

# Executive Summary

The Bay Area is experiencing a period of rapid economic and population growth that is testing the transbay transportation systems and exacerbating equity concerns around housing and health. Along with growing challenges in system operations, these conditions make it particularly important to consider the case for a new transbay crossing that could potentially help improve urban and regional accessibility, unlock new land uses, and create a more resilient transportation network for a stronger, healthier, more equitable region. This report analyzes the potential of a new transbay crossing to provide additional travel capacity between San Francisco and the East Bay, complementing the existing Bay Area Rapid Transit (BART) tube and the Bay Bridge. This project would be larger in scope than the combined scale of many other major Bay Area transportation projects of recent years and has the potential to be significant for the nine-county region, the Northern California megaregion and the State of California. This new crossing is commonly referred to as the “second crossing.” However, we call it a *third crossing* because it would augment the existing Bay Bridge and BART tube if constructed.

Working over the course of a semester, our team of 15 transportation planning, public health and engineering graduate students at UC Berkeley explored potential modes and alignments for such a crossing as well as the magnitude and distribution of potential benefits and challenges of the project. We also analyzed the social equity opportunities, potential governance structures, risk management, and funding and financing implications for a new crossing, providing recommendations in each case. It is our hope that the recommendations and analysis provided in this report will add to the literature published in recent years by regional organizations and will help guide future discussions of a new crossing. The below summarizes our key recommendations and findings.

## Social Equity Opportunities

Social equity must be addressed at every stage of the planning, financing, building and operating phases of a third crossing, and the project must include a number of co-benefits that can offset some of the negative impacts the project could have on historically marginalized communities.

## Key Considerations and Performance Metrics

The development of five key considerations, modeled after the problem statement formation process for major transportation projects, guided our analysis. The five key considerations are:

- 1) Social Equity
- 2) Accessibility and Connectivity
- 3) Land Use Planning Coordination
- 4) Climate Change Mitigation
- 5) Resilience and Adaptation

## Alternatives Analysis

- We analyzed four project alternatives and evaluated them in terms of the five key considerations with additional consideration for capacity and engineering feasibility.

- With use of the Metropolitan Transportation Commission (MTC) travel demand model (Travel Model One) to estimate changes in travel patterns and UrbanSim to estimate land use impacts, we concluded preliminary findings and were able to compare across alternatives and point to areas worthy of future investigation.
- Based on the results of our models, the alternative crossing should not be viewed as a path for encouraging development. As a result, if built, a third crossing should be built to serve areas with existing residential and job centers and/or significant planned growth. The travel model seems to indicate that standard rail may remove longer trips whereas the BART alternatives add more transit trips. The reduction in VMT generated by the all of the alternatives is not insubstantial but the reductions are relatively minor when placed in the context of total Bay Area VMT. Further analysis is needed to evaluate how the alternatives differ from one another in terms of achieving emissions reductions to confirm the results from the travel model.

*Table 1: Analyzed alternatives and brief route description*

<b>Project Name</b>	<b>Alignment / Project Modeled</b>	<b>Model Conclusion</b>
<b>Alternative 1: New Opportunities (BART)</b>	Includes a BART diversion south of MacArthur Station running along a reimagined I-980 corridor in Oakland.  Connects with San Francisco's South of Market (SoMa) before continuing West on Geary St. via Civic Center	Serves growing areas downtown San Francisco and Oakland, while creating a more resilient corridor
<b>Alternative 2: Critical Needs (BART)</b>	Includes a BART diversion south of MacArthur Station running along Franklin St. in Downtown Oakland. Connects with Mission Bay and Downtown San Francisco via Geary	Serves highest density areas of San Francisco and Oakland, while building similar resilience
<b>Alternative 3: Connecting the Megaregion (Standard Rail)</b>	Includes a standard rail diversion south of the existing Emeryville Station running along a reimagined I-980 corridor in Oakland.  Connects with San Francisco via the Transbay Transit Center. Extends Capitol Corridor service to Transbay Transit Center and extends Caltrain service to Richmond.	Creates new regional connections and job access, and a critical step in the state rail system
<b>Alternative 4: Performance Pricing</b>	Addresses transportation problems without a new crossing by increasing westbound Bay Bridge tolls during peak hours and using the revenue to fund increased bus service and land use changes that reduce demand on the corridor, in addition to other equity opportunities. Impacts to vulnerable groups would be mitigated by a lifeline discount.	Flexible response to an immediate need, with revenue to support regional goals

## Governance, Risk Management, and Independent Oversight

The question of governance—organizational structures, agency relationships and responsibilities, and external coordination with the public—is of particular importance to any large-scale infrastructure undertaking. With regards to a third crossing, assembling the diverse set of local, regional, state, and private actors necessary to conceptualize, design, finance, construct, operate, and maintain such a

critical piece of infrastructure is the first step on a decades-long journey towards implementation. Currently, no agency in the Bay Area possesses enough dedicated staff to both continue existing operations and manage a new megaproject, and thus a logical championing agency does not yet exist. A governing board will need to develop its own guiding principles to aid in decision-making. We recommend that external independent oversight should be formed from the early stage to minimize unexpected risks and poor communication.

An extensive literature review from project management, corporate governance, megaproject, and infrastructure planning discourses, paired with semi-structured stakeholder interviews as well as other stakeholder discussions served as the basis for identifying and analyzing alternative forms of governance structures. To account for unique factors stemming from geographies, political climates, and the nature of megaprojects, multiple different strategies for project delivery exist, including private involvement, management by an existing agency, and a joint powers authority. We provide “constrained” and “ideal” governance structure recommendations depending on the operational circumstance selected. However, the ideal governance scenario would involve an integrated multi-modal authority that merges major existing transbay operators. This multi-modal entity would be capable of managing travel demand in a megaregion, but would still continue to provide existing services through modal agencies. To complement the governance structure responsible for carrying out the third crossing, we also recommend the formation of a Community Advisory Board in an effort to ensure positive outcomes for vulnerable communities.

A megaproject like a third crossing has a significant risk potential. We established the risk management framework for a third crossing based on our review of the literature and analysis of recent State legislation regarding megaproject risks. This project requires a defined strategy that focuses on continuous improvement with an iterative progression, shared lessons learned, and the implementation of best practices. We recommend our risk management framework be incorporated into every step of the process through transparent accountability measures in both the governance and funding and finance structures.

## Funding and Finance

A third crossing will require an innovative funding and financing framework due to the project’s complexity and the uncertain future of Federal and State support. Our analysis of this topic applies the academic literature concerning the development of cost estimates and the equity implications of various funding mechanisms to a potential new crossing. Case study analysis and conversations with experts also inform our discussion. Though in-depth engineering and environmental analyses have not yet been conducted, preliminary cost estimates for a new crossing are between \$8 and \$12 billion for the capital costs alone (AECOM Consult, Inc, 2012). While assigning new cost estimates is beyond the scope of this project, predicted costs of major infrastructure projects are often significantly lower than actual costs (Flyvbjerg, Holm, & Buhl, 2002; Flyvbjerg, Holm, & Buhl, 2004). Additionally, many secondary costs, like financing costs, transaction costs, and maintenance & operations costs are not included in public deliberations or sufficiently considered in overall project cost estimating. To address these issues, we propose several risk management techniques, including reference class forecasting, which adjusts costs estimates to align with comparable completed projects (Flyvbjerg, 2006).

The main funding sources we identified include loans, grants, user fees, special assessment districts, regional measures, and value capture mechanisms. However, it is challenging to predict what funding and financing opportunities will be available in the coming decades. To address this uncertainty, we created both ideal and constrained scenarios and identified which of these funding sources might be available in each scenario.

## Moving Forward

A third crossing has the potential to provide increased connectivity for the region. However, any project would be a significant undertaking and it will be challenging to determine the best mode, alignment and governance structure. It is imperative that a third crossing project include community involvement at levels, incorporate risk management, external independent oversight and peer review in tandem with extensive geographic and political coordination.

Ultimately the third crossing has the potential to be a galvanizing project for the Bay Area and the Northern California megaregion. It will undoubtedly require significant regional cooperation between stakeholders and community members. This report offered our team the opportunity to explore this project from a variety of angles and it is our hope that the analysis conducted will provide a viable framework should the region and State move forward with a plan to build a third crossing.