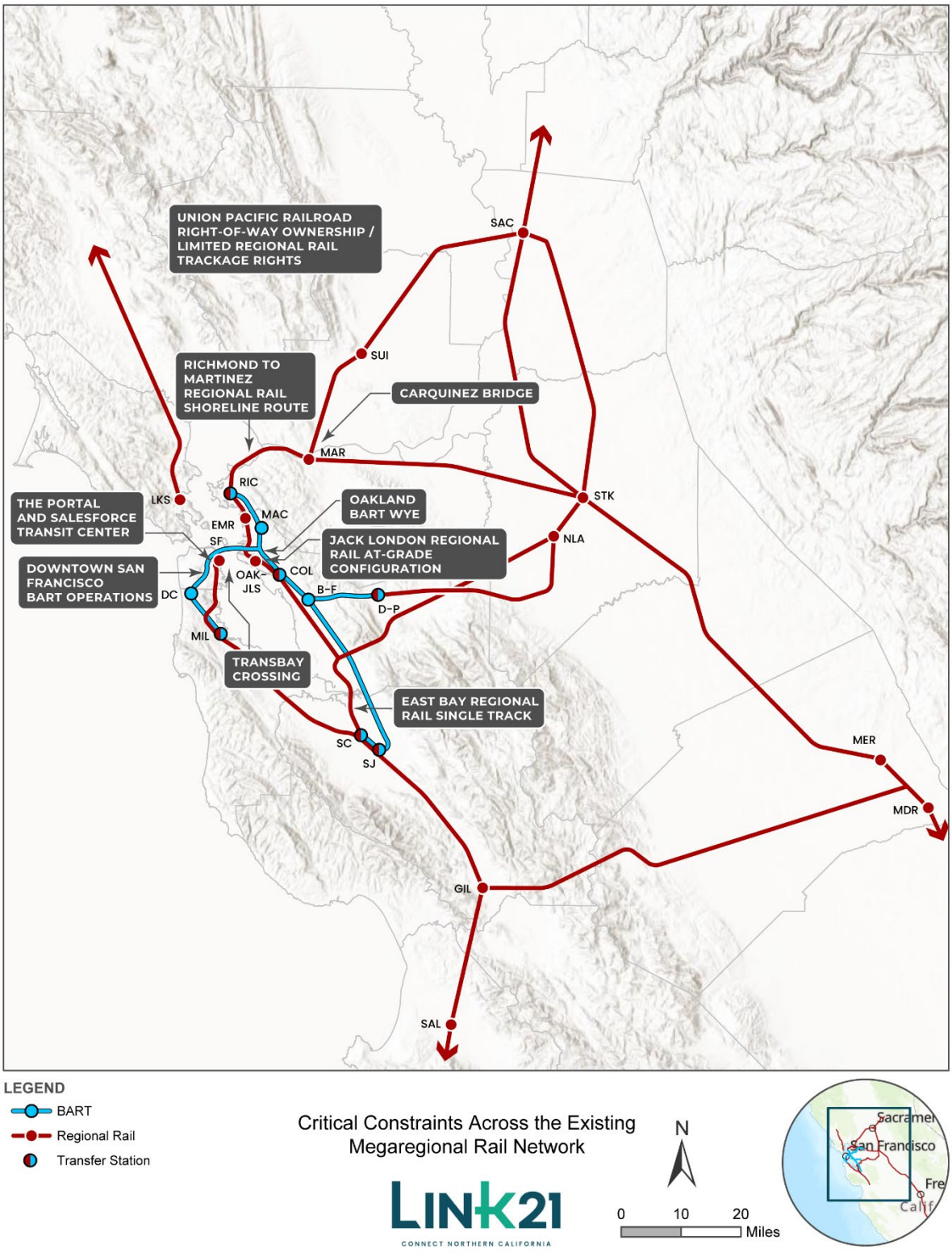
Table 4-1. Megaregional Passenger Rail Constraints

ISSUE	SUMMARY
Passenger Train Connections	There are large gaps in the Regional Rail network, including no crossing between San Francisco and the East Bay. This gap affects megaregional travel, requiring transfers to other services to complete key trips, such as between San Francisco and Sacramento or Stockton. It also affects travel in the urban core, preventing a critical train service, Caltrain (San Jose up the San Francisco Peninsula), from across the bay and requiring transfers to other transit modes. Further, in multiple places, the current system's station and schedule design do not make transfers easy for travelers, adding waiting time and inconvenience (especially for those traveling with baggage).
Frequency	Intercity | Express train corridors in Northern California have relatively infrequent service due to infrastructure challenges. These include limited trackage rights on privately-owned freight right-of-way, at-grade operation (e.g., Caltrain, Jack London Square), the stub-end terminus of Caltrain rail on the San Francisco Peninsula, limited trackage (e.g., single track segments, lack of passing tracks), and the Benecia-Martinez lift bridge. The resulting low train frequency, when coupled with the lack of connectivity discussed above, can make train travel unattractive. The Transbay corridor connecting the two major urban centers of San Francisco and Oakland currently provides high-frequency service via BART, but future demand will exceed the existing BART crossing's ability to match it with increased frequency, even with the additional planned improvements by BART's Core Capacity project.

[4] Link21 Strategic Case Framework Draft Final, April 2022 https://link21program.org/en/media/205/download?inline

ISSUE	SUMMARY
Transbay Rail Crowding	While BART's Core Capacity project will increase capacity in the existing BART transbay crossing, future demand is expected to exceed available capacity. The resulting crowding on trains and inside stations will make travel by train less attractive.
Travel Time	Long travel times result from a combination of station access, wait times (including for transfers), service reliability, and train speed. Train speed can be limited by curves, such as on the route between Richmond and Martinez, elevation changes, and service patterns. When service frequencies are low or transfers are not timed, these add to the perceived and actual travel time and can diminish the train passenger experience.
Service Hours	Limited trackage rights on the freight rail network define when passenger trains can operate. Service hours that are limited to the commute period or midday period pose an impediment to using rail, particularly when people want to access jobs, classes, appointments, or activities that require early-morning, night, and/or weekend travel. These types of trips are not currently well accommodated by most regional and Intercity | Express rail services. Further, some services even lack sufficiently frequent service during the midday to meet the needs of some travelers. In the transbay corridor, trains do not operate late night or early in the morning. The nightly pause enables BART to safely perform critical maintenance when trains are not running. With only single crossing, transbay passenger trains cannot be scheduled during these times.
Reliability	The megaregional passenger train network is vulnerable to systemwide delays. A single delay at one point in the network can quickly cause systemwide delays that can impact trips well beyond the initial point of delay. Infrastructure challenges such as at-grade road crossings, unauthorized intrusion to right-of-way, and freight priority can cause reliability issues. Further, trains between Sacramento and Bay Area can incur significant, unscheduled delays when the Benecia-Martinez bridge is lifted to allow for ship movements in the Carquinez Strait. The waterfront route between Richmond and Martinez is another challenge, as it is vulnerable to annual flooding and sea level rise. In the transbay corridor, there are no passenger train alternatives when there are disruptions to service in the existing BART tube. This can significantly impact travel throughout the Bay Area, including several freeways and bridges.

Figure 4-1. Critical Constraints Across the Existing Megaregion Rail Network



INTENTIONALLY LEFT BLANK

5. Relationships to Other Investments

A new transbay rail crossing amplifies the benefits of other planned investments.

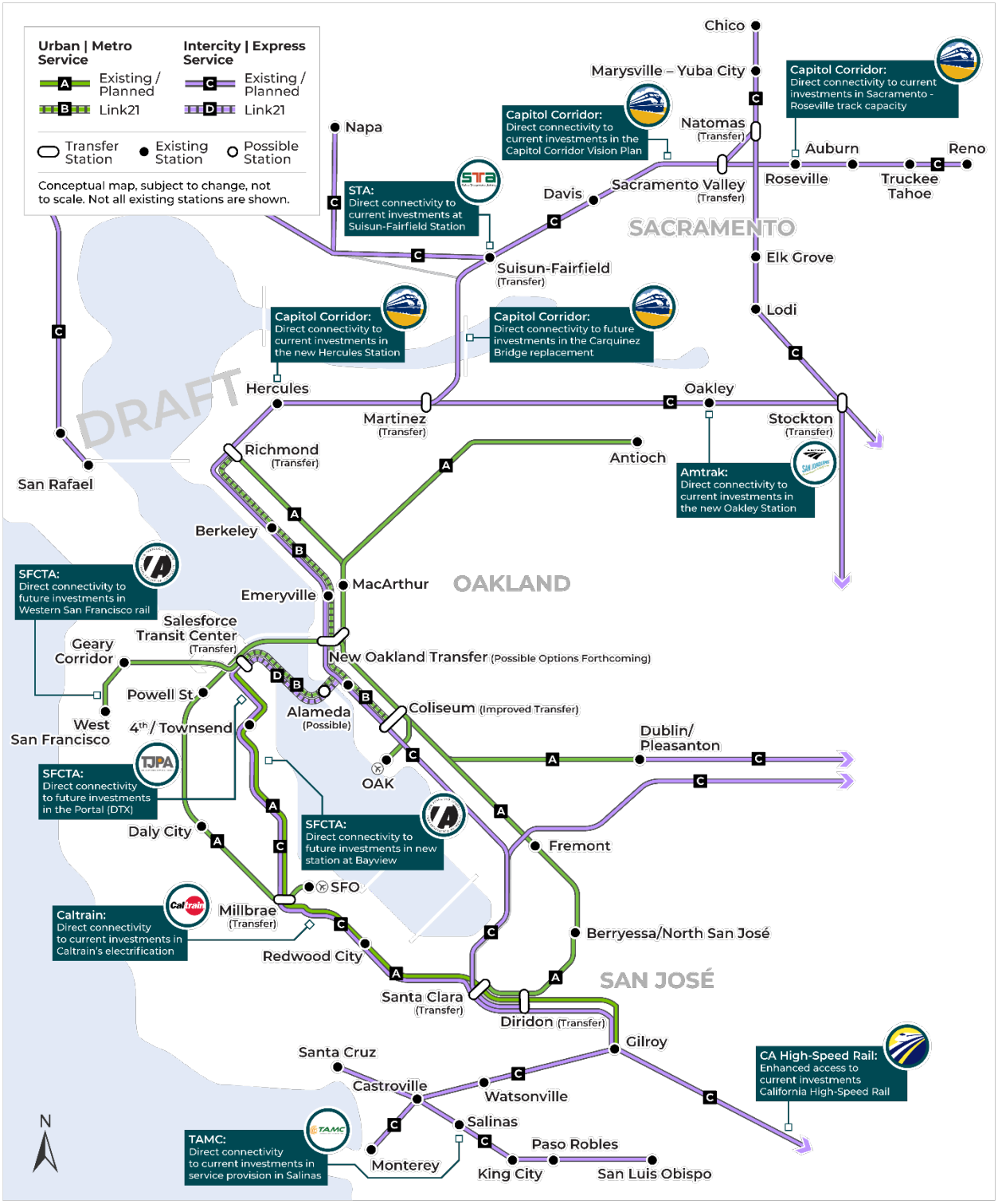
Link21's crossing project amplifies the benefits generated by other rail investments in the Megaregion, including projects adopted in regional transportation plans, identified in the State Rail Plan, and planned by individual rail operators. Improvements to rail travel provided across the Megaregion by other rail investments will not just benefit travel in those locations; because services from other parts of the network will be able to use Link21's new transbay crossing, travelers across the network will benefit. When implemented, the projects together will provide benefits greater than the individual investments on their own.

Some examples of how Link21 amplifies the benefits of other projects include (see **Figure 5-1**):

- The Portal (SF Downtown Extension Project). A new transbay rail crossing would amplify the benefits of current investments including the Salesforce Transit Center and The Portal. Extending rail east would transform Salesforce Transit Center from a stub end to a through-track station, increasing the use of the station by enabling more trains with more destinations at this station.
- Peninsula Rail. The implementation of Caltrain's electrification project and long-term vision will result in increased speed, reliability and frequency. Link21 would connect these services to markets in Oakland and the East Bay and to megaregional markets such as Sacramento and Stockton, providing Peninsula communities with significantly expanded rail access to multiple destinations across the Megaregion.
- Station Improvements. Link21 would also provide increased use of other stations in the Megaregion with recent or planned improvements, including San José Diridon Station, Bayview in San Francisco, Hercules, Oakley, Sacramento Valley Station, and Suisun-Fairfield Station.
- Capitol Corridor. The implementation of the Capitol Corridor Vision Plan, including the replacement of the Carquinez rail bridge, will improve service and reliability. Link21 would further improve service and reliability in the Corridor as well as provide communities with direct access to San Francisco, the Peninsula and SFO.
- Western San Francisco Rail. San Francisco agencies are proposing new rail service along Geary Boulevard and 19th Avenue. Link21 could provide direct connections to western San Francisco and provide communities with expanded access to destinations in the East Bay and the Megaregion while also improving access for the Megaregion's residents to San Francisco's centers for employment, healthcare, and education.

- Other Future Rail Services. Several additional service improvements are planned in the Megaregion. Train services using the new Link21 transbay crossing would provide connections to these passenger rail services, providing new or improved rail access to Chico, Marysville/Yuba City, Reno, Napa, Sonoma, Watsonville, Santa Cruz, Monterey, Salinas, and San Luis Obispo.

Figure 5-1. Link21 within the Context of Key Rail Investments



6. Phasing of Link21 and Megaregion Projects

As Link21 is further refined, studies will be undertaken to better understand the relationship between projects to identify opportunities to maximize benefits. This will include working with other project sponsors to consider project phasing and sequencing.

INTENTIONALLY LEFT BLANK