Appendix B

Notice of Intent
and
Notice of Preparation

This page intentionally left blank.

agreement in effect before FMCSA will issue a property broker license.

Cancellation of Prior Filings Form BMC–35 entitled, Notice of Cancellation Motor Carrier Insurance Under 49 U.S.C. 13906, Form BMC–36 entitled, ''Notice of Cancellation Motor Carrier and Brokers Surety Bonds Under 49 U.S.C. § 13906,'' and Form 85 entitled, ''Property Broker's Trust Fund Agreement Under 49 U.S.C. 13906,'' cancel prior filings.

Endorsement Form BMC 90 entitled, ''Endorsement for Motor Carrier Policies of Insurance for Automobile Bodily Injury and Property Damage Liability Under Section 13906, Title 49 of the United States Code,'' and Form BMC–32 entitled, ''Endorsement for Motor Common Carrier Policies of Insurance for Cargo Liability Under 49 U.S.C. § 13906,'' are executed by the insurance company, attached to BI&PD and cargo insurance policies, respectively, and forwarded to the motor carrier or freight forwarder.

Self Insurance motor carriers can also apply to the FMCSA to self-insure BI&PD and/or cargo liability in lieu of filing certificates of insurance with the FMCSA, as long as the carrier maintains a satisfactory safety rating. See 49 CFR 387.7(d)(3) and 387.309. The Form BMC–40 is the application used by carriers to apply for self-insurance authority.

Title: Financial Responsibility, Motor Carriers, Freight Forwarders and Brokers, formerly titled ''Financial Responsibility, Trucking and Freight Forwarding.''

OMB Control Number: 2126–0017.

Type of Request: Revision of a currently-approved information collection.

Respondents: Motor carriers, freight forwarders and brokers.

Estimated Number of Respondents: 251,415.

Estimated Time per Response: The estimated average burden per response for the Form BMC–40 is 40 hours. The estimated average burden per response for all of the other remaining insurance forms (BMC–32, 34, 35, 36, 82, 83, 84, 85, 90, 91, and 91X) is 10 minutes per form.

Expiration Date: February 28, 2009.

Frequency of Response: Certificates of insurance, surety bonds, and trust fund agreements are required when the transportation entity first registers with the FMCSA and then when such coverages are changed or replaced. Notices of cancellation are required only when such certificates of insurance, surety bonds or trust fund agreements are canceled. The Form BMC–40 is generally filed only when a carrier seeks approval from FMCSA to self-insure its BI&PD and/or cargo liability.

Estimated Total Annual Burden: 66,960 hours [5 BMC–40 filings per year x 40 hours to complete + 400,560 filings per year for all of the other forms x 10 minutes/60 minutes to complete = 66,960].

Public Comments Invited: You are asked to comment on any aspect of this information collection, including: (1) Whether the proposed collection is necessary for the agency to perform its mission; (2) the accuracy of the estimated burden; (3) ways for the FMCSA to enhance the quality, usefulness, and clarity of the collected information; and (4) ways that the burden could be minimized without reducing the quality of the collected information. The agency will summarize or include your comments in the request for OMB's clearance of this information collection.

Issued on: November 14, 2008.

Terry Shelton,

Associate Administrator for Research and Information Technology.

[FR Doc. E8–27867 Filed 11–21–08; 8:45 am]

BILLING CODE 4910–EX–P

DEPARTMENT OF TRANSPORTATION

Federal Transit Administration

Preparation of an Environmental Impact Statement/Environmental Impact Report for the Geary Bus Rapid Transit Project in San Francisco, CA

AGENCY: Federal Transit Administration (FTA), Department of Transportation.

ACTION: Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS).

SUMMARY: The Federal Transit Administration (FTA) and the San Francisco County Transportation Authority (The Authority) intend to prepare an EIS on the implementation of a fixed-guideway transit system in the Geary Boulevard Corridor located between the Transbay Terminal on the east (at First and Mission Streets) and 33rd Avenue on the west. Alternatives proposed to be considered in the draft EIS include a combined No Project/Transportation Systems Management (TSM) Alternative, a Geary BRT Alternative and any additional reasonable alternatives that emerge from the study process. The EIS will be prepared to satisfy the requirements of the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations. The FTA and The Authority request public and interagency input on the purpose and need to be addressed by the project, the alternatives to be considered in the EIS, and the environmental and community impacts to be evaluated.

DATES: Written comments on the scope of the NEPA review, including the project's purpose and need, the alternatives to be considered, and the related impacts to be assessed, should be sent to The Authority by December 24, 2008. *See* **ADDRESSES** below.

Scoping Meetings: Meetings to accept comments on the scope of the EIS will be held on December 4 and December 6, 2008 at the locations given below. On December 4, 2008, the public scoping meeting will begin at 6 p.m. and continue until 8 p.m. or until all who wish to provide oral comments have been given the opportunity. The meeting on December 6, 2008 will begin at 10 a.m. and continue until 12 p.m. or until all who wish to provide oral comments have been given the opportunity.

The locations are accessible to people with disabilities. A court reporter will record oral comments. Forms will be provided on which to submit written comments. Project staff will be available at the meeting to informally discuss the EIS scope and the proposed project. Governmental agencies will be invited to a separate scoping meeting to be held on December 3, 2008 at the San Francisco County Transportation Authority between 1 p.m. and 3 p.m.

ADDRESSES: Written comments on the scope of the EIS, including the project's purpose and need, the alternatives to be considered, and the related impacts to be assessed, should be sent to Zabe Bent, Principal Transportation Planner; San Francisco County Transportation Authority; 100 Van Ness Avenue, 26th Floor; San Francisco, CA 94102. *Phone:* (415) 522–4819. Fax: (415) 522–4829. *E-mail: Elizabeth.Bent@sfcta.org.* Please include the name of an appropriate contact person in your agency for continued EIS coordination. Further project information will be available at the scoping meetings and may also be obtained by calling (415) 522–4800, by downloading materials from *http://www.GearyBRT.org* or by e-mailing *gearybrt@sfcta.org.*

SUPPLEMENTARY INFORMATION:

I. Background/Project Description

The proposed project would be located in the Geary Boulevard Corridor, a key east-west transportation corridor in the heart of the City and County of San Francisco. Geary Boulevard is an important roadway and transit route serving high-density commercial and residential areas along its length from Market Street on the east to Pacific Ocean on the west. The project aims to improve travel times and reliability in the portion of the transit corridor located between the Transbay Terminal on the east (at First and Mission Streets) and 33rd Avenue on the west; special focus will be on the segment located west of Van Ness Avenue which is the most congested portion of the corridor. The roadway serves as a major thoroughfare for local traffic as well as through traffic, carrying over 50,000 transit trips per day, between 30,000 and 65,000 auto trips daily depending on the location on the corridor, and thousands of pedestrian and bicycle trips. Transit service is provided by Muni route 38–Geary (including 38L, 38AX, and 38BX), and by Golden Gate Transit (based in Marin County), which operates commute service and limited all-day service into San Francisco on Geary Boulevard. Unlike many transit routes that primarily serve commuters, transit ridership on Geary Boulevard is consistently high throughout the day, on both weekdays and weekends, and in both the eastbound and westbound directions. A number of major north-south transit routes cross Geary Boulevard and generate major bus-to-bus transfers with Geary Boulevard services, including Muni lines 22–Fillmore, 49–Van Ness, 30–Stockton, and 14–Mission (including 14L and 14X), and the Muni Metro T-Line (formerly 15–Third). In addition to the routes on and perpendicular to Geary Boulevard, routes that operate within a few blocks of Geary Boulevard are considered part of the broader Geary corridor, including 1–California (including 1AX and 1BX), 2–Clement, 3–Jackson, 4–Sutter, and 31–Balboa.

Traffic congestion in mixed-flow traffic lanes and transit overcrowding result in poor transit service reliability and low average bus speeds, currently just 8 to 10 miles per hour for Muni Route 38–Geary. Bus reliability is poor, with high variation in headways and bunching. Buses serve as much as 25% of the trips made in the Geary Boulevard corridor in the PM peak hour, with the highest passenger loads between Fillmore Street and Van Ness Avenue. For all neighborhoods in the corridor, walking also accounts for a large percentage of trips. The non-auto mode share in the neighborhoods located in the heart of the city is as follows: The Tenderloin is over 50% bike, walk and transit; in the Western Addition/Japantown, it is 40%; and in the Richmond it is just over 30%. In spite of high transit ridership and high pedestrian use, much of the current roadway layout and traffic signal infrastructure on Geary primarily benefits motorists more than it benefits transit riders and pedestrians. A major project purpose is, therefore, to improve its walkability and livability.

Geary Boulevard has been identified as a high priority transit improvement corridor in a number of planning studies and funding actions by the City and County of San Francisco. The Authority's Four Corridors Plan (1995) and Muni's Vision for Rapid Transit (2000) and Transit Effectiveness Project (2008) identify Geary Boulevard as a priority corridor for rapid transit improvements. Along with two other key transit corridors, Geary Boulevard was designated for BRT improvements in the New Expenditure Plan for San Francisco, approved in November 2004 by voters as Proposition K, the reauthorization of the City's half-cent transportation sales tax measure. The Expenditure Plan is the investment component of the 2004 San Francisco Countywide Transportation Plan, which sets forth the city's ''blueprint to guide the development of transportation funding priorities and policy'' with a key objective being the promotion and implementation of San Francisco's Transit First policy through the development of a network of fast, reliable transit including bus rapid transit. The Geary Corridor BRT Study (the Feasibility Study) was initiated in 2004, completed in 2007, and evaluated the feasibility of four alternative BRT configurations on Geary Boulevard. A Transportation Systems Management (TSM) and three full-featured BRT alternatives were developed and compared with a No Project scenario, in conjunction with a comprehensive public and agency participation program. The Feasibility Study found that all the BRT configurations studied would be feasible on Geary and recommended an environmental analysis and further technical design work to identify a preferred alternative. The alternatives—and others identified through the scoping process—will be addressed in the proposed project EIS.

As discussed above, previous studies and documents relevant to this action include the recently completed Geary Boulevard BRT Feasibility Study (June 2007); 2005 Prop K Strategic Plan (March 2005); 2004 San Francisco Countywide Transportation Plan (adopted July 20, 2004), and the New Transportation Expenditure Plan for San Francisco (Proposition K, approved November 4, 2003). These documents describe the planning and funding for transportation improvements in San Francisco, including BRT in major bus corridors.

II. Scoping

The FTA and The Authority invite all interested individuals, organizations, and Federal, State, and local governmental agencies to comment on the project's purpose and need, the alternatives to be considered in the EIS and the impacts to be evaluated. During the scoping process, comments on the proposed statement of purpose and need should address its completeness and adequacy. Comments on the alternatives should propose alternatives that would satisfy the purpose and need at less cost or with greater effectiveness or less environmental or community impact and were not previously studied and eliminated for good cause. At this time, comments should focus on the scope of the NEPA review and should not state a preference for a particular alternative. The best opportunity for that type of input will be after the release of the draft EIS.

Following the scoping process, public outreach activities with interested parties or groups will continue throughout the duration of work on the EIS. The project Web site, *http://www.GearyBRT.org,* will be updated periodically to reflect the status of the project. Additional opportunities for public participation will be announced through mailings, notices, advertisements, and press releases. Those wishing to be placed on the project mailing list may do so by registering on the Web site at *http://www.GearyBRT.org,* or by calling (415) 522–4819.

Public and agency scoping meetings to be held on:

Thursday, December 4, 2008, Self Help for the Elderly, Jackie Chan Activity Center, 408—22nd Avenue (at Geary), 6–8 p.m.

Saturday, December 6, 2008, Tenderloin Community School, 627 Turk Street (at Polk), 10 a.m.–12 p.m.

An agency scoping meeting will be held on:

Wednesday, December 3, 2008, San Francisco County Transportation Authority, 100 Van Ness Avenue, 26th Floor (at Fell), 1–3 p.m.

Comments on issues and impacts to be considered in preparation of the EIS will be recorded.

III. Purpose and Need

The Authority adopted as part of the 2004 Countywide Transportation Plan and its investment component, the New Expenditure Plan for San Francisco, a BRT strategy for expanding rapid transit service in San Francisco. The BRT network is intended to address the following purpose:

1. Support the city's growth and development needs;
2. Better serve existing transit riders and stem and reverse the trend toward transit mode share loss; and
3. Improve the operational efficiency and cost effectiveness of the transportation system.

A BRT network can meet those goals by:

• Improving transit levels of service cost effectively;
• Strengthening rapid transit services;
• Raising the cost effectiveness of Muni service and operational efficiency of transit preferential streets; and
• Contributing to the livability of BRT corridors.

IV. Alternatives

Alternatives to be reviewed in the EIS include a (1) combined No-Project/Transportation Systems Management (TSM) Alternative, which would include low-cost improvements to corridor bus services, such as bus stop amenities and limited transit signal priority; (2) a Geary BRT Alternative, which will include design options for the configuration of the BRT transitway and stations; and (3) any additional reasonable alternatives that emerge from the study process.

The No-Project/TSM Alternative assumes a 2015 condition of land use and transit capital and service improvements that are programmed or planned to be implemented by the San Francisco Municipal Transportation Agency (SFMTA) (which includes the San Francisco Municipal Railway and the Department of Parking and Traffic), and other transit providers in the study area (*e.g.*, Golden Gate Transit and the Bay Area Rapid Transit District, or BART, a regional rail service provider). For transit, these include upgraded bus stops and passenger information/communication systems. Other transit improvements could include advanced traffic signal priority systems on Muni vehicles, rationalizing the allocation of limited vs. local Muni service in the corridor, expanding Muni service hours to 7 p.m. on weekdays, and enhanced Muni transit shelters and signage.

The Geary BRT Alternative would include, among other features:

• Dedicated transit lanes within the existing Geary Boulevard right-of-way;
• Sheltered, low-platform passenger stations with real-time bus arrival passenger information signs, lighting, and fare ticketing machines;
• Off-vehicle self-service fare vending and on-board proof-of-payment verification; and
• Advanced transit traffic signal priority and traffic management systems to reduce bus delays at signalized intersections yet maintain acceptable traffic flow.

Preferred spacing for passenger stations would be an average of one-half mile between stops, with local bus stations located every 800 to 1000 feet. BRT transitway and station improvements would be made entirely within existing public rights-of-way; improvements outside of existing public-rights of way are not anticipated with the possible exception of required improvements to existing Muni bus storage and maintenance facilities and to off-alignment intersections for mitigation of project impacts. Variations in the cross-section for the BRT transitway and the locations of stations are anticipated and would comprise design options for the basic BRT alignment. A two-way transitway either in the median of Geary Boulevard or along the outside curbs (one eastbound BRT lane along the south curb/parking lane; one westbound BRT lane along the north curb/parking lane) and, correspondingly, stations in the median or as extensions of the sidewalk were considered in the Geary BRT feasibility study and warrant further evaluation as part of the EIS and alternatives analysis. All BRT alternatives considered would be designed to be ''rail-ready'' in terms of vertical and horizontal clearances and operational requirements.

The Authority, in association with SFMTA, will evaluate the procurement of modern low-floor high-capacity vehicles that would be assigned to the BRT service and have added features, such as two-sided, multi-door access, passenger station docking assist, and other amenities. Streetscape improvements, such as enhanced landscaping and pedestrian access along Geary Boulevard, are also included in the proposed BRT project.

V. Probable Effects

The EIS will evaluate and fully disclose the environmental consequences of the construction and operation of a fixed guideway transit system in the Geary Transit Corridor. The EIS will evaluate the impacts of all reasonable alternatives on land use, zoning, residential and business displacements, parklands, economic development, community disruptions, environmental justice, aesthetics, noise, vegetation, water quality, wetlands, waterways, floodplains, hazardous waste materials, and cultural, historic, and archaeological resources. To ensure that all significant issues related to this proposed action are identified and addressed, scoping comments and suggestions on more specific issues of environmental or community impact are invited from all interested parties. Comments and questions should be directed to The Authority as noted in the **ADDRESSES** section above.

VI. FTA Procedures

The EIS will be prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, and its implementing regulations by the Council on Environmental Quality (CEQ) (40 CFR parts 1500–1508) and by the FTA and Federal Highway Administration (''Environmental Impact and Related Procedures'' at 23 CFR part 771). In accordance with FTA regulation and policy, the NEPA process will also address the requirements of other applicable environmental laws, regulations, and executive orders, including, but not limited to: Federal transit laws [49 U.S.C. 5301(e), 5323(b), and 5324(b)], Section 106 of the National Historic Preservation Act, Section 4(f) (''Protection of Public Lands'') of the U.S. Department of Transportation Act (49 U.S.C. 303), Section 7 of the Endangered Species Act, and the Executive Orders on Environmental Justice, Floodplain Management, and Protection of Wetlands.

Issued on November 19, 2008.

Leslie T. Rogers,

Regional Administrator, Region IX, Federal Transit Administration.

[FR Doc. E8–27868 Filed 11–21–08; 8:45 am]

BILLING CODE 4910–57–P

DEPARTMENT OF TRANSPORTATION

Maritime Administration

[Docket No. MARAD 2008 0106]

Requested Administrative Waiver of the Coastwise Trade Laws

AGENCY: Maritime Administration, Department of Transportation.

ACTION: Invitation for public comments on a requested administrative waiver of the Coastwise Trade Laws for the vessel BIKINI KIM.

SUMMARY: As authorized by 46 U.S.C. 12121, the Secretary of Transportation, as represented by the Maritime Administration (MARAD), is authorized to grant waivers of the U.S.-build requirement of the coastwise laws under certain circumstances. A request for such a waiver has been received by MARAD. The vessel, and a brief

San Francisco County Transportation Authority

100 Van Ness Avenue 26th Floor
San Francisco, California 94102-5244
415.522.4800 FAX 415.522.4829
info@sfcta.org www.sfcta.org

NOTICE OF PREPARATION (NOP)

ENVIRONMENTAL IMPACT REPORT (EIR)

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY: GEARY CORRIDOR BUS RAPID TRANSIT (BRT) PROJECT

RECEIVED
NOV 24 2008
STATE CLEARING HOUSE

Date: November 20, 2008

To: Responsible Agencies, Interested Parties, and Organizations

From: Tilly Chang – Deputy Director for Planning

Subject: **Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Geary Corridor Bus Rapid Transit (BRT) Project**

The San Francisco County Transportation Authority (Authority) proposes to implement, with the San Francisco Municipal Transportation Agency (SFMTA), transit improvements along the Geary Boulevard Corridor, from approximately the Transbay Terminal on the east (First and Mission Streets) to 33rd Avenue on the west. The Authority is preparing an Environmental Impact Report (EIR) under the provisions of the California Environmental Quality Act (CEQA) for the proposed action. The project involves a federal action and is therefore also subject to review under the National Environmental Policy Act (NEPA). The environmental document will be a combined environmental statement and report and is hereinafter referred to as the EIS/EIR.

The Authority is the Lead Agency under CEQA and the Federal Transit Administration (FTA) is the Lead Agency under NEPA. On behalf of the FTA, the Authority will direct preparation of the EIS/EIR and requests your input regarding the scope and content of environmental analysis that is relevant to your agency's statutory/regulatory responsibilities in order to ascertain potential impacts of the proposed project. The project description is provided on the following pages. An initial study is not attached and is not required.

CEQA Guidelines Section 15082(b) mandates each Responsible Agency to respond to an NOP within thirty days (30) after receipt. The review period will extend from November 24 through December 24, 2008. Please send your written response, with the name of your agency contact person, to the following address:

Zabe Bent, Principal Transportation Planner
San Francisco County Transportation Authority
100 Van Ness Avenue, 26th Floor
San Francisco, CA 94102

Your views and comments on how the project may affect the environment are welcomed. Please contact Ms. Bent at (415) 522-4819 if you have any questions.

TChang 11/20/08

Tilly Chang, Deputy Director for Planning Date
San Francisco County Transportation Authority

Moving the City.

November 20, 2008

SUBJECT: NOTICE OF PREPARATION / NOTICE THAT AN EIR IS REQUIRED
Geary Bus Rapid Transit (BRT) Project
Environmental Impact Statement/Environmental Impact Report (EIS/EIR)

The San Francisco County Transportation Authority (Authority) and Federal Transit Administration (FTA), as joint lead agencies, will prepare an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) and an Environmental Impact Report (EIR) in accordance with the California Environmental Quality Act (CEQA) for the following proposed project:

PROJECT TITLE: Geary Bus Rapid Transit (BRT)

The Authority requests the views of your agency on the scope and content of the environmental information relevant to your agency's jurisdictional or regulatory responsibilities. If your agency is a responsible agency or trustee agency as defined by State California Environmental Quality Act (CEQA) Guidelines (Sections 15381 and 15386), your agency will need to use the EIS/EIR prepared for this project when considering your permit or other approval for the project. If your agency is not a responsible or trustee agency as defined by CEQA guidelines, or if you are an interested individual or organization, we would still appreciate your views on the scope of the environmental document for this project.

The project description, location, and probable environmental effects are described herein, along with dates, times, and locations of project scoping meetings. The project has the potential to have a significant effect on the environment, and therefore an EIS/EIR is required pursuant to State CEQA Guidelines 15060(d). No initial study has been prepared. Due to the time limits mandated by state law, your response must be sent at the earliest possible date, but no later than 30 days after the receipt of this notice, or December 24, 2008, whichever is later. Please send your responses no later than December 24, 2008 to **Zabe Bent, Principal Transportation Planner; San Francisco County Transportation Authority; 100 Van Ness Avenue, 26th Floor; San Francisco, CA 94102.** Phone: (415) 522-4819. Fax: (415) 522-4829. E-mail: elizabeth.bent@sfcta.org. Please include the name of an appropriate contact person in your agency for continued EIS/EIR coordination.

BACKGROUND/PROJECT DESCRIPTION

The proposed project would be located in the Geary Boulevard Corridor, a key east-west transportation corridor in the heart of the City and County of San Francisco. Geary Boulevard is an important roadway and transit route serving high-density commercial and residential areas along its length from Market Street on the east to Pacific Ocean on the west. The project aims to improve travel times and reliability in the portion of the transit corridor located between the Transbay Terminal on the east (at First and Mission Streets) and 33rd Avenue on the west; special focus will be on the segment located west of Van Ness Avenue which is the most congested portion of the corridor. The roadway serves as a major thoroughfare for local traffic as well as through traffic, carrying over 50,000 transit trips per day, between 30,000 and 65,000 auto trips daily depending on the location on the corridor, and thousands of pedestrian and bicycle trips.

Transit service is provided by Muni route 38-Geary (including 38, 38L, 38AX, and 38BX), and by Golden Gate Transit (based in Marin County), which operates commute service and limited all-day service into San Francisco on Geary Boulevard. Unlike many transit routes that primarily serve commuters, transit ridership on Geary Boulevard is consistently high throughout the day, on both weekdays and weekends, and in both the eastbound and westbound directions. A number of major north-south transit routes cross Geary Boulevard and generate major transfers with Geary Boulevard services, including Muni lines 22-Fillmore, 47- Van Ness, 49-Van Ness, 30-Stockton, and the Muni Metro (light rail) lines. In addition to the routes on Geary Boulevard, routes that operate within a few blocks of Geary Boulevard are considered part of the broader Geary corridor, including 1-California (including 1AX and 1BX), 2-Clement, 3-Jackson, 4-Sutter, and 31-Balboa.

Traffic congestion in mixed-flow traffic lanes and transit overcrowding result in poor transit service reliability and low average bus speeds, currently just 8 to 10 miles per hour for Muni Route 38-Geary. Bus reliability is poor, with high variation in headways and bunching. Buses serve as much as 25% of the trips made in the Geary Boulevard corridor in the PM peak hour, with the highest passenger loads between Fillmore Street and Van Ness Avenue. For all neighborhoods in the corridor, walking also accounts for a large percentage of trips. The non-auto mode share in the corridor neighborhoods is as follows: the Tenderloin is over 50% bike, walk and transit; in the Western Addition/Japantown, it is 40%; and in the Richmond it is just over 30%. In spite of high transit ridership and high pedestrian use, much of the current roadway layout and traffic signal infrastructure on Geary primarily benefits motorists more than it benefits transit riders and pedestrians. A major project purpose is, therefore, to improve its walkability and livability.

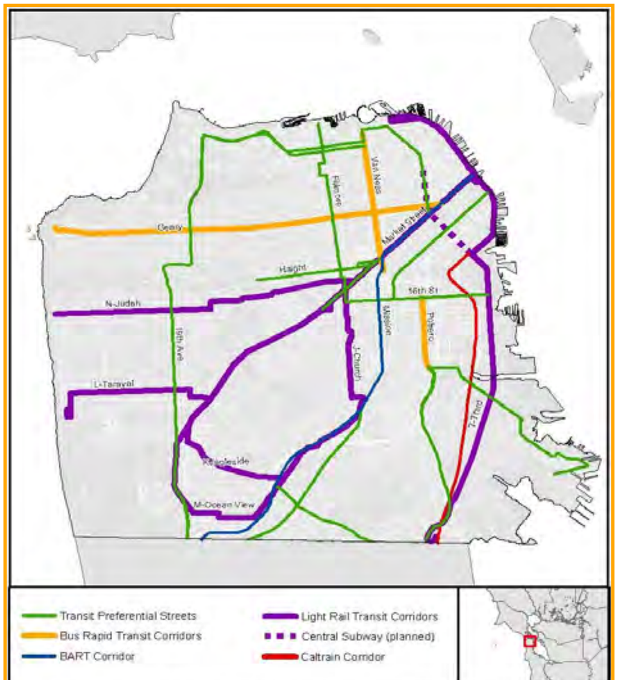


Figure 1. San Francisco Transit Priority Network

Geary Boulevard has been identified as a high priority transit improvement corridor in a number of planning studies and funding actions by the City and County of San Francisco. The Authority's Four Corridor Plan (1995), Muni's Vision for Rapid Transit (2002) and SFMTA's Transit Effectiveness Project (2008) identify Geary Boulevard as a priority corridor for rapid transit improvements. Along with two other key transit corridors, Geary Boulevard was designated for BRT improvements in the New Expenditure Plan for San Francisco, approved in November 2004 by voters as Proposition K, the reauthorization of the City's half-cent transportation sales tax measure. The Expenditure Plan is the investment component of the 2004 San Francisco Countywide Transportation Plan, which sets forth the city's "blueprint to guide the development of transportation funding priorities and policy" with a key objective being the promotion and implementation of San Francisco's Transit First policy through the development of a network of fast, reliable transit including bus rapid transit (see Figure 1).

The Geary Corridor BRT Study (the Feasibility Study) was initiated in 2004, completed in 2007, and evaluated the feasibility of four alternative BRT configurations on Geary Boulevard. A Transportation Systems Management (TSM) and three full-featured BRT alternatives were developed and compared with a No Project scenario, in conjunction with a comprehensive public and agency participation program. The Feasibility Study found that all the BRT configurations studied would be feasible on Geary and recommended an environmental analysis and further technical design work to identify a preferred alternative. The alternatives – and potentially others identified through the scoping process – will be addressed in the proposed project EIS/EIR.

As discussed above, previous studies and documents relevant to this action include the recently completed Feasibility Study (June 2007); 2005 Prop K Strategic Plan (March 2005); 2004 San Francisco Countywide Transportation Plan (adopted July 20, 2004), and the New Transportation Expenditure Plan for San Francisco (Proposition K, approved November 4, 2003). These documents describe the planning and funding for transportation improvements in San Francisco, including BRT in major bus corridors.

The preparation of the EIS/EIR will be initiated through a formal NEPA/CEQA scoping process, which solicits input on the range of alternatives to be analyzed and potential project impacts to consider in the environmental studies. Scoping will be accomplished through meetings and correspondence with interested persons, organizations, the general public, and federal, state, and local agencies, including public scoping meetings to be held on:

Thursday, December 4, 2008
Self Help for the Elderly
Jackie Chan Activity Center
408 – 22nd Avenue (at Geary)
San Francisco
6:00 – 8:00 pm

Saturday, December 6, 2008
Tenderloin Community School
627 Turk Street (at Polk)
San Francisco
10:00 am – 12:00 pm

An agency scoping meeting will be held on:

Wednesday, December 3, 2008
San Francisco County Transportation Authority
100 Van Ness Avenue, 26th Floor (at Fell)
1:00 - 3:00 pm

Comments on issues and impacts to be considered in preparation of the EIS/EIR will be recorded.

Following the scoping process, public outreach activities with interested parties or groups will continue throughout the duration of work on the EIS/EIR. The project web site, http://www.GearyBRT.org, will be updated periodically to reflect the status of the project.

Additional opportunities for public participation will be announced through mailings, notices, advertisements, and press releases. Those wishing to be placed on the project mailing list may do so by registering on the web site at http://www.GearyBRT.org, or by calling (415) 522-4819.

Purpose of and Need for the Project

The Authority adopted as part of the 2004 Countywide Transportation Plan and its investment component, the New Expenditure Plan for San Francisco, a BRT strategy for expanding rapid transit service in San Francisco. The BRT network is intended to address the following purpose:

1. Support the city's growth and development needs;
2. Better serve existing transit riders and stem and reverse the trend toward transit mode share loss; and
3. Improve the operational efficiency and cost effectiveness of the transportation system.

A BRT network can meet those goals by:

- Improving transit levels of service cost effectively;
- Strengthening rapid transit services;
- Raising the cost effectiveness of Muni service and operational efficiency of transit preferential streets; and
- Contributing to the livability of the BRT corridors.

The Project and Project Alternatives

Alternatives to be reviewed in the EIS/EIR include a (1) combined No-Project/Transportation Systems Management (TSM) Alternative, which would include low-cost improvements to corridor bus services, such as bus stop amenities and limited transit signal priority; (2) a Geary BRT Alternative, which will include design options for the configuration of the BRT transitway and stations; and (3) any additional reasonable alternatives that emerge from the study process.

The No-Project/TSM Alternative assumes a 2015 condition of land use and transit capital and service improvements that are programmed or planned to be implemented by the San Francisco Municipal Transportation Agency (SFMTA) (which includes the San Francisco Municipal Railway and the Department of Parking and Traffic), and other transit providers in the study area (e.g., Golden Gate Transit, and the Bay Area Rapid Transit District, or BART, a regional rail service provider). For transit, these include upgraded bus stops and passenger information/communication systems. Other transit improvements could include advanced traffic signal priority systems on Muni vehicles, rationalizing the allocation of limited vs. local Muni service in the corridor, and enhanced Muni transit shelters and signage.

The Geary BRT Alternative would include, among other features:

- Dedicated transit lanes within the existing Geary Boulevard right-of-way;
- Sheltered, low-platform passenger stations with real-time bus arrival passenger information signs, lighting, and fare ticketing machines;
- Off-vehicle self-service fare vending and on-board proof-of-payment verification; and
- Advanced transit traffic signal priority and traffic management systems to reduce bus delays at signalized intersections yet maintain acceptable traffic flow.

Preferred spacing for passenger stations would be an average of one-half mile between stops, with local bus stations located every 800 to 1000 feet. BRT transitway and station improvements would be made entirely within existing public rights-of-way; improvements outside of existing public-rights of way are not anticipated with the possible exception of required improvements to existing Muni bus storage and maintenance facilities and to off-alignment intersections for mitigation of project impacts. Variations in the cross-section for the BRT transitway and the locations of stations are anticipated and would comprise design options for the basic BRT alignment. A two-way transitway either in the median of Geary Boulevard or along the outside curbs (one eastbound BRT lane along the south curb/parking lane; one westbound BRT lane along the north curb/parking lane) and, correspondingly, stations in the median or as extensions of the sidewalk were considered in the Feasibility Study and warrant further evaluation as part of the EIS/EIR and alternatives analysis. All BRT alternatives considered would be designed to be "rail-ready" in terms of vertical and horizontal clearances and operational requirements.

The Authority, in association with SFMTA, will evaluate the procurement of modern low-floor high-capacity vehicles that would be assigned to the BRT service and have added features, such as two-sided, multi-door access, passenger station docking assist, and other amenities. Streetscape improvements, such as enhanced landscaping and pedestrian access along Geary Boulevard, are also included in the proposed BRT project.

THE EIS/EIR PROCESS AND THE ROLE OF PARTICIPATING AGENCIES AND THE PUBLIC

The purpose of the EIS/EIR process is to explore in a public setting potentially significant effects of implementing the proposed action and alternatives on the physical, human, and natural environment. Areas of investigation include, but are not limited to, transportation circulation, land use, development potential, land acquisition and displacements, historic/cultural resources, visual and aesthetic qualities, air quality, noise and vibration, energy use, safety and security, socio-economic effects, and ecosystems, including threatened and endangered species. Measures to avoid, minimize, or mitigate any significant adverse impacts will be identified.

Regulations implementing NEPA and CEQA, as well as provisions of the recently enacted Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), call for public involvement in the EIS/EIR process. Section 6002 of SAFETEA-LU requires that FTA and the Authority do the following: (1) extend an invitation to other Federal and non-Federal agencies and Indian tribes that may have an interest in the proposed project to become "participating agencies," (2) provide an opportunity for involvement by participating agencies and the public in helping to define the purpose and need for a proposed project, as well as the range of alternatives for consideration in the impact statement, and (3) establish a plan for coordinating public and agency participation in and comment on the environmental review process. An invitation to become a participating agency, with the scoping information packet appended, will be extended to other Federal and non-Federal agencies and Indian tribes that may have an interest in the proposed project. It is possible that the Authority may not be able to identify all Federal and non-Federal agencies and Indian tribes that may have such an interest. Any Federal or non-Federal agency or Indian tribe interested in the proposed project that does not receive an invitation to become a participating agency should notify the Authority Project Manager, Zabe Bent, at the earliest opportunity at the contact numbers identified above.

A comprehensive public and agency involvement program is under development. The program includes a project Web site (http://www.GearyBRT.org); outreach to local and regional officials and community and civic groups; a public scoping process to define the issues of concern among all parties interested in the project; establishment of a citizens advisory committee and organizing periodic meetings with that committee; a public hearing on release of the draft EIS/EIR; and development and distribution of project Fact Sheets.

The purpose of and need for the proposed project has been preliminarily identified in this notice. We invite the public and participating agencies to consider the preliminary statement of purpose of and need for the proposed project, as well as the alternatives proposed for consideration. Suggestions for modifications to the statement of purpose of and need for the proposed project and any other alternatives that meet the purpose of and need for the proposed project are welcomed and will be given serious consideration. Comments on potentially significant environmental impacts that may be associated with the proposed project and alternatives are also welcomed. There will be additional opportunities to participate in the scoping process at the public meetings announced below.

In accordance with 23 CFR 771.105(a) and 771.133 and with CEQA and the implementing regulations, FTA and the Authority will comply with all Federal and state environmental laws, regulations, and federal executive orders applicable to the proposed project during the environmental review process to the maximum extent practicable. These requirements include, but are not limited to, the regulations of the Council on Environmental Quality and FTA implementing NEPA (40 CFR parts 1500-1508, and 23 CFR Part 771), the project-level air quality conformity regulation of the U.S. Environmental Protection Agency (EPA) (40 CFR part 93), the Section 404(b)(1) guidelines of EPA (40 CFR part 230), the regulation implementing Section 106 of the National Historic Preservation Act (36 CFR Part 800), the regulation implementing section 7 of the Endangered Species Act (50 CFR part 402), Section 4(f) of the DOT Act (23 CFR 771.135), federal Executive Orders 12898 on environmental justice, 11988 on floodplain management, and 11990 on wetlands, and the CEQA laws and regulations.

The Authority intends to seek FTA approval to enter Project Development and secure funding under the Small Starts program (SAFETEA-LU amended 49 U.S.C. 5309) prior to initiating further engineering (e.g., preliminary engineering) and preparing the Final EIS/EIR.

To ensure that the full range of issues related to this proposed action will be addressed and all significant issues identified, comments and suggestions are invited from all interested parties. Comments or questions concerning this proposed action and the EIS/EIR should be directed to the Authority Project Manager, Zabe Bent, as noted above.

INITIATION OF STUDIES/SCOPING MEETINGS

To assure public involvement at the initiation of studies on this project, public scoping meetings are scheduled as follows:

Thursday, December 4, 2008 Self Help for the Elderly Jackie Chan Activity Center 408 – 22nd Avenue (at Geary) **San Francisco** **6:00 p.m. to 8:00 p.m.**	**Saturday, December 6, 2008** Tenderloin Community School 627 Turk Street (at Polk) San Francisco **San Francisco** **10:00 am – 12:00 pm**

The first 30 minutes of the meeting will be an open house and a viewing of exhibits. A brief presentation of the project purpose and alternatives will follow, with meeting participants provided the opportunity to comment on issues of interest. The open house will resume after the presentation and comment period. Project staff will be present to receive formal public input regarding the scope of the environmental studies, key issues, and other suggestions. Opportunities will be offered during the scoping meeting for comments to be provided either orally or in writing during the entire scoping comment period.

The meeting locations are accessible to persons with disabilities. Any individual with a disability who requires special assistance, such as a sign language interpreter, or any individual who requires English language interpretation should contact the Authority at 415-522-4800 at least 48 hours in advance of the meeting in order for the agency to make necessary arrangements.

An agency scoping meeting will also be held:

Wednesday, December 3, 2008
San Francisco County Transportation Authority
100 Van Ness Avenue, 26th Floor (at Fell)
San Francisco
1:00 - 3:00 pm

ADDRESSES/CONTACT LIST/FURTHER INFORMATION

Written comments during scoping or on the proposed project in general should be sent to: Zabe Bent, Principal Transportation Planner, San Francisco County Transportation Authority; 100 Van Ness Avenue, 26th Floor; San Francisco, CA 94102. Phone: 415-522-4819 or (e-mail) Elizabeth.Bent@sfcta.org. To be added to the mailing list for the Geary BRT Project, contact Ms. Bent at the address listed above.

Additional information on the Geary BRT Project can also be found on the Authority project web site at http://www.GearyBRT.org.

This page intentionally left blank.

Appendix C

Notice of Availability
and
Notice of Completion

This page intentionally left blank.

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

NOTICE OF AVAILABILITY/NOTICE OF COMPLETION
FOR THE
GEARY CORRIDOR BUS RAPID TRANSIT PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT

In compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) Section 15087, the Federal Transit Administration (FTA) and the San Francisco County Transportation Authority (SFCTA), in cooperation with the San Francisco Municipal Transportation Agency (SFMTA), have prepared a joint Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Geary corridor Bus Rapid Transit (BRT) Project (project). This Draft EIS/EIR has been prepared pursuant to the requirements of both NEPA and CEQA. Both laws require that projects with a potential for significant adverse environmental effects be reviewed in an EIS and EIR, respectively.

This Notice of Availability/Notice of Completion serves as a notice to the public regarding the availability of this environmental document and seeks public opinion and comment on the findings in the Draft EIS/EIR. The FTA is the lead agency for the purposes of NEPA, and the SFCTA is the lead agency for the purposes of CEQA.

PROJECT LOCATION

Geary Boulevard/Street is a major east-west arterial spanning San Francisco, California, from Market Street in the downtown area's Financial District to 48th Avenue in the Outer Richmond neighborhood, traversing a broad swath of the City's northern neighborhoods.

The project is proposed along the entire six-mile length of the Geary corridor. The study area for the proposed project incorporates the corridor used by the SFMTA 38 Geary bus line, which travels the full length of Geary plus other City streets, including those that buses use to reach the Transbay Transit Center. Therefore, the study area includes the full length of Geary Boulevard/Street from 48th Avenue to Market Street, as well as other streets used by 38 line buses. These additional streets are:

- O'Farrell Street from Gough Street to Market Street
- Portions of Market, Mission, 1st, and Fremont Streets (that link to the Transbay Transit Center)

The Geary corridor experiences some of the highest levels of transportation use of all City roadways. According to the SFMTA, the Geary corridor sees a range of between 20,000 to

45,000 daily auto trips (higher numbers on weekdays) and about 50,000 daily transit trips. Transit usage is high in both east and westbound directions at most times of day. In addition, the Geary corridor hosts thousands of daily pedestrian trips and is also frequented by bicyclists.

PROJECT DESCRIPTION

The project is intended as an affordable approach to creating rapid transit along one of San Francisco's major east-west transit routes. The Draft EIS/EIR analyzes four build alternatives and a no-build alternative. Each build alternative would create two dedicated transit lanes (one eastbound and one westbound) from Gough Street to 34th Avenue. The build alternatives would incorporate the following features:

- **Bus-only Lanes.** All build alternatives would feature bus-only lanes, but the configuration of the lanes (i.e., side versus center lanes) in some portions of the corridor differs for each alternative. Construction of bus-only lanes would include colorizing the lanes red.
- **High Frequency Bus Service.** The build alternatives would replace the current 38 Geary Rapid service with BRT service between the Transbay Transit Center and 48th Avenue. The BRT service would have reduced headways (meaning less time between one bus and the next) and increased service span (meaning longer hours of daily operation). In most alternatives, the 38 Geary Local service would remain.
- **Transit Signal Priority (TSP).** At a traffic signal, TSP is programmed to give buses green light priority. As such, TSP enables buses to move through the corridor with fewer stops at red lights. All build alternatives would include the installation of fiber-optic-cable-connected TSP on all signalized intersections between 25th Avenue and Gough Street.
- **BRT/Rapid Network-branded Vehicles with Low-floor Design.** All build alternatives would deliver BRT service via vehicles similar to the new low-floor buses that would be implemented in the No-Build Alternative. In addition to providing a different type of service, the vehicles would feature SFMTA Rapid Network "branding" markings to distinguish this different type of bus service.
- **High-amenity BRT Stations**. The build alternatives would include enhanced stations with amenities to distinguish the BRT service at selected stop locations.
- **Mixed-flow Traffic Lanes and Parallel Parking.** Minor changes to lane configurations and signal operations on Geary and O'Farrell Streets at the Powell and Stockton Street intersections would shift the buses away from right-turning vehicles at these heavy turn right-turn locations. West of Gough Street, mixed-flow traffic would be two lanes in each direction. From Gough Street to Scott Street, the change to two lanes would equal a lane reduction from the four lanes in each direction that are currently present. From Scott Street to Park Presidio Boulevard, the change to two lanes would be a reduction of one lane from three existing lanes. A lane of parallel on-street parking would generally be provided on the north and south sides of the Geary corridor. Existing diagonal parking between 33rd Avenue and Park Presidio Boulevard would be replaced with parallel parking to provide enough space to create a bus-only lane in each direction.

- **Bus Bulbs and Pedestrian Crossing Bulbs**. Bus bulbs would be constructed along existing sidewalks at bus stops to extend curb lines where new side-running bus lanes are proposed, to simplify bus positioning and facilitate patron boarding and alighting. The project also proposes pedestrian crossing bulbs to be installed at selected street corners, including near bus stops and at high-pedestrian-injury locations.
- **Left Turns**. To reduce conflicts with the bus-only lanes as well as increase pedestrian safety, left turns for mixed traffic would be restricted at various locations for an overall reduction in the number of left turn opportunities. The build alternatives would provide some existing left turns with their own protected signal phase and add new (protected) left turns in different locations. The left-turn locations would vary by alternative and the proposed bus stop locations.
- **Pedestrian Bridges at Steiner Street and Webster Street**. These two pedestrian overcrossings would be removed to eliminate conflicts between these structures' piers and the proposed bus lanes. The project would provide pedestrian crossings at street grade.
- **New Signalized Crossing at Buchanan and Broderick Streets**. The build alternatives would implement a new, signalized pedestrian crossing at Buchanan Street (that street connects only on the south side of Geary) to decrease the out-of-direction walking distance required to cross Geary on this long block, as well as a new signalized crossing at Broderick to address high pedestrian demand associated with medical facilities at that location.
- **Bicycle Lane Between Masonic Avenue and Presidio Avenue.** The build alternatives include construction of a new Class II bicycle lane on Geary Boulevard between Masonic Avenue and Presidio Avenue. This would be a continuation of the bicycle lane/cycle track proposed in the SFMTA's Masonic Avenue Streetscape Improvement Project.
- **Regional Transit:** Golden Gate Transit Route 92, which provides inter-regional connections to the Geary corridor from the North Bay, would serve BRT stops on Geary Boulevard between Park Presidio Boulevard and Webster Street, similar to existing operation.

PROJECT NEED AND PURPOSE

Project Need

While the Geary corridor serves thousands of multimodal trips per day, current transit performance and pedestrian conditions in the Geary corridor are in need of improvement in several key ways. The following transportation needs have been identified in the Geary corridor, serving as the basis for the project purpose:

- Existing transit service in the Geary corridor is unreliable, slow, and crowded, and is in need of improvement in order to promote high ridership and competitiveness with other travel modes.
- Geary Boulevard's wide travelway and high vehicle travel speeds create unfavorable pedestrian and bicycle conditions, and some key nearby bicycle network connections are lacking.
- The Geary corridor's existing street and streetscape environment do not provide a high-quality transit passenger experience, despite the corridor's high transit ridership.

Project Purpose

The core purpose of the project is to enhance the performance, viability, and comfort level of transit and pedestrian travel along the Geary corridor between the Transbay Terminal, at First and Mission Streets, and 48th Avenue. The project purpose is further described as follows:

- **Improve transit performance on the corridor as a key link in the city's rapid transit network to improve the passenger experience and promote high transit use**. Reduce transit travel times, making transit more attractive for passengers and enabling the system to provide more service at similar cost. Increase transit travel time reliability, providing more consistent arrival times for passengers. Enhance passenger comfort by reducing crowding on buses and at bus stops.
- **Improve pedestrian conditions and pedestrian access to transit.** Improve pedestrian comfort and safety by providing enhanced pedestrian crossing facilities and a more comfortable, inviting streetscape environment. Improve access to transit by targeting crossing enhancements to station areas and providing larger, higher-amenity stations.
- **Enhance transit access and the overall passenger experience, while maintaining general vehicular access circulation.** Re-balance the street's design to better support and accommodate transit users, while maintaining access and circulation for private vehicles and goods movement. Improve the transit ride quality and boarding process for passengers by reducing the need for buses to weave around traffic and into bus stops.

Existing transit services in the corridor, including San Francisco Muni's route 38 Geary (including 38, 38R, 38AX, and 38BX buses), and Golden Gate Transit (based in Marin County), operate commute and all-day service into San Francisco via portions of Geary Boulevard. These existing services suffer from poor performance in terms of speed and reliability. A key need for transit service along the Geary corridor is to close the performance gap, in ridership and in travel time, between transit and automobile travel. Attainment of these transit improvement objectives must be balanced with the need to accommodate mixed traffic, pedestrian, bicycle and goods circulation, and access within the corridor, as well as maintain on-street parking for loading/unloading and drop-off access.

ENVIRONMENTAL IMPACTS

The Draft EIS/EIR evaluates the environmental effects that would result from each build alternative and the No Build Alternative. The Draft EIS/EIR identifies measures to avoid, minimize and mitigate environmental impacts pursuant to NEPA and CEQA. Potentially significant and unavoidable impacts to traffic circulation are identified to occur with implementation of each build alternative. All other environmental effects are considered less than significant or less than significant with incorporation of impact avoidance, minimization or mitigation measures.

PUBLIC REVIEW AND COMMENT PERIOD

The Draft EIS/EIR is being made available to the public for a 45-day comment period which will occur from October 2, 2015 to November 16, 2015. During this review period, the project team is soliciting further public and agency input on the findings of the environmental impact analysis and alternatives analysis.

Following close of the public review and comment period, the SFCTA and the SFMTA will propose an LPA in a separate LPA report. The LPA Report will be presented to the SFCTA and SFMTA Boards for adoption before completion of the Final EIS/EIR.

Agencies and members of the public may submit comments on the Draft EIS/EIR via email or letter to:

Mr. Chester Fung, Principal Transportation Planner
San Francisco County Transportation Authority
1455 Market Street, 22nd Floor San Francisco, CA 94103
chester.fung@sfcta.org

For a list of upcoming events, please visit the project website, www.sfcta.org/geary. Comments may also be given at the Public Comment Meeting, which will be held at the following time and location:

- Public Comment Meeting on November 5, 2015 at St. Francis Hall in the St. Mary's Cathedral (1111 Gough Street, San Francisco, CA) from 6:30pm – 8:30pm.

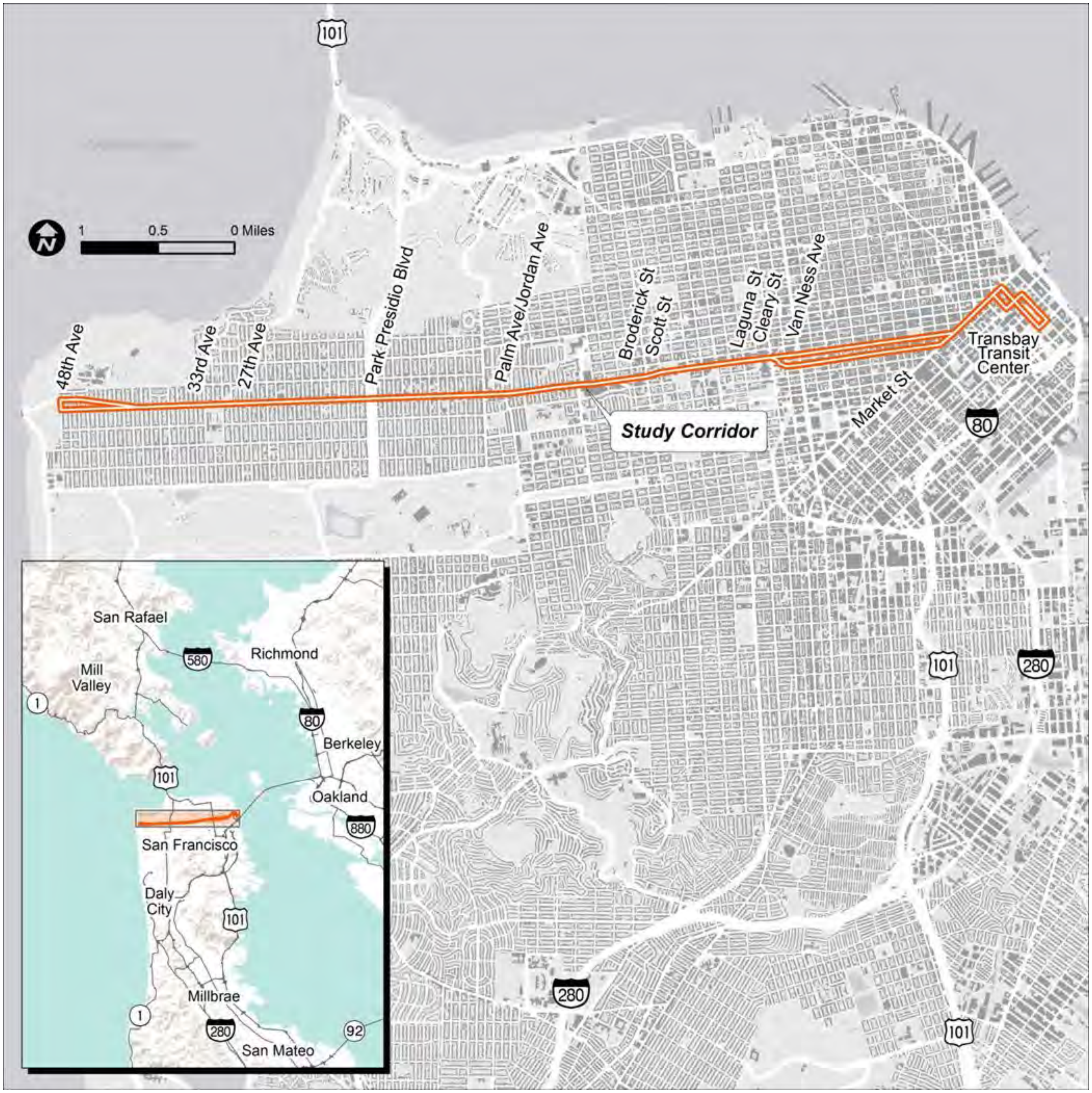
Buildings used for the public hearings are accessible to persons with disabilities. Any individual who would require special accommodations, such as a sign language interpreter, accessible seating, documentation in alternative formats, are requested to contact Mr. Chester Fung at chester.fung@sfcta.org or (415) 522-4804.

WAYS TO OBTAIN AND REVIEW THE DRAFT EIS/EIR

The Draft EIS/EIR is available from the SFCTA at the address shown above as well as one the web at **www.gearybrt.org**. Paper and CD copies of the Draft EIS/EIR are also available for review at the San Francisco public libraries and City agency offices listed below:

Main Library Branch 100 Larkin Street	Anza Branch Library 550 37th Avenue	Richmond/Senator Milton Marks Branch Library 351 9th Avenue	Western Addition Branch Library 1550 Scott Street
SFMTA Main Office 1 South Van Ness Avenue	SFCTA Front Desk 1455 Market Street, 22nd Floor	Planning Information Center 1660 Mission Street, 1st Floor	

Figure 1 Geary Corridor



Appendix D

Transportation Chapter Appendices

Note: On April 25, 2015, SFMTA changed naming conventions for limited stop bus services. Bus services previously referred to as limited and denoted by the letter "L" following the bus line number, e.g. 38L, are now referred to as rapid services and are denoted by the letter "R."

Contents

Appendix D1: Modeling Methodology Approach

D1.1. Introduction

This appendix explains the methodology used to model transportation system performance for the alternatives considered as part of the Geary Corridor Bus Rapid Transit (BRT) project. Tools and methods used to analyze transportation performance include travel demand models, traffic simulation models, probabilistic models, and various analytical adjustment methods. This appendix describes these tools and how they were used to forecast future year travel behavior and transportation operations for each project alternative. More detailed information about each of the simulation models, how each model was developed and evaluated, model input assumptions, and model outputs not otherwise presented in Chapter 3 of this document are included as additional appendices following this appendix.

D1.2. Study Areas

The project study area covers a large portion of northern San Francisco. Specifically, the Geary Corridor encompasses the entire length of Geary Boulevard and the adjacent neighborhoods to the north and south. In the east, the corridor extends beyond the terminus of Geary Boulevard to the Transbay Transit Center. The transit service that is the focus of the Geary Corridor BRT project includes the bus lines that run along Geary Boulevard and numerous other transit services operating on other streets in the Geary Corridor. The Geary BRT Environmental Impact Report/Statement (EIR/S) evaluates transportation performance using the most appropriate geographic definition for each metric. In addition to the geographic areas represented in the performance metrics, each analysis tool has a unique network geographic boundary as well. This section defines all of the geographic areas used as part of Geary BRT study.

Performance Metric Geographic Definitions

- Geary BRT Transportation Study Area

  The area bounded by Powell Street to the east, Pacific Street, Jackson Street, or the Presidio to the north, the Pacific Ocean to the West, and Fulton Street or Golden Gate Park to the south. This area represents surrounding neighborhoods to the north and south of Geary Boulevard. It also includes parallel streets to Geary Boulevard that have alternative transit services and where vehicles may divert under the project alternatives. The Geary BRT Transportation Study Area is used to analyze behavior patterns of neighborhood residents and employees that could be affected by the project alternatives. It is also used to report changes in traffic conditions on streets and at intersections that are not on Geary Boulevard, but which could be affected by the project. This area excludes downtown San Francisco to avoid inclusion in travel behavior summaries of the many commuters that travel to and from Downtown San Francisco, but that do not have travel patterns that relate to the Geary BRT Corridor.

- Geary BRT Transportation Study Area, Including Downtown

  This area is the same as the Geary BRT Transportation Study Area, except that it is extended into Downtown San Francisco and includes the downtown destination areas served by Geary Boulevard transit lines.

- Geary BRT Corridor

  The Geary BRT Corridor includes Geary Boulevard, Geary Street, O'Farrell Street, and other streets used by the 38 and 38L bus lines from the Transbay Transit Center to Point Lobos Avenue and 48th Avenue. The Geary Boulevard Corridor is used to analyze and report on transportation conditions on Geary Boulevard and throughout the routes of the Geary Boulevard bus lines.

- Geary BRT Corridor, Central Geary Segment

  The Central Geary Segment is a subset of the Geary BRT Corridor. This area is the section of Geary Boulevard from approximately Van Ness Avenue to 25th Ave. This is the section of the Geary Boulevard Corridor where the Geary BRT project differs between alternatives. Outside of the Central Geary Segment all of the project alternatives are essentially the same. Some metrics representing transportation conditions in the Geary BRT Corridor are reported for the Central Geary Segment only. Doing so facilitates an understanding of how the project alternatives differ in their potential impacts on Geary BRT Corridor transportation operations.

Analysis Tools Geographic Definitions

- San Francisco Bay Area Network

  The San Francisco Bay Area includes the following nine California counties: San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Solano, Napa, Sonoma, and Marin. The regional travel demand model, SF-CHAMP (explained below) simulates travel behavior throughout the San Francisco Bay Area. The San Francisco Bay Area Network includes all streets within San Francisco and all major roads in the other eight Bay Area counties. The network also includes all San Francisco Bay Area transit lines.

- San Francisco Northwest Quadrant Network

  This area consists of all of San Francisco to the north of Fulton Street and to the west of Van Ness Avenue. This area is represented in the transportation network used by the San Francisco Northwest Quadrant Dynamic Traffic Assignment Model (explained below).

- Geary Boulevard Corridor, Central Geary Segment Network

  The Geary Boulevard Corridor Central Geary Segment Network is a VISSIM (explained below) network that includes the Geary Boulevard Corridor, Central Geary Segment.

- Geary Boulevard Corridor, Western Geary Segment

  The Western Geary Segment includes all of the Geary Boulevard Corridor to the west of the Central Geary Segment. This area is not included within the Central Geary Segment Network, but is included within the San Francisco Northwest Quadrant Network.

- Geary Boulevard Corridor, Inner Geary Segment

  The Inner Geary Segment includes all of the Geary Boulevard Corridor to the east of the Central Geary Segment. This area is not included within the Central Geary Segment Network or the San Francisco Northwest Quadrant Network, but is part of the San Francisco Bay Area Network.

D1.3. Scenarios

The San Francisco Countywide Transportation Plan (2004) and Geary BRT Feasibility Study (2007) identified a project purpose and need for improved transit service in the Geary Boulevard Corridor. In 2008 and 2009 a process of alternatives scoping and screening was conducted for transit improvements in the Geary Boulevard corridor. This process resulted in the recommendation of bus rapid transit for study in an EIR/S. Under the specifications for EIR and EIS preparation, three project years are analyzed. These include a base year, the project opening year, and a project horizon year. Analysis is conducted for eleven scenarios including five project alternatives and three years of analysis (See Table D1-1). For each year of analysis, land use assumptions are held constant, but transportation system features differ across alternative project scenarios. This section describes the land use assumptions, transportation network assumptions, and project alternatives for each analysis year.

Table D1-1 Project Alternatives and Years of Analysis

Alternative \ Year	2012	2020	2035
No Project	Existing Conditions (2012)	No Project (2020)	No Project (2035)
Alternative 2	Not analyzed	Alternative 2 (2020)	Alternative 2 (2035)
Alternative 3	Not analyzed	Alternative 3 (2020)	Alternative 3 (2035)
Alternative 3C	Not analyzed	Alternative 3C (2020)	Alternative 3C (2035)
Hybrid Alternative	Not analyzed	Hybrid Alternative (2020)	Hybrid Alternative (2035)

Years of Analysis

Analysis is performed for three project years: the base year, the project opening year, and the project horizon year. 2012 serves as the existing conditions year for transportation analysis. The opening year for analysis purposes is the year 2020 and the horizon year is 2035 (fifteen years after anticipated project opening). Each of the project alternatives is modeled and analyzed for both the opening year and the horizon year.

Project Alternatives

Five Geary BRT alternatives are analyzed for both future scenario years. The first alternative reflects baseline conditions – current conditions and all reasonably foreseeable projects – and does not propose changes to Geary Blvd. The remaining four alternatives are the project alternatives. All four project alternatives involve the addition of exclusive bus lanes on Geary Boulevard between Van Ness Avenue and approximately 33rd Avenue. The four project alternatives also provide two mixed flow traffic lanes in each direction throughout the entirety of this segment. The project alternatives differ in the alignment of the bus lane, the locations of local and limited bus stops, the location of roadway medians, the impacts on parking, and locations where vehicles can make left turns. The five alternatives are described below, but more detailed and comprehensive descriptions are provided in the main body of the EIR/S.

- <u>Alternative 1 - No Project</u>

  Transit service under this alternative is most similar to existing conditions. Stations locations and traffic lane configurations under the No Project Alternative remain the same as existing conditions. Combined transit service frequency on the 38, 38L, 38AX, and 38BX bus lines increases in tandem with demand, but not as much as under the project alternatives.

- <u>Alternative 2 - Side-Running BRT</u>

  In this alternative a side-running bus lane is added to both directions of Geary Boulevard between Van Ness Avenue and 33rd Avenue. For most of the corridor, the bus lane is located between a parked car lane and the traffic lanes. Throughout this segment of the corridor, the number of mixed traffic lanes generally decreases from three to two. The 38 local bus route continues to operate as a local bus, but the 38L limited bus route is upgraded to BRT service. The 38AX and 38BX bus lines would be combined into a 38X bus route.

- <u>Alternative 3 - Center-Running BRT, Side-Boarding</u>

  In this alternative bus lanes are added to both directions of Geary Boulevard between Van Ness Avenue and 33rd Avenue. Between Laguna Street and 25th Avenue the bus lanes are located in the middle of the roadway. To the east and west of this segment the bus lanes are located in the outermost traffic lanes. In the portion of the corridor where the bus lanes are aligned in the center of the roadway the existing median is removed and replaced by two parallel medians separating the bus lanes from the mixed flow traffic lanes. In the center running portion of the corridor bus stations are located in the center medians. Bus service would be the same as under Alternative 2.

- Alternative 3C - Center-Running BRT, Consolidated Stations

  Alternative 3C is similar to Alternative 3, except that Alternative 3C consolidates local and limited bus service into a consolidated 38L bus line. The 38L would have more stations than the 38L in alternatives 2 and 3, but less stations than the 38 bus line. The 38L in Alternative 3C would operate more frequently than in the other alternatives.

- Hybrid Alternative – Combination of Alternative 2 and Alternative 3C

  The Hybrid Alternative is a combination of Alternative 2 and Alternative 3C. Under this alternative the center-running alignment of Alternative 3C would extend from 25th Avenue to approximately Palm Street. From Palm Street to Van Ness Avenue the Hybrid Alternative would have the alignment of Alternative 2. Bus lines and service frequency would be the same as under Alternative 2, but in the center-running portion of the corridor the bus stops would be consolidated and the 38 and 38L bus lines would stop at the same consolidated stations.

D1.4. Assumptions

Land Use Assumptions

The Geary BRT project uses the Association of Bay Area Governments' (ABAG) Projections 2009 (p2009) land use assumptions with San Francisco Planning Department allocations for future year analysis[1]. The p2009 land use assumptions anticipate significant growth in San Francisco's eastern neighborhoods, but minimal land use change in much of the Geary Transportation Study Area and in the Richmond District in particular. One location where significant growth is anticipated prior to the project opening year is in the vicinity of Geary and Van Ness where the CPMC Cathedral Hill campus is under development. Table D1-2, below, summarizes land use by scenario year.

[1] See: http://www.abag.ca.gov/planning/currentfcst/#

Table D1-2 ABAG p2009 Population and Employment Forecasts with SF Planning Department Allocation

Geography & Metric \ Analysis Year		Existing Conditions	Opening Year (2020) using p2009 forecast for 2015	Horizon Year (2035)
Geary Transportation Study Area	Households	75,600	77,400	80,700
	Household Population	151,900	154,900	160,600
	Employed Residents	78,900	80,600	90,900
	Jobs	89,500	96,100	116,600
San Francisco	Households	346,500	361,500	415,200
	Household Population	788,000	821,900	960,600
	Employed Residents	411,100	426,600	543,800
	Jobs	570,000	611,800	807,800

<u>Opening Year - 2020</u>

The project is currently expected to open in 2018 or 2019. When rounded to the nearest five-year increment, 2020 is used for the "Opening Year" Analysis. Land use inputs are from ABAG's p2009 projections. These land use assumptions were the most recent assumptions available when Geary BRT transportation analysis commenced.

In the years immediately following the release of ABAG's p2009 projections, the San Francisco Bay Area experienced an unexpectedly prolonged period of slow economic and population growth, resulting in a rate of growth lower than the projections. As a result, near term future land use characteristics are unlikely to meet p2009 forecasts for near-term future years and p2009 land use forecasts for the year 2020 are no longer realistic. The ABAG p2009 forecasts of year 2015 for the Geary corridor, therefore, reflect conditions that are expected to occur more closely to the project's opening year. An example of this trend is the California Pacific Medical Center Cathedral Hill campus. Originally assumed to be complete by 2015, the complex will now be completed between 2015 and 2020. The Authority has confirmed this further by comparing ABAG p2009 metrics for year 2015, such as estimated increase in households, population, and jobs in the Geary Transportation Study Area with similar parameters from the most recent ABAG forecasts for 2020[2]. The percent differences vary between one and three percent, confirming that the ABAG p2009 assumptions are valid for forecasting Year 2020 conditions for the project. As such ABAG p2009 land use forecasts for 2015 are used to represent 2020 opening year conditions for the Geary BRT project.

<u>Horizon Year – Year 2035</u>

ABAG p2009 forecasts of year 2035 conditions have been used for the project's horizon year of 2035. According to the FTA's New and Small Starts process, the FTA allows project sponsors, at their option, to calculate evaluation criteria using horizon year based estimates as well as current year estimates. According to FTA guidance, project sponsors should determine the horizon year they wish to use -- either 10 years or 20 years in the future from the current date. The San Francisco County Transportation Authority and the San Francisco Municipal Transportation Agency have selected year 2035, almost 20 years from today, as the project's horizon year.

[2] ABAG p2011 Jobs Housing Connection, Spring 2013 update land use forecasts

Transportation System Assumptions

All future year project alternatives are modeled with uniform transportation system assumptions with the exception of the project itself. Transportation networks in the future year project scenarios reflect forecasted changes to the transportation system including all reasonably foreseeable transport projects. The most notable baseline projects included in future year analysis include transit signal priority (TSP) on Geary Boulevard, four new traffic signals on Geary Boulevard, the opening of the Van Ness BRT project, and the completion of the Presidio Parkway project. A bike lane project is also expected to reduce the number of traffic lanes on Masonic Avenue. A complete list of assumed regional transportation projects is shown in Table D1-3, below.

Table D1-3 Regional Transportation System Developments Assumed in Future Year Scenarios

Transit System Changes	Roadway Changes
2020 Transit System Changes (Difference from Existing Conditions) • Regional Measure 2 Express Bus • MUNI T line to Sunnydale • CPMC Shuttles • Van Ness BRT "Center A" Scenario • East Bay BRT	**2020 Roadway Changes** (Difference from Existing Conditions) • Bike Plan (including Masonic Ave lane reduction) • Geary Blvd Transit Signal Priority (TSP) • Mission Bay Street Grid • Presidio Parkway (Doyle Drive) new configuration • SR 237 HOV lanes between 85 and 101 • Central Expressway - widen to 3 lanes from Mary Ave to San Tomas Expy • US 101 - widen some segments to 4 lanes - between Lawrence Expy to 85 • San Tomas Expy - widen to 3 lanes between El Camino Real and Williams Rd (south of 280) • SR 17 - widen to 4 lanes from Hamilton Ave to San Tomas Expy • Oakland Rd - widen to 3 lanes from US 101 to Montague Expy • Berryessa Rd - widen to 3 lanes from US 101 to I-680 • I-680 HOV lanes in NB direction from Calaveras Ave (near US 101, Milpitas) to I-580 and conversion of SB HOV2 to HOV3 • SR 84 - Widen to 2 lanes from I-680 to I-580 (through Livermore) • I-580 - HOV lanes from Santa Rita Rd to Greenville Rd (Pleasanton -Livermore) • SR4 East - widen to 3 lanes each direction + HOV lane from Loveridge to 160 • Caldecott Tunnel (4th bore) • I-680 NB HOV lanes - from Main St (Walnut Creek) to

	SR 242 • US 101 - HOV lanes from Novato to Petaluma • SR 12 (Jameson Canyon Rd) - Widen to 2 lanes each direction from 29 to I-80 • US 101 - HOV lanes from Petaluma to Steele Ln (north of Santa Rosa) • New roadways in SE Santa Rosa
2035 Transit System Changes (Difference from 2020 assumptions • MUNI T line from Sunnydale to Bayshore (segment S) • MUNI T line Central Subway to Chinatown • MUNI E line • Ferry Service (WETA) South SF to Oakland and Treasure Island • BART to Warm Springs • E-BART from Pittsburgh to Antioch • Caltrain Electrification • Caltrain 2025 Operating Plan • SMART	**2035 Roadway Changes** (Difference from 2020 assumptions • Same as 2020

D1.5. **Modeling Tools**

Several modeling and analysis tools are utilized in the analysis of Geary BRT project impacts, each of which are appropriate for specific purposes and each of which have unique strengths. The modeling tools include:

- SF-CHAMP,
- The San Francisco Northwest Quadrant Dynamic Traffic Assignment Model,
- Synchro,
- VISSIM, and
- Various factoring and adjustment methods

These modeling and analysis tools are used in a systematic framework where the outputs from one model are used as inputs into another model following any necessary adjustment processes. The functionalities of all applicable modeling and analysis tools are discussed in this section, below. How the various modeling tools fit together in an overall modeling framework is explained in section D1.6.

SF-CHAMP

SF-CHAMP is the regional activity-based travel demand model created and operated by the San Francisco County Transportation Authority (SFCTA) to forecast travel behavior in San Francisco and surrounding areas. SF-CHAMP simulates traveler behavior across the region and forecasts where trips are going to and from, when, for what purpose, and by what travel mode. SF-CHAMP's strengths are modeling travel behavior for large numbers of actors and over a vast and complex transportation system. As the scope of SF-CHAMP is wide-reaching, it does not effectively model detailed traffic and transit operations. SF-CHAMP's network representation is simplified in that it does not enforce hard capacity limits on roadways. While this methodology shows some of the latent demand, it can also lead to unrealistically high estimates of traffic volume in congested areas. SF-CHAMP inputs include a synthetically generated population for the region, other land use information such as employment and school enrollment, and auto, transit, bicycle and pedestrian transportation networks.

San Francisco Northwest Quadrant Dynamic Traffic Assignment Model

The San Francisco Northwest Quadrant Dynamic Traffic Assignment Model is a dynamic traffic assignment (DTA) model that uses the commercially available Dynameq software by INRO. DTA models simulate network performance at a mesoscopic level whereas SF-CHAMP's current network model is more macroscopic. Dynameq is a simulation-based DTA that represents the behavior of individual vehicles in a transportation network and how they interact using the industry-standard car-following approach. In order to simulate the interaction of various vehicles, DTA typically simulates traffic flow in six-second or less increments, as opposed to SF-CHAMP, which treats traffic flows at a macro-temporal scale of several hours. Since DTA is more data-intensive and sensitive to many network nuances, DTA models are generally applied to smaller geographic areas than regional models. For the Geary BRT project, the DTA analysis area includes the quadrant of San Francisco north of Fulton Street and west of Van Ness Avenue.

The San Francisco Northwest Quadrant DTA Model's representation of the transportation network is far more detailed than SF-CHAMP's representation. It includes information about traffic signal timing, stop signs, and lane configurations at intersections. These features allow for a much more realistic representation of actual capacity at individual intersections than that of SF-CHAMP. The DTA model explicitly represents lanes, so it can account for the effects of weaving and it can represent travel time differences across multiple lanes on a single roadway link. Since DTA is not a microscopic model, it does not simulate the interactions between motorized vehicles and non-motorized traffic.

VISSIM

VISSIM is a multi-modal transportation microsimulation software package for simulating complex interactions among vehicles and other road users. The Geary BRT Corridor features complexities such as high frequency transit service, high traffic volumes, transit signal priority (TSP), bicycles, pedestrians, and significant interactions between the different travel modes. VISSIM is used for Geary BRT traffic analysis because it can simulate all of these features and is an effective tool for evaluating the impacts of the proposed project alternatives on Geary BRT Corridor transportation operations.

VISSIM differs from Dynameq in that the simulation step duration is much shorter and the car following model is more realistic. Unlike Dynameq, VISSIM can be used to simulate vehicle interactions with bicycles and pedestrians, providing a more realistic simulation of vehicle travel time and delay. Because of VISSIM's greater complexity, it is also more time consuming to calibrate and run models. This means that it is usually impractical to build a VISSIM model larger than neighborhood scale. Due to these tradeoffs, VISSIM is used to evaluate travel time and delay on Geary Boulevard in the Central Geary Segment of the Geary BRT Corridor only, and not for other parts of the study area.

Synchro

Synchro is a traffic simulation tool that is used to analyze traffic performance using the level of service (LOS) methodology of the Highway Capacity Manual (HCM). In the Geary BRT study, Synchro is used to analyze intersection LOS on Geary Street and O'Farrell Street east of Van Ness Avenue, Geary Boulevard west of 25th Avenue and important intersections that are within the Geary Transportation Study Area, but which are not in the Geary BRT Corridor. Synchro is used because of its ability to model multiple coordinated intersections, its ability to easily optimize traffic signal timing, and because of its use of HCM methodology. The inputs necessary for Synchro analysis include a representation of the transportation network, signal timing for signalized intersections, traffic volumes, and the adjustment of traffic flow calibration parameters.

Adjustments and Other Analytical Tools

In some cases the outputs from one model may not be readily appropriate for application to another model. In other cases, a modeling tool may produce results that do not account for some meaningful contributing factors. In such cases an adjustment process is undertaken to account for the differences between the two modeling tools or to account for specific areas where one of the modeling tools may not produce intuitively correct results. Every model has both strengths and weaknesses. The purpose of intermediate and post-processing adjustments is to make sensible interventions into model results where the results are influenced by known model weaknesses. The primary adjustments and analysis tools applied in Geary BRT analysis are listed below.

- <u>SF-CHAMP Subarea Demand Extraction</u>

  This process transforms traffic demand outputs from SF-CHAMP into vehicle travel demand inputs to the San Francisco Northwest Quadrant DTA Model. PM period vehicle trips that start and end within the San Francisco Northwest Quadrant Network area remain unchanged, but trips that start inside the network area and end outside or start outside and end inside are clipped so that the trip in the DTA model connects the zone within the San Francisco Northwest Quadrant Network area with the boundary street used by the trip to enter or leave the San Francisco Northwest Quadrant Network. The static three hour demand produced by SF-CHAMP is distributed into fifteen minute demand intervals spanning the period from 3:30 PM through 6:30 PM. The extracted demand is used by the San Francisco Northwest Quadrant DTA Model to analyze PM peak hour traffic and transit conditions.

- <u>San Francisco Northwest Quadrant DTA Model – Geary Boulevard Traffic Volume Post Processing</u>

  Traffic demand outputs from the DTA model are used as inputs into the VISSIM and Synchro models. Some adjustments are necessary before DTA model output can be used for VISSIM simulation. The Adjustments are necessary for two reasons. First, future forecasts are inherently uncertain. SF-CHAMP and Dynameq projections of future vehicular travel demand in the Geary corridor are lower than current conditions. There are numerous reasonable explanations for why traffic demand is projected to fall, but none are guaranteed to occur. This known uncertainty demands the use of a conservative approach to modeling future travel demand, and traffic volumes on Geary Boulevard are increased in future year scenarios. This is intended to account for the possibility that traffic volumes will not decline as projected and to ensure that the proposed project alternatives are robust enough to handle unexpectedly high traffic demand.

  Second, VISSIM requires a high level of traffic volume accuracy at the turning movement level. The Northwest Quadrant DTA Model is a robust tool for analyzing route choice at the mesoscopic level, but simulated intersection level turning movements may differ considerably from actual future conditions. The DTA model's forecasted turning movements are sometimes far too high at one location and unreasonably low at a nearby alternate intersection. The problem is not that overall volumes are too high or too low, but rather that some vehicles on a particular street make turns a few blocks away from where they would take place in the real world. Since the DTA model uses simplified representations of land use and trip origins/destinations, with a zonal spatial representation rather than a more realistic parcel-level representation, the model results include localized model error. To address this concern, focused adjustments are made to Geary Blvd turning movements. These adjustments respect the general flow of traffic as forecasted by SF-CHAMP and the DTA model, but relocate turning movement volumes where Dynameq assignments are unrealistic. Focused adjustment decisions are based on existing traffic patterns and traffic engineering judgment. Detailed descriptions of the conservative adjustment of Geary Blvd traffic volume and the focused adjustments are available upon request.

- San Francisco Northwest Quadrant DTA Model – Off-Geary Boulevard Intersection Volume Post Processing

  At some locations base year traffic volumes simulated by the San Francisco Northwest Quadrant DTA Model are not close enough to existing conditions to use for traffic analysis without post processing. Traffic volumes for intersections that are located outside of the Central Geary Boulevard Segment of the Geary Boulevard Corridor are post-processed to produce forecasts that are consistent with existing travel patterns. This process adjusts existing volumes for each intersection turning movement according to changes forecasted between the Existing Conditions DTA Model scenario and each future year DTA Model scenario. This means that forecasted traffic volumes reflect existing travel patterns, but are modified to account for likely changes in traffic patterns in future years.

- Transit Ridership Post Processing

  SF-CHAMP produces raw transit ridership forecasts. Forecasted changes in transit ridership between the existing conditions year and the future year scenarios are applied to existing observed transit ridership. This process produces final transit ridership forecasts that take advantage of model sensitivity to change, but also uses more accurate information about existing travel patterns.

- Transit Travel Time Post Processing

  VISSIM is an advanced microsimulation model that explicitly simulates complex interactions between vehicles, infrastructure, and other road users. However, some of the factors that contribute to travel speeds on an urban roadway such as Geary Boulevard are not well represented in the Geary BRT VISSIM model. These weaknesses include impacts of double parked vehicles and parking maneuvers on buses for side-running BRT transit lane alignments. VISSIM also explicitly represents delay due to right turning vehicles, but because of unrealistically obedient pedestrian behavior, the VISSIM representation of right turn delays underestimated the effects that right turning vehicle have on transit vehicle travel speeds for side-running BRT alignments. To better account for these important contributors to bus delay a probabilistic model calibrated with observed data is used to estimate the amount of delay that is not represented in VISSIM for side-running BRT operations. The additional delay estimated by the probabilistic model is added to the simulated VISSIM transit travel times to create a more accurate and realistic forecast of transit travel time under each project alternative scenario. Additional delay due to double parking, parking maneuvers, and right turning vehicles is not added to the baseline, No Project Alternative scenarios as buses are not necessarily traveling in the right-most lane.

- Transit Reliability Post Processing

  Transit reliability is the consistency of transit travel time. Measures of transit reliability indicate how much travel time varies across different bus runs. The VISSIM model produces a distribution of transit travel times. This distribution of transit vehicle travel times is combined with the additional delay factors developed for Transit Travel Time Post Processing. The probabilistic model explained above is applied to calculate joint travel time distributions incorporating VISSIM travel time variability and the variability of additional parking, double parking, and right turn delay.

D1.6. **Forecasting Process**

Geary BRT modeling begins with SF-CHAMP. At this stage the model simulates travel behavior throughout the entire nine county San Francisco Bay Area. In subsequent steps, Dynameq, Synchro and VISSIM are utilized to simulate more detailed representations of travel and traffic behavior and transportation system performance in increasingly focused geographic areas. The entire modeling process is conducted for the base year, the project opening year, and the project horizon year. In the project opening year and the project horizon years all five unique scenarios are modeled: the No Project Alternative, Alternative 2, Alternative 3, Alternative 3C, and the Hybrid Alternative.

A prerequisite for modeling future year transportation operations is a calibrated model of existing conditions. The first step is to develop base year models in each of the modeling tools. Each of the modeling components is calibrated such that the base year representation of travel behavior and traffic conditions is reasonably representative of existing conditions. After the base year models have been calibrated, their modeling accuracy is validated against observed data such as traffic counts, floating car travel times, transit ridership, and queue lengths at traffic signals. Each model is assigned appropriate validation targets that specify how close the model results should match observed conditions. After the base year models have been calibrated to meet specified validation targets, the modeling process is repeated for future year scenarios. In the future year scenarios land use assumptions are changed to reflect projections of future growth and the transportation network is altered to reflect planned infrastructure projects, but the calibration settings from the base year models are maintained. In order to isolate the impacts of each project alternative the only input that changes between various alternatives in future year analysis is the network representation of the project alternatives. The following sections describe how the different models work together and Figure D1-1, below, presents a graphic representation of how the models and analysis tools fit together.

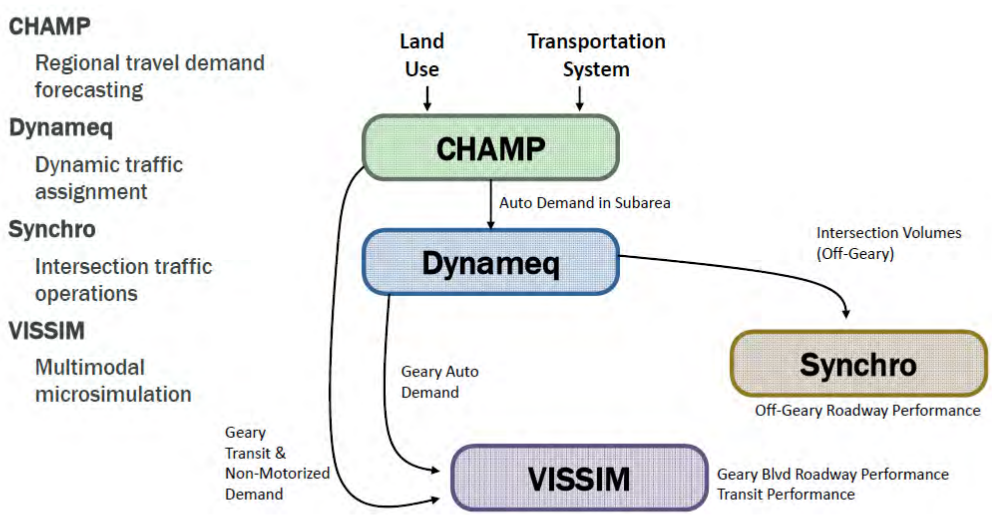


Figure D1-1 Geary Modeling Framework (Simplified)

SF-CHAMP

The first step is for SF-CHAMP to predict travel behavior throughout the entire nine-county San Francisco Bay Area. SF-CHAMP models the interactions of land use inputs with transportation network supply to predict the amount of tours and trips, the purpose of travel, the profile of the travelers, trip and tour origins and destinations, departure and arrival times (period of the day), travel mode, routes traveled, and travel time. Of these outputs, the matrices quantifying travel demand by origin, destination, travel mode, and time of day and transit ridership information are most important for subsequent modeling steps. The existing conditions SF-CHAMP model is calibrated and validated against traffic counts, transit ridership, aggregate quantities of travel, and regional trip profiles.

Transit Ridership Post Processing

SF-CHAMP transit ridership output is used to develop transit ridership forecasts for each of the Geary BRT project alternatives. Transit ridership forecasts are developed using existing observed transit ridership data, SF-CHAMP existing conditions transit ridership model output and SF-CHAMP future year project alternative transit ridership. Following the guidance in NCHRP 255 the differences in transit ridership between the existing and future year SF-CHAMP model scenarios are applied to existing observed ridership figures. These adjustments are made individually for each segment of the corridor, each direction of travel, and each period of the day. Since existing year

SF-CHAMP forecasts tend to overstate Geary Boulevard transit ridership, this adjustment process effectively reduces SF-CHAMP transit ridership estimates to lower, but more realistic levels.

This completes transit ridership forecasting. Traffic condition forecasting, level of service analysis, and transit travel time simulation follows.

SF-CHAMP Subarea Demand Extraction

Since the northwest quadrant network area is smaller than the analysis area covered by SF-CHAMP it is necessary to perform a sub-area extraction of the resulting travel demand to determine the portion pertaining to this smaller area. This process produces vehicle demand tables with origins and destinations that are either 1) within the subarea or 2) on the network links at the subarea border. Although SF-CHAMP produces forecasts of individual travel, the extracted trip tables refer to auto vehicle trips and transit vehicle trips irrespective of passenger count for either mode.

San Francisco Northwest Quadrant Dynamic Traffic Assignment Model Simulation

Once northwest quadrant traffic demand is extracted from SF-CHAMP outputs, the Northwest Quadrant Dynamic Traffic Assignment Model is used to produce route choice information, traffic volumes, and measures of experienced travel time. The existing conditions scenario model is calibrated and validated against traffic counts, turning movement counts, and observed travel times. Visual observation of travel patterns, visualization of queue lengths, and available observed data are all used for model calibration.

San Francisco Northwest Quadrant DTA Model – Geary Boulevard Traffic Volume Post Processing

Adjustments to prepare San Francisco Northwest Quadrant DTA Model outputs for VISSIM modeling consist of two techniques: a conservative scaling of Geary mainline volume and a focused adjustment of intersection turning movements.

The conservative scaling increases total through trip travel demand along Geary Blvd in areas where the modeling process predicts significant trip reduction in future year No Project scenarios. This accounts for the possibility of certain projected land use trends, such as a reduction in Golden Gate Bridge traffic due to forecasts of greater job availability in the North Bay, not occurring as forecasted. The conservative scaling adjustment for both directions is 300 additional PM peak hour vehicles for the segments of Geary Blvd west of Cook St. East of Presidio Ave there is no sensitivity adjustment. Between Presidio Ave and Cook St the sensitivity adjustment increases mainline volumes by 50 vehicles per intersection so as to taper the additional volume of the sensitivity adjustment between Cook and Presidio Ave.

The focused adjustments address locations where the Northwest Quadrant Dynamic Traffic Assignment Model un-intuitively increases turning movement activities at some locations while decreasing turning movement activity at nearby intersections. A summary of the proposed focused adjustments is available upon request.

When both the conservative scaling and focused adjustments are applied to future year No Project scenario Northwest Quadrant Dynamic Traffic Assignment Model forecasts, the adjusted traffic volumes fall within a reasonably narrow range of the highest existing conditions traffic counts.

After Geary Boulevard Traffic Volume Post Processing is completed, the adjusted traffic demand in the Central Geary Segment of the Geary BRT Corridor can be input into the VISSIM model.

VISSIM Simulation

VISSIM model inputs include lane counts and alignments, allowable turning movements at intersections, posted speed limits throughout the corridor, traffic signal timing, and transit schedules. A precursor to the current Geary Corridor VISSIM model was developed for the 2007 Geary BRT feasibility study, while the current VISSIM model has been expanded and features additional detail in order to be consistent with CEQA and NEPA modeling guidelines. Some of the features added to the Geary Corridor VISSIM model include origin-destination vehicle routing, D4 traffic signalization (the system used to control San Francisco traffic signals), bicycle traffic, pedestrian activity at crosswalks, more detailed representations of transit vehicle activity, and on-street parking.

Turning movement counts collected at numerous intersections along Geary Blvd support calibration of the existing conditions VISSIM model. The VISSIM model assumes that trucks account for 2% of total traffic on Geary Blvd.

Pedestrian counts collected at 13 intersections are used to predict pedestrian activity at intersections throughout the corridor. Bicycle counts collected from the 2008 Geary Blvd Bicycle Demand Study are used to represent bicycle activity. SFMTA APC (automatic passenger count) data provides experienced transit travel times and floating car survey data provides experienced auto travel times.

The existing conditions VISSIM model is calibrated and validated according to criteria specified by Caltrans and the Federal transit Administration (FTA). In order to calibrate the VISSIM model, various traffic behavior parameters are adjusted until the existing conditions VISSIM model simulation matches present-day observed traffic and transit operations. These parameters include vehicle fleet composition, driver headways, distance between stopped vehicles, and driver lane changing behavior. Since the VISSIM model is a stochastic simulation resulting in varying traffic conditions across runs, the model is run twenty times and the results of ten model runs are averaged to derive model performance measures. The model performance measures include vehicles served, VMT (vehicle miles traveled), VHD (vehicle hours of delay), average delay per vehicle, CO emissions, NOx emissions, VOC emissions, and fuel consumption.

The VISSIM model uses time-dependent origin-destination traffic demand produced by the San Francisco Northwest Quadrant DTA Model – Geary Boulevard Traffic Volume Post Processing process as the primary demand input. The VISSIM model outputs information about traffic operations such as travel time and level of service for intersections within the Central Geary Segment. The VISSIM model also produces information about transit operating conditions, including transit vehicle travel times and the variability of these travel times. Transit operations results are further post-processed in subsequent steps to account for impacts that parking maneuvers, double parking, and right turning vehicles have on side-running bus lane transit operations.

Transit Travel Time Post Processing

In this step additional delay to bus operations due to parking maneuvers, double parking, and right turning vehicles is estimated using a probabilistic model. The model is parameterized with observed data about bus-vehicle interactions that was collected in San Francisco. Estimates of average additional delay by segment of the corridor are added to the average transit travel time values estimated in the VISSIM model. The combined total transit travel time figures constitute the final transit travel time forecasts reported in the EIR/S.

Transit Reliability Post Processing

The additional delay to transit vehicles due to parking maneuvers, double parking, and right turning vehicles also affects the variability of transit travel time. After additional delay has been calculated, the probabilistic delay model is used to combine VISSIM model travel time distributions with the distribution of additional delay estimated for side-running transit segments. The probabilistic model calculates a combined distribution of travel time. This combined transit travel time distribution is used to calculate the final estimates of transit travel time variability reported in the EIR/S

San Francisco Northwest Quadrant DTA Model – Off-Geary Boulevard Intersection Volume Post Processing

The study evaluates traffic conditions at thirty intersections outside of the Central Geary Segment of the Geary BRT Corridor area. Forecasted traffic volumes for these intersections are developed using a combination of observed traffic volumes and output from the San Francisco Northwest Quadrant Dynamic Traffic Assignment Model. Changes in turning movement volumes at each of the thirty intersections was estimated by calculating the change in incoming and outgoing link volumes for the subject turning movement between the existing conditions DTA model scenario and the future year DTA model project scenario. These changes were then applied to the existing traffic volumes using the NCHRP 255 methodology. The resulting traffic volume forecasts were evaluated for consistency and then used for Synchro analysis of intersection level of service.

Synchro Analysis

Synchro analysis is used to assess intersection performance at intersections outside of the Central Geary Segment of the Geary BRT Corridor. Analysis is performed for the PM peak hour of 5:00 PM to 6:00 PM. Model inputs include roadway geometries, signal timing, and traffic volumes forecasts from Off-Geary Boulevard Intersection Volume Post Processing of San Francisco Northwest Quadrant DTA Model outputs. The outputs from this analysis include LOS, Critical V/C, and queue lengths.

Time of Day and Geography of Analysis

Geary BRT project analysis focuses on the PM peak period, which is the critical peak period of the day; high traffic volumes are sustained for a longer duration than in the AM peak period. The PM peak period is considered to be the time period from 3:30 PM to 6:30 PM, and the peak hour is between 5:00 PM to 6:00 PM.

SF-CHAMP simulates Bay Area travel activities over a 24-hour weekday period. Aggregate forecasts of daily transit ridership and daily trip making behavior are derived from SF-CHAMP outputs. The San Francisco Northwest Quadrant DTA Model simulates traffic patterns for the entire three hour PM peak period within the San Francisco Northwest Quadrant Network Area. Meanwhile, VISSIM and Synchro are used to simulate traffic and transit operating conditions during the PM peak hour only.

Geography of Analysis - Transit

Transit operations within the Central Geary Segment of the Geary BRT Corridor are simulated using VISSIM and the probabilistic delay model. Outside of the Central Geary Segment transit travel time forecasts are established by applying TTRP toolkit modifications to existing observed travel times.

Geography of Analysis - Traffic

Traffic operations for Geary Boulevard intersections within the Central Geary Segment of the Geary BRT Corridor are evaluated using the VISSIM model. In addition to the intersections within the Central Geary Segment, Synchro is used to evaluate level of service at an additional thirty intersections.

The following intersections are analyzed using Synchro:

• Geary and 40th	• California and Park Presidio
• Geary and 33rd	• California and Arguello
• Geary and Van Ness	• Presidio Ave and California
• O'Farrell and Van Ness	• Masonic and Bush
• Geary and Polk	• Divisadero and California
• O'Farrell and Polk	• Divisadero and Pine
• Geary and Larkin	• Fillmore and Pine
• O'Farrell and Hyde	• Bush and Franklin
• Geary and Stockton	• Pine and Franklin
• O'Farrell and Stockton	• Clement and Park Presidio
• Balboa and 25th	• Masonic and Anza
• Anza and Park Presidio	• Turk and Franklin
• Fulton and Park Presidio	• Golden Gate and Gough
• Anza and Arguello	• Eddy and Fillmore
• Fulton and Stanyan	• Turk and Parker

D1.7. Special Topics and Considerations

1.7.1 2015 and 2020 Land Use Assumptions

Future land use assumptions fluctuate over time due to uncertainty about future growth rates. The p2009 land use assumptions appear to have assumed more growth in the immediate future years than has actually occurred. The more recent SCS land use forecasts assume less land use intensity in the near term future than the p2009 forecasts.

The Geary BRT project now intends to consider 2020 to be the project opening year instead of 2015. However, since land use change is happening less rapidly than forecast in the p2009 projections, the Geary BRT project team used 2015 p2009 land use assumptions to represent likely land use conditions in 2020. The following table compares p2009 land use assumptions for 2015 with current land use assumptions for 2020.

TABLE A1 – Opening Year Land use Comparison – p2009 2015 Forecast v. p2011 SCS Focused Growth

Area	Metric	p2009 2015 Land Use	P2011 SCS Focused Growth 2020 Land Use	Percent Difference
San Francisco	Households	361,500	371,400	3%
	Population	821,900	869,400	6%
	Employed Residents	426,600	422,600	-1%
	Employment (jobs)	611,800	606,400	-1%

Appendix D2-1: Land Use Inputs

SAN FRANCISCO
PLANNING DEPARTMENT

MEMO

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

DATE: **September 12, 2014**

TO: **Colin Dentel-Post, SFCTA**

FROM: **Aksel Olsen**

Information and Analysis Group, San Francisco Planning Department

RE: **Land Use Assumptions for the Geary Blvd**

Bus Rapid Transit Environmental Impact Statement/Environmental Impact Report Transportation Modeling

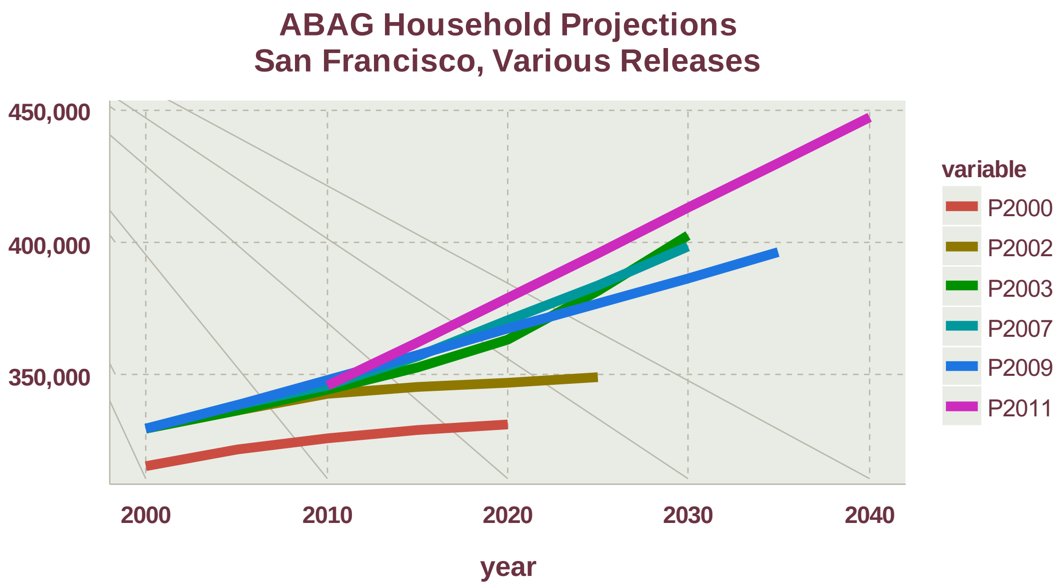
This memo is intended to explain assumptions of the Planning Department's land use allocation, and their relationship to the Association of Bay Area Governments ("ABAG") projections, for the Geary Corridor Bus Rapid Transit (BRT) Project Transportation Analysis to support the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) lead by the San Francisco County Transportation Authority ("SFCTA").

The Planning Department routinely prepares land use forecasts to aid in policy deliberation and decision making on the city's land use future, as well as form the basis for testing transportation impacts of new projects or plans. The basis for the land use forecasts has for a number of years been the citywide projections from the Association of Bay Area Governments (ABAG). ABAG issues biennial projections for population, jobs and households, and as these are updated, the Planning Department typically incorporates these into its own allocation of intra-city growth of jobs and housing. Since 2003 the ABAG projections have been performed reflecting a strategic effort to focus regional growth where existing infrastructure can be leveraged. The latest ABAG release when Geary BRT modeling commenced was Projections 2009, an ambitious growth forecast for the city and county focused on regional sustainability.

General ABAG Compliance

The Land Use Allocation ("LUA") is made to be consistent with ABAG's 2009-series projections (p2009). Per State of California Government Code 65089, databases (i.e., land use inputs) for models such as SF-CHAMP used to determine quantitative impacts of development on the circulation system "…shall be consistent with the data bases used by the regional planning agency [i.e., MTC]". For this reason, land use projections used in the SF-CHAMP model for EIRs led by the San Francisco Planning Department as well as the Geary BRT Project EIS/EIR are within 1% of regional ABAG projections for population, employed residents, households, and employment. The allocation and transportation model together are accordingly consistent with the Regional Transportation Plan pursuant to CEQA Guidelines Section 15130(b)(1)(B). With this consistency, different projects can be evaluated against a consistent baseline to

Figure 1: Comparison of ABAG Household Projections



make various analyses more comparable relative to what would have been the case in the absence of such consistency

ABAG projections have, as noted in the introduction, themselves undergone a change in philosophy during the past decade or so. Starting with Projections 2003, ABAG has moved towards a projection series pursuant to ideas about "smart growth" as adopted by the ABAG Executive Board in 2002. This is reflected in larger shares of growth coming in the form of infill development.[1] Particularly for San Francisco, it has meant a marked increase in expected growth relative to the projections issued just a year earlier (see Figure 1). These assumptions are borne out by recent development trends, with growth during the past decade showing higher amounts of growth in San Francisco relative to historical levels for the city in previous decades. The fact that ABAG's projections assume a change in "business as usual" with respect to the location of growth appears more empirically plausible given the accelerated growth in San Francisco during the past decade.

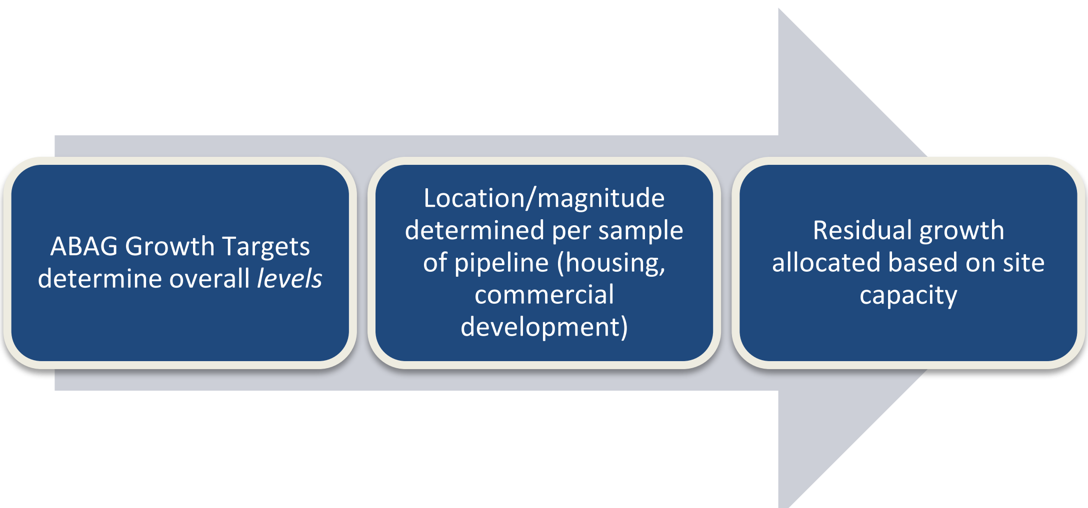
Such changes in regional assumptions matter because regulatory consistency means that the projections from ABAG are taken as externally given constraints, "control totals" on the Planning Department's allocation, representing the total amount of growth the city will experience by a given time frame given regional economic assumptions.

[1] Metcalf, G. (2003). Projections 2003: A Review and Critique. The Urbanist, (September 1). Retrieved from http://www.spur.org/publications/article/2003-09-01/projections-2003-review-and-critique

ALLOCATING ABAG'S PROJECTIONS TO TRAVEL ANALYSIS ZONES

While more details on the allocation are available in a separate memo,[2] a brief discussion is on order here. The main components going into the Planning Department's allocation of ABAG's citywide growth targets to Travel Analysis Zones (TAZs) are 1) growth allocated according to the development pipeline, and 2) growth allocated according to estimated capacity on currently underutilized sites, favoring zones with established activity centers (households or jobs).

The Development Pipeline consists of known[3] development projects that would add residential units or commercial space, applications for which have been formally submitted to the Planning Department or the Department of Building Inspection (DBI). As of 2010, the time of preparation of this projection, pipeline activity levels were high, at nearly 50,000 units. In addition, there were a number of projects the Department was analyzing at the time, including the Transit Center District Plan (consisting of a changed zoning program for around 18 development sites in the Transbay area), and Mission Bay.



Adding all these components presents the challenge of remaining within the macroeconomic assumptions for overall growth for the City for the projection horizon as represented by ABAG's control totals. If everything is included, the allocation is not compliant with California Government Code §65089 (see discussion at start of section). One approach would be to assume the area plans developed in full, but was rejected because the total growth would have either significantly exceeded the ABAG control totals or would have "crowded out" the development pipeline of known projects in order to meet those control totals, neither of which was feasible or desirable from an analytical standpoint since the pipeline represented actually revealed developer interest. As this interest comprised a sizeable share of the control total, it was taken to embody more immediate location information.

---

[2] San Francisco Planning Department. (2010). "San Francisco Land Use Allocation. Summary Documentation". Memo From Aksel Olsen to Elizabeth Sall, January 27, 2010

[3] The Planning Department maintains a database of projects (the "development pipeline") as they move through the entitlement stages, obtain building permits and proceed with construction.

Generally, area plans such as Market Octavia and the Eastern Neighborhood suite (Mission, Showplace Square/Potrero Hill, Central Waterfront and East Soma) were treated as development *capacity* that could *enable* growth, rather than growth that would deterministically happen. This is consistent with what the plans are—a change to zoning controls bundled with fees on development, ensuring impacts are offset as growth proceeds, enabling private developers to over time develop – or not as the case may be–property according to the updated zoning designations. But zoned capacity is no guarantee that development will happen; and as it is, more than 73,000 units could be developed under existing zoning throughout the city.[4] Thus zoning plans, each representing for some areas several thousand parcels with scattered ownership, differ in nature from more defined projects such as Mission Bay and the Transit Center District Plan mentioned earlier, as each of these are characterized by a much more limited number of parcels and land owners, and/or the developer and funding sources may already be identified. Given the relatively large projection envelope, the pipeline could be largely accommodated within the projection horizon.

In the Geary corridor specifically, a sample of key projects included in the vicinity of the corridor for the land use projections are the CPMC Cathedral Hill hospital project; a 69-unit project at 1450 Franklin St; a 250-unit project at 1634 Pine St; a 107-unit project at 1634 Sutter St; a 113-unit project at 1545 Pine St; the refurbishment of Westside Courts along with the addition of new units per the Hope SF program; a 100-unit project at 701 Golden Gate Ave; a 200-unit project at 2501 Sutter St; a 400-unit project at 233 Ellis St. Figure 3 in Annex 2 shows allocated growth in the vicinity and beyond for households and jobs, respectively.

Overall, in the quarter mile area surrounding the Geary BRT corridor, the pipeline included nearly 90 projects, 5,900 units and nearly 9 million square feet of non-residential space. Much of this development, however, is in the downtown portion of this vicinity. Table 1 shows the relative pipeline contribution of just TAZs within one-quarter mile of the part of Geary Blvd. falling west of Van Ness Avenue.

Table 1: Summary of Geary Vicinity Pipeline

Section	Net Units	Net Office	Net CIE	Net Medical	Net PDR	Net Visitor	Net Retail
East of Van Ness (includes downtown portion)	4,129	5,698,522	95,115	0	-17,612	533,975	1,276,079
West of Van Ness Only	1,799	78,166	79,863	1,223,206	-37,026	-15,764	-54,221

[4] See Table I-57, *Housing Element 2009, Part I: Data and Needs Analysis*, San Francisco Planning Department.

PROJECTION CONSIDERATIONS

When modeling for the Geary BRT project began in early 2011, ABAG P2009 projections were the most recent official release, and so were used by the Transportation Authority for project modeling. 2015 projections were provided for the project opening year, and 2035 projections were provided for the horizon year. Also at the time, ABAG was developing and releasing a series of scenarios in connection with work on the regional Sustainable Communities Strategy (SCS). However, these preliminary projections in 2011 had no standing as official projection releases. ABAG completed this scenario work in the fall of 2013. Due to the regional importance of ABAG's SCS scenario development pursuant to new "smart growth" state legislation (Senate Bill 743), Transportation Authority staff analyzed the difference between the official P2009 series and a draft release of the new series of projections[5] to determine if using the new projections for the years 2020 and 2040 would significantly change growth assumptions in the Geary corridor.

Development in 2008 of ABAG's P2009 series predated the recession and thus the projections had considerably higher growth assumptions in the near- to medium-term than would actually occur. At the time, ABAG anticipated growth between 2010 and 2015 of 13,000 households. In its later P2011[6] projection, the growth that had been assumed for the near term in earlier projections instead shifted to later years in the projection time horizon. As illustrated in Figure 2, the growth curve shifted *right*, but not up, and the employment curve also has a lower overall trend. As a result, the differences in projected growth in households and jobs along the Geary Corridor between the P2009 projection for 2015 and the P2011 projection for 2020 only vary between one and three percent, as shown in Table 2. Accordingly, for the BRT analysis, which was done using the earlier projection, 2015 figures were used to model the 2020 opening year conditions while remaining consistent with the magnitude of the more recent projections series. Also as a result of the shift of projected growth to later years commensurate with the recession, the P2009 2035 projection forecasts similar levels of household growth and higher levels of job growth compared to the 2011 projection for 2040. This makes it reasonable to use the earlier P2009 series projection for 2035 instead of the P2011 projection for 2040.

[5] The scenario was named "focused future".

[6] P2011 refers to early versions of the Jobs-Housing-Connection projection series released in connection with the regional Sustainable Communities Strategy crafted by the Association of Bay Area Governments.

Figure 2: Comparison of P2009 and P2011 Projections for Geary Corridor TAZs West of Van Ness Avenue

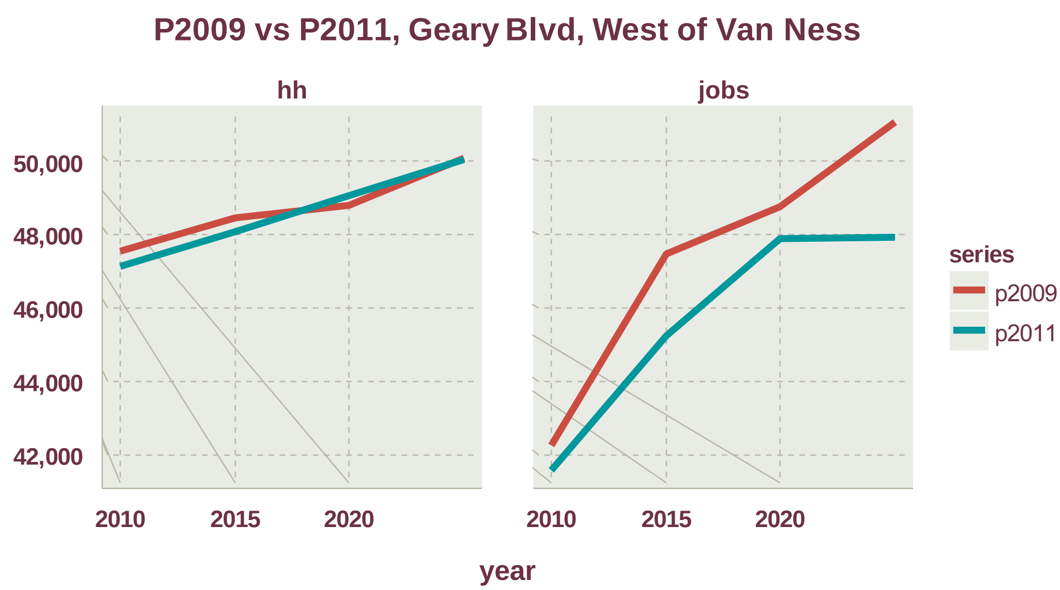


Table 2: Comparison of P2009 2015 and P2011 2020 Projections in Geary Corridors TAZs

Section	P2009 Households 2015	p2011 Households 2020	House-holds Percent Difference	P2009 Jobs 2015	p2011 Jobs 2020	Jobs Percent Difference
West of Van Ness Only	48,458	49,062	1.2%	47,474	47,888	0.9%
Remaining Geary TAZs	18,983	19,274	1.5%	101,382	102,134	0.7%
Geary Total	67,441	68,336	1.3%	148,856	150,023	0.8%

Annex 1 Data Tables

Table 1 ABAG Projections Series 2009, San Francisco Subset

ABAG Sector	2010	2015	2020	2025	2030	2035
Agriculture & Natural Resources	1,020	1,020	1,020	1,020	1,020	1,020
Construction	27,060	29,390	31,810	35,540	39,020	42,250
Manufacturing & Wholesale	25,760	28,580	31,920	34,570	37,920	40,140
Retail	45,000	47,890	51,080	58,470	63,070	68,070
Transportation & Utilities	28,150	28,960	29,970	30,170	30,970	32,790
Information	36,860	39,260	41,590	45,570	49,420	53,510
Financial & Leasing	79,720	83,810	89,230	96,600	103,400	111,640
Professional & Managerial Services	101,960	108,970	118,060	129,400	139,790	150,910
Health & Educational Services	101,810	109,010	115,390	119,680	129,400	139,880
Arts, Recreation & Other Services	96,990	104,000	110,260	114,700	123,460	133,460
Government	24,400	25,650	26,860	29,110	30,630	33,160
Jobs, Total	**568,730**	**606,540**	**647,190**	**694,830**	**748,100**	**806,830**
Households	346,680	359,170	372,750	386,800	400,700	415,000

Table 2 ABAG Projections Series 2009 Converted to Landuse Sectors, San Francisco Subset

Land Use Sector	2010	2015	2020	2025	2030	2035
CIE	67,718	72,524	76,817	79,847	86,229	93,214
MED	51,889	55,563	58,831	61,048	66,008	71,349
MIPS	255,668	271,562	290,965	316,227	339,815	366,479
PDR	73,170	78,277	83,862	90,015	96,916	103,897
RETAIL/ENT	103,732	110,866	117,898	128,117	138,062	149,114
VISITOR	16,553	17,749	18,818	19,575	21,070	22,777
Total	568,730	606,540	647,190	694,830	748,100	806,830

Table 3 Citywide Growth Summary, P2009 "Standard" (See Figure 2 for a map of districts)

Planning District	Households_growth	MIPS_growth	CIE_growth	RET_growth	VIS_growth	PDR_growth	MED_growth
Balboa Park	1328	49	4	21	0	46	0
Bernal Heights	355	1002	381	646	45	25	1188
Buena Vista	290	57	125	247	17	0	682
BVHP Area A,B	1810	3449	895	1506	102	6348	545
Candlestick	6880	454	0	1830	0	33	0
Central	432	128	400	664	42	0	213
Central Waterfront	550	9276	1845	1738	98	742	502
Downtown	4190	14574	1041	2869	75	-50	504
East SoMa	1822	3584	392	778	561	69	220
Executive Park	2684	-395	11	244	0	1	0
Glen Park Compact	5	7	6	9	2	0	0
Golden Gate Park	0	0	0	0	0	0	0
HP Shipyard	3799	15063	0	202	451	1049	0
India Basin	1389	2047	94	237	227	178	58
Ingleside, Other	478	4107	3269	5418	393	0	2011
Inner Sunset	304	129	428	720	54	1	244
Japantown	562	35	832	1369	101	0	512
Marina	512	347	697	1171	80	2	-20
Market Octavia	2114	938	589	963	56	38	362
Mission	1642	2292	1181	1922	139	958	712
Mission Bay	2390	15694	208	101	89	2	4649
Northeast	1359	4543	990	1420	613	-20	464
Other S Bayshore	1013	8159	1711	2832	201	4344	1046
Outer Sunset	476	125	1244	2218	128	1	728
Park Merced	5754	288	80	799	0	0	0
Presidio	322	1592	190	81	130	2	0
Richmond	844	293	1385	2302	153	0	817
Rincon Hill	2352	-145	2	105	0	0	0
SFSU	624	3	732	0	0	0	0
Showpl/Potrero	1285	1822	2107	1607	114	742	588
South Central, Other	2643	473	2193	3711	252	50	1307
South of Market	242	3135	22	214	733	10	15
TB Combo	5252	25707	115	1600	2400	-2	0
Treasure Island	6846	351	854	900	500	86	0
VisVal	1188	-17	40	286	0	1	0
Western Addition	1529	657	1347	1810	121	4	4213
WSoMa	3404	3311	141	2025	22	416	30
Grand Total	**68669**	**123134**	**25551**	**44565**	**7899**	**15076**	**21590**

Figure 3 LUA Planning Summary Districts

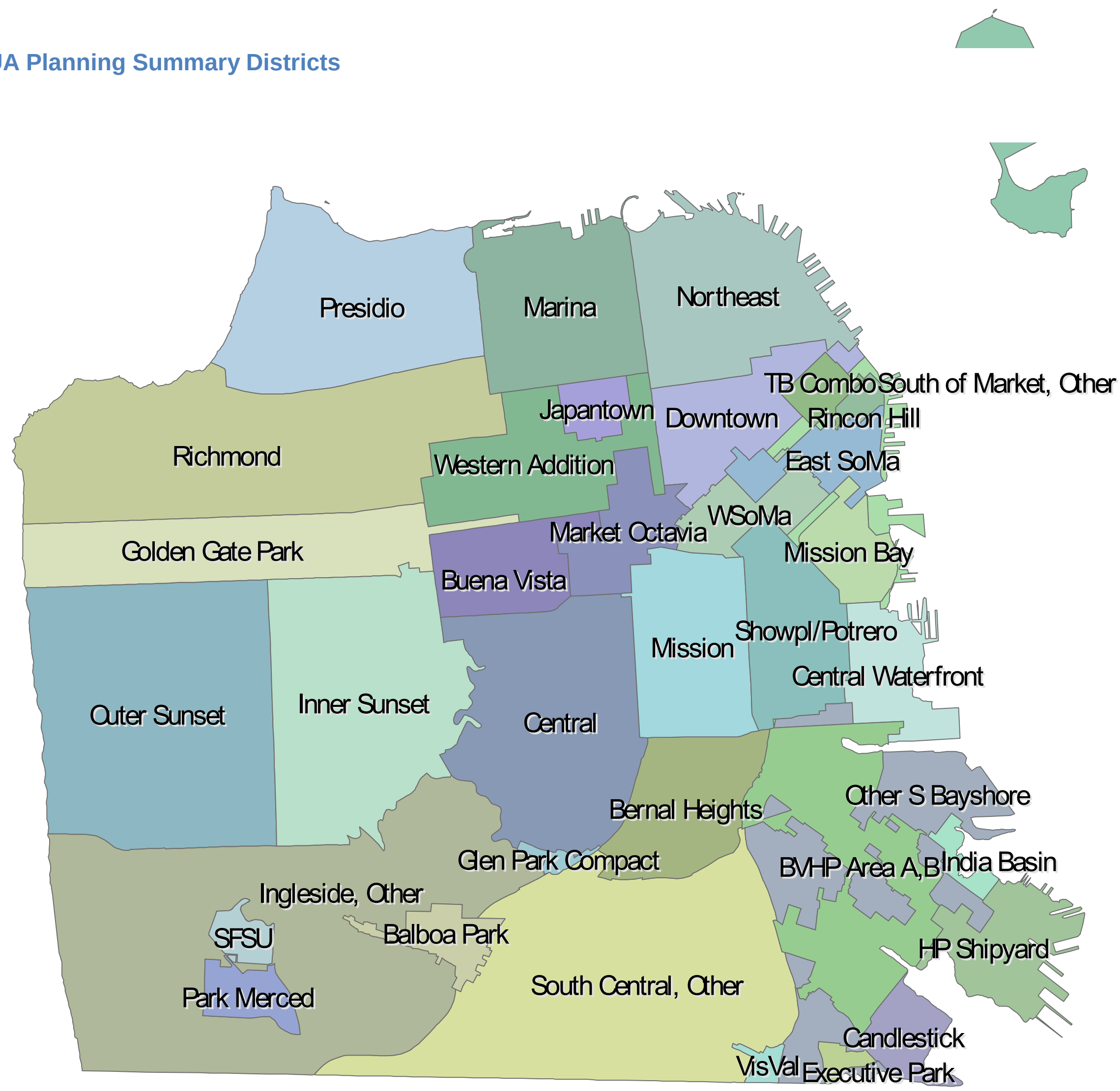
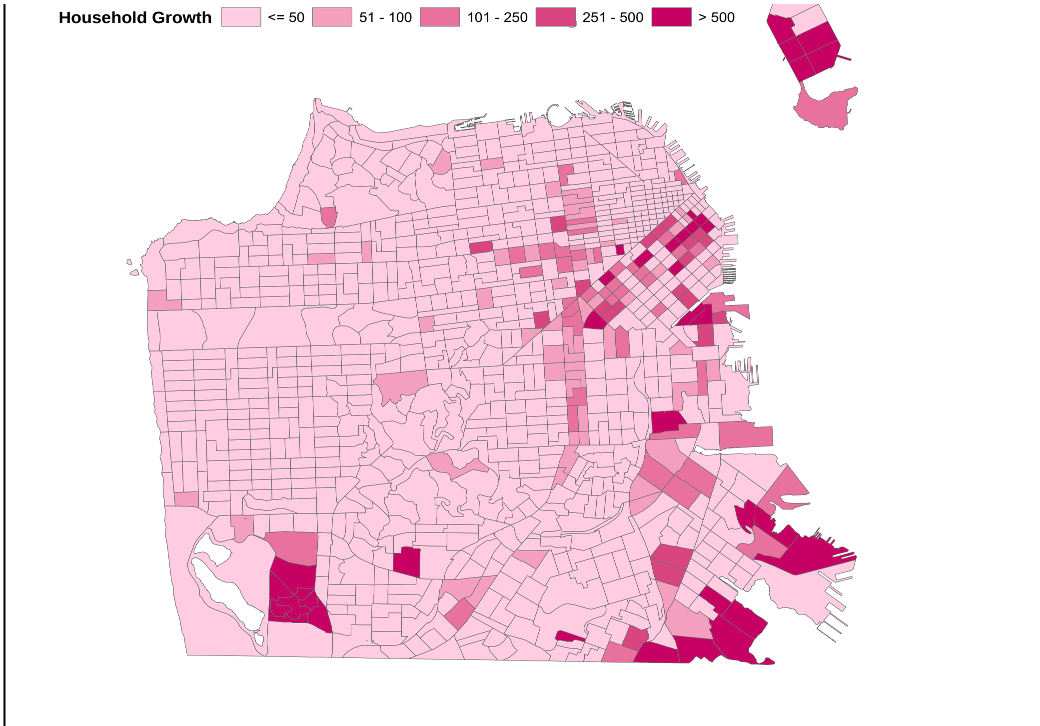


Figure 4 **Panel A: Allocation of Projected Growth in Households, 2010-2035**
Panel B: Allocation of Projected Growth in Employment, 2010-2035
Source: San Francisco Planning Department LUA 2009



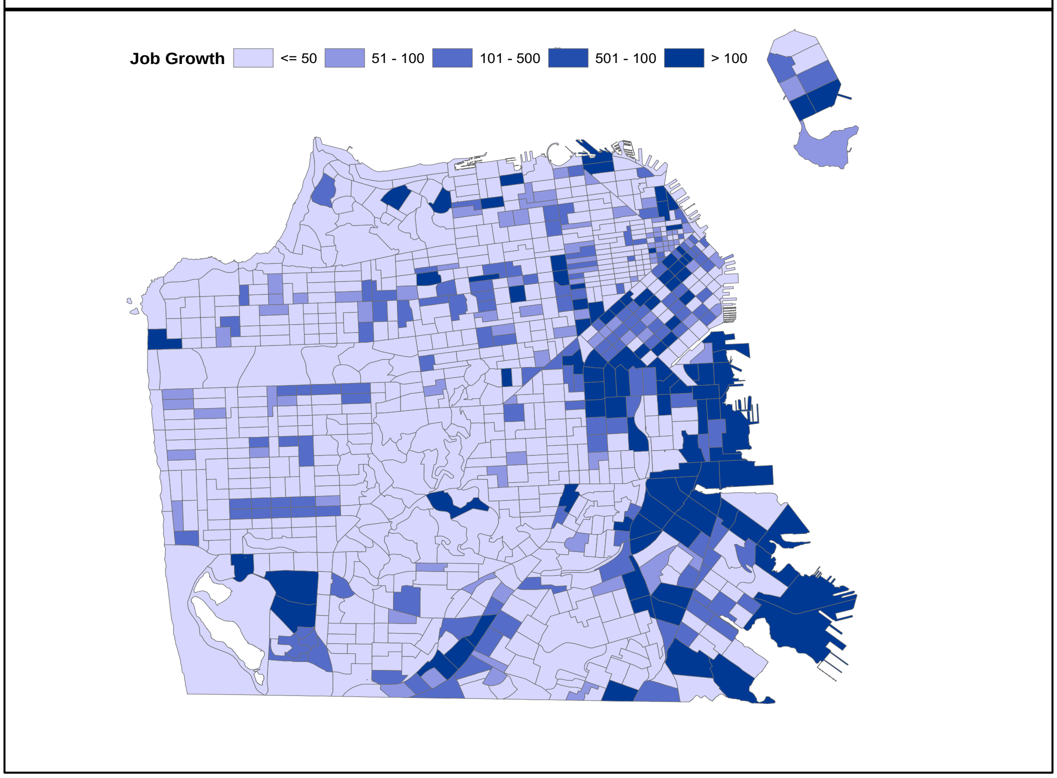


Table 4 Residential projects adding more than 50 units or more than 50,000 sf non-residential square feet

Name	TAZ	Net Units	Net Office	Net CIE	Net Medical	Net PDR	Net Visitor	Net Retail
Sunnydale Phased Project	12	1333						
1169 MARKET ST	621	1083	0	0	0	0	0	33540
Estimated Moscone East Convention Center Expansion & Mixed Use Project	690	900	750000				425000	375000
Potrero Hill Phased Project	152	872						
201 Folsom St	765	806	0	0	0	0	0	0
1401 MARKET ST	608	719	0	0	0	0	0	12250
Estimated Harrison Gardens Residential Project	640	600					8500	
300 SPEAR ST	765	541	0	0	0	0	36000	0
Estimated San Francisco Chronicle Site Mixed-Use Project	685	539	1100000				100000	
Hunters View Phased Project	445	533						
Transbay Redevelopment	764	526	0				6000	0
1000 16TH ST	651	450	0	0	0	0	0	26500
55 Laguna Street	243	440	0	12590	12000	0	0	3500
Transbay Redevelopment	730	430	0				3979	0
Transbay Redevelopment	731	421	0				6460	0
350 08TH ST	598	416				3700		53000
231 ELLIS ST	678	400	11000	0	0	0	0	11000
Transbay Redevelopment	781	364	0				3317	0
Transbay Redevelopment	731	355	0				10000	0
5800 03RD ST	906	355	0	0	0	-103000	0	13000
Palace Hotel sw corner	742	353	0	0	0	0	5062	0
425 First Street Phase II	981	340	-75816	0	0	0	0	0
101 EXECUTIVE PARK BL	880	340	0	0	0	0	0	14000
Westside Courts Phased Project	310	314						
45 LANSING ST	732	305	-15000	0	0	0	1000	0
Estimated 2nd & Harrison Mixed-Use Project	692	300	647000				30000	240000
41 Tehama Street (Block 3736, Lots 074-078A)	730	276	0	0	0	0	5062	0
1634 PINE ST	330	250	12000					-11552
1333 GOUGH ST	706	231	0	0	0	0	0	0
1390 MARKET ST	647	230	-9500	0	0	0	0	8000
Estimated 706 Mission Residential Tower & Mexican Musuem Project	744	220		60000			8000	
833-881 Jamestown	880	198	0	0	0	0	0	0
2235 03RD ST	558	196	0	0	0	0	0	5339
1880 MISSION ST	236	194	0	0	0	-63512	0	0
655 04TH ST	642	192	0	0	0	-17640	0	15284
Transbay Redevelopment	731	189	0				2898	0
1540 MARKET ST	588	180	-22827					9575
220 GOLDEN GATE AV	302	172	-13670	0				-17020
8 Washington Street	814	170	1500	0	0	0	0	30600
168 EDDY ST	678	170						15000
1400 MISSION ST	608	165	0	0	0	0	0	3640
50 01st Street (Block 3708, Lots 006-7, 009-012, 055	740	165	924550	0	0	0	11551	247832
Transbay Redevelopment	764	162	0				4575	0
900 MINNESOTA ST	536	160	0	0	0	-144260	0	15000
1150 OCEAN AV	915	159	0	0	0	0	0	15100
938 HOWARD ST	668	154	0	0	0	-25000	0	6044
3575 GEARY BL	288	150	53957	0	0	0	0	-33000
Transbay Redevelopment	764	150	0				9942	0
746 LAGUNA ST	268	143	-19620	0	0	0	0	21945

Name	TAZ	Net Units	Net Office	Net CIE	Net Medical	Net PDR	Net Visitor	Net Retail
Transbay Redevelopment	781	137	0				1247	0
1 HAWTHORNE ST	690	135	-32279	0	0	0	0	7000
555 Market St	740	134	-102515	0	0	0	0	0
800 Brotherhood Way	884	127	0	0	0	0	0	0
2558 MISSION ST	176	125	0	0	0	0	0	0
Transbay Redevelopment	731	123	0				0	0
365 FULTON STREET	619	120	0	0	0	0	0	0
134-140 NEW MONTGOMERY ST	743	118	-89820					5160
1415 MISSION ST	609	117	2430	0	0	-4480	0	2350
Transbay Redevelopment	781	116	0				1056	0
1960-1998 MARKET ST	243	115						9000
1844 MARKET ST	248	113	-996	-1071	0	0	0	5100
1529 PINE ST	327	113				-18176		10000
1545 PINE ST	327	113	-16000	0	0	-12000	0	10000
2550 VAN NESS AV	367	109	0	0	0	0	-54298	2945
1285 SUTTER ST	319	107						-8308
Golden Gate University (Block 3708, Lot 098)	740	104	726670	-175000	0	0	7088	155715
Rosa Parks Annex	281	100						
973 MARKET ST	667	100	-58450	0	0	0	0	5700
1036-1040 MISSION ST	666	100						1256
701 GOLDEN GATE AV	683	100	0	0	0	0	0	0
Parcel F (Block 3721, Lot 015A)	741	96	670075	0	0	0	5344	143588
277 GOLDEN GATE AV	286	88	-49945	0	0	0	0	0
333 FREMONT ST	767	88	-30417	0	0	0	0	0
Transbay Redevelopment	732	87	0				0	0
2655 BUSH ST	715	84	0	0	-45117	0	0	4500
Transbay Redevelopment	764	83	0				2335	0
125 MASON ST	678	81	0	0	0	0	0	0
620 SUTTER ST	735	78	0	0	0	0	-51085	4650
Transbay Redevelopment	764	77	0				2160	0
72 TOWNSEND ST	727	74						
1301 Indiana St.	535	71	0	0	0	-14800	0	5000
401 Grove Street	619	70						7000
1450 FRANKLIN ST	330	69	0		0	0	0	-24000
350 Mission (Block 3710, Lot 017)	774	67	380988	0	0	0	4725	100926
245 HYDE ST	300	65	-24240					-2400
Transbay Redevelopment	768	64	0				0	0
5050 MISSION ST	32	61						7030
181 Fremont (Block 3719, Lots 010-11)	942	61	380416	0	0	0	3825	90882
472 ELLIS ST	702	60	0	0	0	0	-65926	0
3400 CESAR CHAVEZ ST	129	60						2147
south side Howard bet 1st and 2nd (Block 3736, Lot 111)	730	58	-75000	0	0	0	3625	0
149 MASON ST	678	56	0	0	0	0	0	0
690 STANYAN ST	240	56	0	0	0	0	0	10800
2800 SLOAT BL	99	55	0	0	0	0	-16344	26000
474 NATOMA STREET	668	55						
1 ECKER ST	740	51	-233620	-5300	0	0	0	0
Parcel M (Block 3718, Lot 27 – northern portion only)	781	0	90000	0	0	0	3750	0
525 HOWARD ST	730	0	252500	0	0	-10230	0	9518
SE corner of 2nd/Howard (Block 3736, Lots 094-098)	730	0	196000	0	0	0	2500	0
1001 POTRERO AV	189	0		419070				
South side Howard bet. New Mnotg'y and 3rd (Block 3735, Lots 039-040)	690	0	146320	0	0	0	2800	0
Transit Tower – Parcel T (Block 3720, Lot 001)	943	0	1526200	0	0	0	7425	0
120 HOWARD ST	780	0	67000	0	0	0	0	0

Name	TAZ	Net Units	Net Office	Net CIE	Net Medical	Net PDR	Net Visitor	Net Retail
949 Market Street	667	0	-74700					312000
942 MISSION ST	667	0	0			-17612	63286	7840
1301 CESAR CHAVEZ ST	491	0	88564			-6585		
835-845 Jackson St	346	0		68010				
802 DAVIS ST	830	0	0	0	0	0	245400	0
North side Howard bet. New Mnotg'y and 3rd (Block 3722, Lots 011, 012, 014, 023, 024, 026)	690	0	362600	0	0	0	5400	0
600 BATTERY ST	826	0	92400					
455 Mission Bay S Blvd	649	0	317248					16697
535 MISSION ST	741	0	293750	0	0	0	0	2680
222 02nd Street	690	0	439195	0	0	0	5383	0
524 Howard (Block 3721, Lots 013 -015)	741	0	493185	0	0	0	6258	0
491 BAY SHORE BL	484	0	0	0	0	0	0	150265
1455 03RD ST	650	0	373499					7500
1600 OWENS ST	653	0	245000					
399 GOLDEN GATE AV	286	0	0	0	0	0	0	53000
350 BUSH ST	789	0	340000	0	0	0	0	7300
345 BRANNAN ST	694	0	49500					3530
300 CALIFORNIA ST	945	0	61600					
300 16TH ST	929	0	312932					
350 MASONIC AV	663	-1	0	69308	0	0	0	0
1401 DIVISADERO ST	670	-21	57000	0	0	0	0	0

Appendix D2-2: 2017 Land Use Validation

SAN FRANCISCO
PLANNING DEPARTMENT

MEMO

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

DATE: May 9, 2017

TO: Liz Brisson, SFMTA
Colin Dentel-Post, SFCTA

FROM: Scott T. Edmondson, AICP, SF Planning

RE: **Land Use Assumptions for the Geary Blvd Bus Rapid Transit Environmental Impact Statement/ Environmental Impact Report Transportation Modeling**

This memo updates the 2014 reassessment of the Planning Department's land use allocation assumptions (referred to hereafter as the "2014 Memo") that were used as inputs to the Geary Corridor Bus Rapid Transit (BRT) Project Transportation Analysis of the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) prepared by the San Francisco County Transportation Authority ("SFCTA"). [1]

Summary

This 2017 reassessment reviews growth and other changes since the 2014 Memo. This assessment concludes, similarly to the 2014 Memo, that ABAG's regional Projections 2009 (P2009), including its city-county totals for San Francisco, and SF Planning's allocation of that growth citywide and to the Geary BRT Study Area, still provide a reasonable conservative estimate of expected growth for "worst-case" environmental impact analysis, and that no more analysis is required, as follows.

1. **The official ABAG regional Projections have not been updated since the 2014 Memo and therefore there is no new regional information that would suggest any need for a reanalysis**.
2. **Although the draft ABAG regional P2017 projections being prepared as part of the regional Plan Bay Area Update forecast more households and fewer jobs (see Appendix Table 1), the P2009 citywide and the allocation to the study area continues to be a reasonable expectation on the upper limits of future growth.** All of the projections, from P2009 thru draft P2017, reflect an aggressive, aspirational policy-based forecast for San Francisco (city-county totals), not simply an economic-based forecast. For San Francisco, realizing the regionally desired policy-based level of growth in any of the forecasts would require difficult policy changes and real estate development production at levels substantially higher than historical levels year over year, both of which are not highly likely.
3. **Recent growth and the citywide "pipeline" of development projects reflect an accelerated catch-up from the recession and a local economic boom, neither of which can be expected to last for 30 years. Thus, the P2009 forecast and citywide allocation to the study area continue to represent a reasonable expectation on the upper limit of growth and no traffic reanalysis would thus be required.** Most likely, the current growth burst will pull the P2009 forecasted growth forward into the first part of the forecast period.

---

[1] Memo, Aksel Olsen (SF Planning) to Colin Dentel-Post (SFCTA), RE: Land Use Assumptions for the Geary Blvd. Bus Rapid Transit Environmental Impact Statement/Environmental Impact Report Transportation Modeling, September 12, 2014.

4. **The 2016 Pipeline's higher household growth for the West of Van Ness sub Study Area would be expected to represent growth within the study area allocation from the P2009 San Francisco totals, and no new analysis would be required.** Comparing the 2009 and 2016 pipelines for the project Study Area (see Appendix Table 2) reveals a substantially smaller pipeline for non-residential development in both the East and West of Van Ness sub study areas. It also reveals lower residential development in the East of Van Ness sub study area (2,430 vs 4,130 units), and higher residential development in the West of Van Ness sub study area (2,300 vs 1,800 housing units). Again, because of the limits on continual high annual growth, the expectation would be that this higher pipeline in the West of Van Ness study area is bringing forward the P2009 expected growth for the period and that there is no basis for expecting that household growth in the West Van Ness study area would exceed P2009 for the analysis years 2020 and 2035.
5. **The study area has not been included in any new or updated area plans that may have encouraged the** aspirational policy-based forecast embodied in ABAG's P2009 through P2017 projections nor has the area included any **upzoning action since the 2014 Memo, thus its development capacity and relative attractiveness to development has not changed since the P2009, and no new analysis would be required.**

For these reasons, the P2009 forecast and SF Planning's sub-city allocation of P2009, including to the study area, reflect a reasonable expectation of the upper limits of future growth, and thus traffic reanalysis would not be required. These points are developed in more detail in the next section.

2017 Assessment

The issue is whether growth since year 2009, or any other changes, have so substantially outpaced or otherwise deviated from ABAG's regional Projections 2009 (P2009) and SF Planning's sub-city allocation of those projections, including to the study area, used in the modelling such that a reassessment now would be warranted. The 2014 Memo concluded no further analysis was required as follows.

1. ABAG's unofficial regional Projections 2011 (P2011) forecast the same total household growth and less total job growth for the City and County of San Francisco over the period. It also adjusted for the 2009 recession by shifting growth from early to later in the projection period. Thus, the P2009 represents the higher and more conservative forecast.
2. ABAG completed its projections work begun in 2011 in the Fall of 2013, and released a new official regional Projection 2013 series (P2013) with city totals for San Francisco.[2] The P2013 forecast totals for San Francisco were exactly the same as P2011 for households and five percent higher in 2035 for jobs (see Appendix Table 1 and Figures 1 & 2, below). Subsequently, the SF "County Transportation Authority staff analyzed the difference between the official P2009 series and a draft release of the new series of projections to determine if using the new projections for the years 2020 and 2040 would significantly change growth assumptions in the Geary corridor."[3]

---

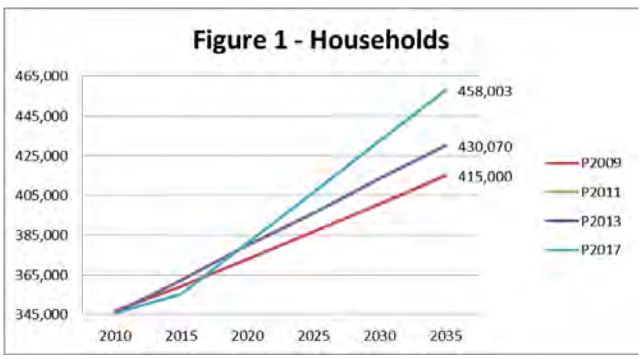
[2] See http://abag.ca.gov/planning/research/forecasts.html, viewed May 9, 2017.

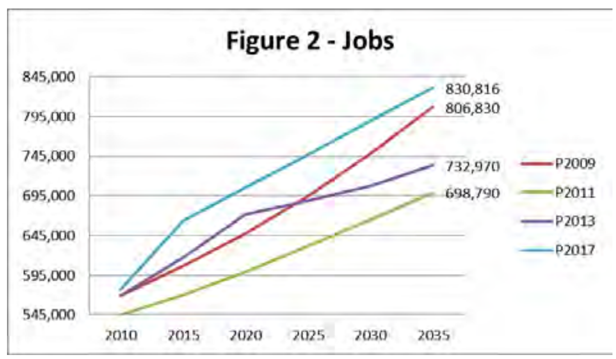
[3] Memo, Olsen, *op. cit.*, p 5.

The following discussion assesses the implications for needing further analysis because of changes since the 2014 Memo, as follows.

1. **The official ABAG regional Projections have not been updated since the 2014 Memo and therefore there is no new regional information that would require a reanalysis** (see Appendix Table 1, & Figures 1 & 2, below; note: because the household forecast for P2011 & P2013 are the same, only the P2013 graph line is shown in Figure 1, with the P2011 line invisible "underneath" it.).

2. **ABAG's most recent, unadopted, draft regional projections for the Plan Bay Area 2017 Update's Preferred Scenario (November 2016) are 84 percent higher for households growth and 17% lower for employment growth from 2015-2035 than the P2009 projections, although the forecast levels of employment for 2015 and 2035 are higher. Yet, achieving the aggressive aspirational policy-based forecasts of all of ABAG's regional Projections for San Francisco is unlikely because it would require difficult policy changes and continual rates of production at levels substantially higher than historic levels. Thus, the P2009 forecast for San Francisco and the Planning Department's sub-city allocation continue to represent a reasonable upper limit on forecast growth for worst-case environmental impact analysis and reanalysis would not be required.**





Although P2017 is higher than P2009 for households and lower for jobs, realizing ABAG's the P2017 aggressive growth projections would require difficult policy changes to increase performance consistently, year-over-year, or consistent production above historical levels otherwise, both of which are unlikely. Thus, the P2009 regional projections of citywide totals for San Francisco and SF Planning's sub-city allocation, including to the study area, likely represent a reasonable upper limit of San Francisco's growth for "worst-case" environmental impact analysis.

i. Appendix Table 1 shows that even P2009 Household growth projections would require production of about 2,800 units per year compared to a 1,860 unit annual historical average (1997-2016).[4]

[4] SF Planning Department, *Housing Inventory 2016*, Table 2, SF Housing Trends.

ii. Appendix Table shows that even the new, 2017 draft projections' lower job growth of 8,300 jobs per year compared to the 10,000 per year of P2009 would be well above the 1990-2000 historical average of 6,300 jobs per year.[5]

3. **Table 2 indicates that recent net new growth has been limited citywide and below projections. Thus, it is unlikely that the actual growth over the 2010-2035 study period will exceed those of P2009.** Net new growth is growth that requires new space compared to filling existing vacant space (from the 2009 recession). Even the relatively high annual near-term growth in SF following the 2009 recession beginning in 2012 reflects a "catch" up or "replacement" growth going into existing space vacated during the 2009 recession. That pace of growth cannot be sustained over the medium to long term (see Point 2, above). In addition, anecdotal information suggests that labor and materials have reached supply limits over the past few years in spite of record high costs. Current year planning and building permit applications indicate growth is slowing down, even leveling off, compared to the high growth of the past few years.

Table 2 – ABAG Projections Compared to Actual Near-Term Development

	ABAG Projections 2009 for Years 2010-16	Actual Growth -- 2010-16
Households	15,206	14,668[1]
Jobs	45,940	7,088[2]

Notes:
1. Unit growth adjusted by a 2.5% vacancy rate to estimate household growth.
2. Real job growth rebounded strongly from the great depression of 2009, with the addition of about 90,000 jobs from 2010-2015. However, all but 3,200 jobs were accommodated in existing vacant space, not net new space.

4. **Additionally, the larger 2016 Pipeline fits within the Projections evaluated to date and would not be expected to yield growth exceeding Projections 2009 citywide for the reasons stated in Point 2a, and therefore not require reanalysis. We would also not expect the larger 2016 Pipeline to disproportionately affect SF Planning's allocation to the Study Area in general, and particularly for the Study-Area-specific assessment of the pipeline in Point No. 4, below, and therefore not require reanalysis.** Comparing San Francisco's citywide development project Pipeline 2016 (see Table 3) with the Pipeline 2009 for projects greater than 50 housing units and 50,000 square feet of commercial space indicates a larger pipeline approximately 36 percent higher than Pipeline 2009. This likely reflects the post-2009 recession boom and may not fully develop. Both pipelines typically reflect the near to medium 5-10+ year development periods, aside from three big projects that will build out over a longer 20+ year timeframe. Those projects are Hunters Point/Candlestick Point, Park Merced, Treasure Island, and they total about 22,000 units and 4.7 million square feet.

   However, the Pipeline is not guaranteed development. All those real estate projects are sensitive to business cycles and economic conditions, including the limits on rates of sustained, year over year industry production discussed above in Point 2a. In this light, the current Pipeline may take longer to build out than the typical 5-10 year period, but would not be expected to exceed Projections 2009.

[5] ABAG Projections, Total Employment, year1990, 579,180 jobs, year 2000, 642,500 jobs.

In addition, neither Pipeline exceeds the P2009 Projections 2010-2035 nor 2015-2035 (see Appendix Table 1). However, the 59,000 households in the 2016 Pipeline exceeds the P2009 projected growth from 2015-2035 of 55,830 households. However, it fits within P2009 after adjusting for more recent data on 2010 household levels and 2010-2015 growth contained in the P2017 series of Appendix Table 1 (+4000 units to the P2009 2015-2035 growth of 55,830, for a total of 59,830). Again, actual growth expected for the period would likely not exceed Projections 2009 for the City or the study area for the reason stated in Point 2a and developed in Point No. 5, below, and reanalysis would not be required.

Table 3 – Pipeline Projects Compared				
Pipeline	**Count**	**Units**	**Commercial GSF**	**Jobs**
2016 (Q4)	197	59,000	22.5 million	75,750
2009 (Q4)	144	43,500	16.4 million	55,500

5. **Even though the Citywide Pipeline has grown since 2009, it has shrunk in the study area indicating that Projections 2009 will likely not be exceeded within the Study Area and reanalysis would not be required.** Appendix Table 2 compares current pipeline projects in the study area to that of 2009. The comparison reveals fewer units and much lower commercial space in development, particularly in the East of Van Ness Study Area. The exception being 534 more housing units in the 2016 Pipeline in the West of Van Ness sub Study Area (2,333) compared to Pipeline 2009 (1,799). In addition, the 2016 Pipeline has 119 more projects (209) than the 2009 Pipeline (90), indicating more small-project activity now.

6. **The Geary Corridor has not been rezoned recently; thus the corridor's capacity for growth, and therefore its attractiveness to the real estate market has not changed, and therefore would not warrant reanalysis.**

APPENDIX - DATA

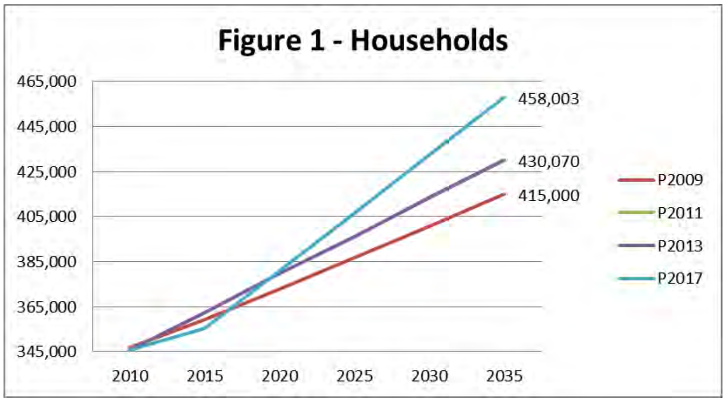
Table 1 - ABAG Projections Compared

Series	2010	2015	2020	2035	Difference with 2009	2015-2035	Difference with 2009	2015-35 Annual	2010-2035	Difference with 2009
HOUSEHOLDS										
P2009	346,680	359,170	372,750	415,000		55,830		2,792	68,320	
P2011/1/	345,811	362,440	379,600	430,070	4%	67,630	21%	3,382	84,259	23%
P2013	345,811	362,440	379,600	430,070	4%	67,630	21%	3,382	84,259	23%
P2017/2/	345,811	355,217	380,913	458,003	10%	102,787	84%	5,139	112,192	64%
JOBS										
P2009	568,730	606,540	647,190	806,830		200,290		10,015	238,100	
P2011/1/	544,750	569,720	599,060	698,790	-13%	129,070	-36%	6,454	154,040	-35%
P2013	568,720	617,420	671,230	732,970	-9%	115,550	-42%	5,778	164,250	-31%
P2017/2/	576,850	664,079	705,763	830,816	3%	166,737	-17%	8,337	253,966	7%

Notes:

/1/ It's a P2009 Update. Year 2040 estimated from average annual growth of P2009 projection series 2010-35.

/2/ Draft Preferred Scenario; 2010-2015 represents actual growth of 87,200 jobs, of which only 4,000 jobs was accommodated in new space, with the balance going into existing space vacant since the 2009 recession.



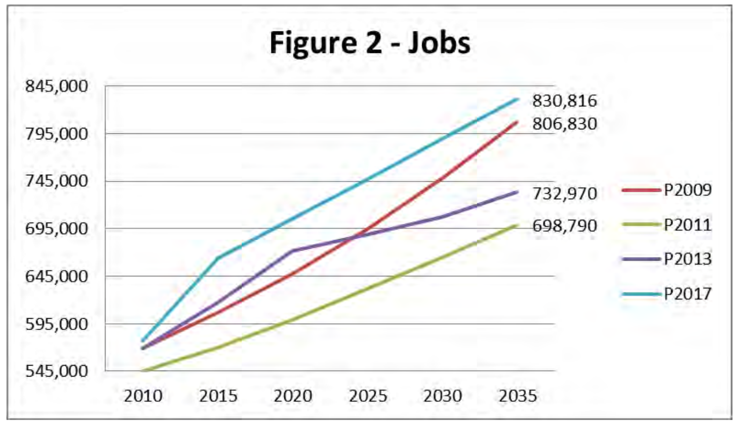


Table 2 - Comparative Summary of the Geary Corridor Pipeline

Pipeline Project Summary: > 50 Units (2016 Q4) East & West of Van Ness

Geary BRT Corridor Study Area *(1/4 mile buffer; from Market Street to the Pacific Ocean)*

			NET GROSS SQUARE FEET (GSF) & JOB GROWTH						
COUNT	**AREA**	**UNITS_NET**	**TOTAL**	**CIE**	**MEDICAL**	**OFFICE**	**PDR**	**RETAIL**	**VISIT**
Pipeline 2016 - 2009									
	EAST of Van Ness	(1,710)	(6,520,108)	639,111	0	(5,225,153)	(19,353)	(1,374,845)	(539,868)
	WEST of Van Ness	534	(1,563,184)	(268,860)	(1,220,693)	(216,250)	41,102	85,753	15,764
119	TOTAL	**(1,176)**	**(8,083,292)**	**370,251**	**(1,220,693)**	**(5,441,403)**	**21,749**	**(1,289,092)**	**(524,104)**
Pipelne 2016									
	EAST of Van Ness	2,419	1,065,971	734,226	0	473,369	(36,965)	(98,766)	(5,893)
	WEST of Van Ness	2,333	(288,960)	(188,997)	2,513	(138,084)	4,076	31,532	0
209	TOTAL	**4,752**	**777,011**	545,229	2,513	335,285	(32,889)	(67,234)	(5,893)
Pipeline 2009									
	EAST of Van Ness	**4,129**	7,586,079	95,115	0	**5,698,522**	(17,612)	1,276,079	533,975
	WEST of Van Ness	**1,799**	1,274,224	79,863	1,223,206	78,166	(37,026)	(54,221)	(15,764)
90	TOTAL	**5,928**	**8,860,303**	**174,978**	**1,223,206**	**5,776,688**	**(54,638)**	**1,221,858**	**518,211**

Notes:

The 2009 Pipeline information is from the 2014 Memo, Table 1, Summary of Geary Vicinity Pipeline, p 4.

The 2016 Pipeline is Quarter 4, Informaiton & Analysis Group, SF Planning.

Appendix D 3-1: Champ Validation

Memorandum

TO: Elizabeth Sall, SFCTA

FROM: Ron West and Michelle Bina, Cambridge Systematics

DATE: November 3, 2011

RE: **Geary BRT – 2008 CHAMP Model Validation**

This memo documents the refinements made to SF-CHAMP 4 Regional Travel Demand Model for the Geary BRT EIR and the 2008 Base Year Validation. While SF-CHAMP 4 is calibrated to 2000 data, the Authority validates the model results for 2000, 2005, 2008, and 2010 because of significant changes in conditions during this period. Changes to the model include network and land use changes for the Year 2008.

Results from CHAMP model runs will be used to obtain regional travel demand. Transit ridership from the model, after post processing, will be used directly to estimate future ridership. CHAMP auto trips to/from/within the study area will be used as an input to a Dynamic Traffic Assignment model which will be used to inform a microsimulation model.

Validation results presented in this memo refer to the latest data available (date of data provided for each source) and will focus on the Geary BRT Study Area, the neighborhoods of Richmond, Pacific Heights, Laurel Heights, and the Western Addition in the northwestern portion of San Francisco in order to validate the model for use in the Geary corridor but will also provide citywide and regional statistics as well.

Base Year Network and Land Use

Using the 2005 network as the base, roadway construction projects between 2005 and 2008 were coded into the network. For all Bay Area bridges, tolls were updated to the correct values for 2008 (though kept in 1989 dollars in order to be consistent). These projects included new roadways in the Mission Bay area and new HOV lanes throughout the Bay Area. Using the 2005 Muni service as the base, the updated Muni network included the extension of the Muni Metro K line into the K-T terminating in Sunnydale, and small changes to stop nodes and frequencies of service to reflect 2008 conditions.

The Land Use assumptions for the 2008 model are assumed to be consistent with the 2010 ABAG Projections 2009 control totals and distributed within the county by the San Francisco

Planning Department based on planned and projected pipeline and soft-site development. 2008 demographics are consistent with the 2010 ABAG Projections 2009 assumptions.

Model Improvements

SF-CHAMP 4.1.0 reflects several improvements and bug-fixes to SF-CHAMP 4.0. The largest change between the two versions is a more detailed workplace location choice calibration between the Richmond district, on the western side of the city, and the Eastern Neighborhoods. The flow of travel through these neighborhoods directly affects the ridership on the Muni lines on and alongside Geary Boulevard and was therefore focused on for improvement in order to support Geary BRT EIR. Model Calibration was undertaken using 2000 data. Changes to the model coefficients and calibration statistics can be found online at http://www.sfcta.org/modeling-and-travel-forecasting#sfchamp.

Other than bug fixes and speed improvements, the other main change from SF-CHAMP 4.1.0 is the elimination of a 'congestion factor' in the Travel Time BPR equations which was added during a previous calibration exercise as an ad-hoc fix. See *San Francisco Travel Demand Forecasting Model: MTC Consistency Report* and *Development of the Regional Pricing Model (SF-CHAMP 4)* for more information on SF-CHAMP 4 development.

Transit Validation

The modeling team validated base year transit assignments to 2007-2009 observed ridership data with estimated ridership data for the major transit operators, including Muni and BART. For SF-CHAMP 4.1.0, the modeling team focused particularly on transit ridership along the Geary BRT corridor. Fall 2007 ridership Automatic Passenger Counters (APC) data provided by MTA was used for regional and systemwide MUNI validation. Additional APC data from January and February 2009 was used to supplement the validation analysis. 2008 BART boardings data was provided by BART for the months of April and October; the ridership numbers used in this report are an average of the two. AC Transit Transbay ridership for October 2008 was provided by AC Transit.

The transit ridership estimates were post processed, using a recently developed component of a future CHAMP version. The post processor produces iterative transit assignment results, accounting for transit vehicle capacity and updating dwell times that account for various factors, such as the number of boardings and alightings at the stop.

Muni

The next figure and following tables compare model year 2008 estimated Muni boardings by line with 2007 observed data from MTA's APC data. In **Error! Reference source not found.**, the diagonal line represents a perfect match between modeled and observed ridership. The spread of these points is fairly close to the diagonal, and there is no clear bias towards either under- or over- prediction, within the Geary corridor or outside of it. Table 1 provides the observed and estimated daily boardings by Muni service type.

Figure 1. 2008 Estimated Daily Boardings and 2007 APC Daily Boardings on all Muni lines

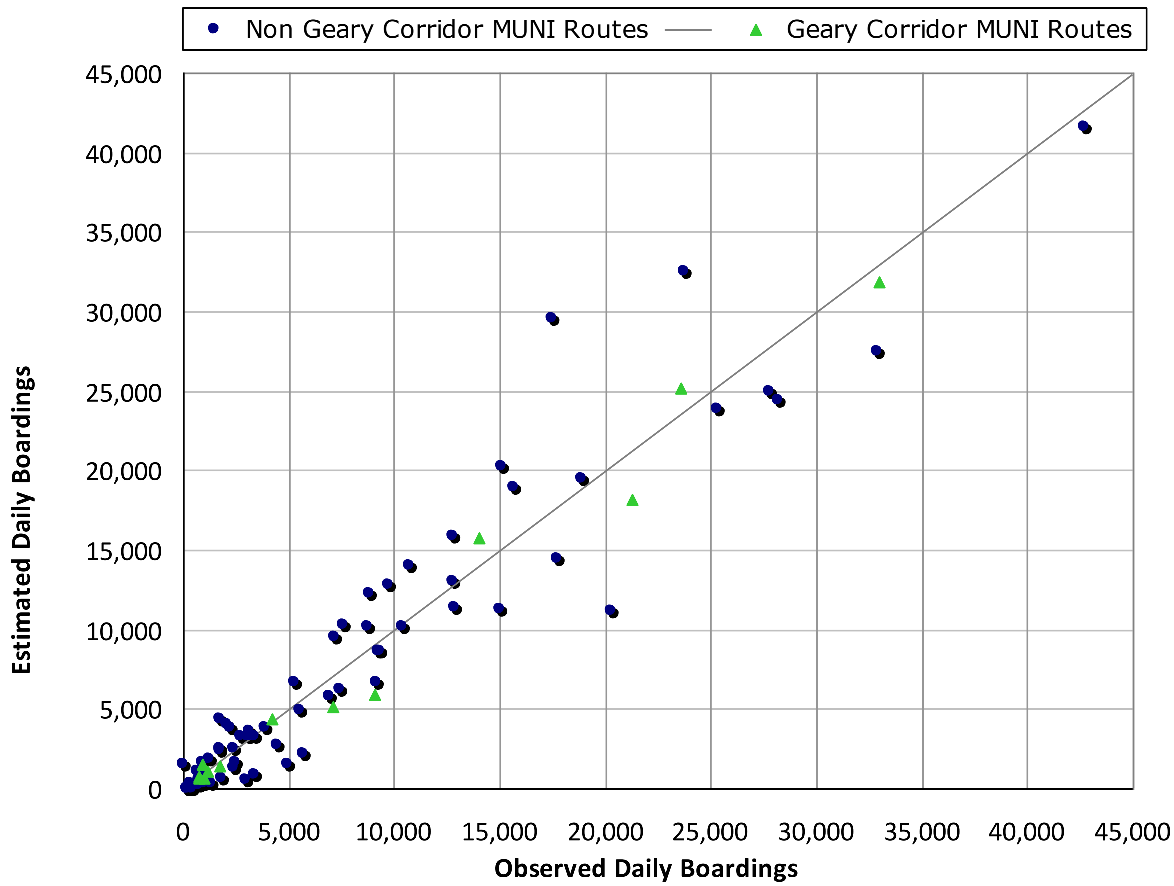


Table 1. Daily boardings for different Muni modes

	MUNI		
Mode	***Observed***	***Modeled***	***Difference***
Local Bus	437,269	427,025	-2%
Express Bus	28,279	28,736	2%
Light Rail & CC	177,052	184,909	4%
Total	642,600	640,670	-0%

BART

Overall, modeled 2008 BART boardings are underestimated, especially at the San Francisco stations when compared to 2008 observed data for all San Francisco stations, as shown in Table 3. There is some obvious interplay between the boardings and exits at the downtown San Francisco stations, all of which are within easy walking distance from one-another. Furthermore, in 2008, San Francisco MTA offered transit passes for unlimited travel within San Francisco. Most riders probably used BART within the city more frequently than if they paid for each trip individually. The model may have a hard time accounting for this fare system and consequently underestimates BART trips because it assumes the riders pay for each ride.

Table 2. 2008 Daily estimated systemwide BART boardings and exits compared with 2008 observations, averaged for the months of April and October

Operator	*Observed*	*Modeled*	*Difference*
BART	358,869	314,200	-4%

Table 3. 2008 Daily estimated BART boardings and exits for San Francisco stations compared with 2008 observations, averaged for the months of April and October

	BART		
Station	***Observed***	***Modeled***	***Difference***
Embarcadero	32,164	32,413	1%
Montgomery Street	31,691	20,455	-35%
Powell Street	30,488	13,859	-55%
Civic Center	22,062	10,787	-51%
16th Street Mission	11,340	5,789	-49%
24th Street Mission	13,061	8,137	-38%
Glen Park	7,969	3,431	-57%
Balboa Park	15,170	5,080	-67%
Total	163,946	99,951	-39%

Transbay

BART and AC Transit operate the only Bay Bridge transit services. Model results show underestimated BART trips and overestimated AC Transit trips. Overall, the model results underestimate the total number of transit trips to and from San Francisco, across the Bay.

Table 4. 2008 Daily estimated systemwide BART boardings and exits compared with 2008 observations

	Inbound			Outbound		
Operator	***Observed***	***Modeled***	***Difference***	***Observed***	***Modeled***	***Difference***
BART	89,728	67,165	-25%	81,938	62,111	-24%
AC Transit	4,744	6,921	46%	7,349	8,415	15%
Total	94,472	74,086	-22%	89,287	70,526	-21%

Geary Corridor

Error! Reference source not found. and 6 compare modeled boardings with the 2007 APC data for select Muni lines serving Geary and parallel routes, respectively.

Table 5. 2008 estimated systemwide MUNI boardings compared with 2007 observations for Geary (which includes Routes 38 and its limited and express services)

				Observed Boardings (2007 APC Data) Along Geary					
	2008 Modeled Boardings Along Geary			2007 APC Observed Boardings			Percent Difference		
Time Of Day	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**
AM Total	6,479	4,649	11,128	6,302	3,840	10,142	3%	21%	10%
Midday Total	7,871	9,040	16,911	8,946	8,501	17,447	-12%	6%	-3%
PM Total	5,329	7,964	13,293	4,461	8,085	12,546	19%	-1%	6%
Evening Total	3,938	6,120	10,058	1,349	2,458	3,807	192%	149%	164%
EA Total	676	103	780	979	1,462	2,441	-31%	-93%	-68%
Daily Total	**24,294**	**27,876**	**52,170**	**22,037**	**24,346**	**46,383**	**10%**	**15%**	**12%**

Table 6. 2008 estimated systemwide MUNI boardings compared with 2007 observations for the Geary Corridor and its Parallel Routes (which includes Routes 1, 2, 3, 5, 31, and 38 and their limited and express services)

				Observed Boardings (2007 APC Data) Within Geary Corridor					
	2008 Modeled Boardings Within Geary Corridor			2007 APC Observed Boardings			Percent Difference		
Time Of Day	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**
AM Total	18,438	10,323	28,761	15,981	8,165	24,146	15%	26%	19%
Midday Total	15,321	16,719	32,040	18,154	16,662	34,816	-16%	0%	-8%
PM Total	14,566	17,920	32,486	9,621	18,454	28,075	51%	-3%	16%
Evening Total	6,356	9,802	16,159	2,520	4,778	7,298	152%	105%	121%
EA Total	779	139	918	2,036	2,599	4,635	-62%	-95%	-80%
Daily Total	**55,461**	**54,903**	**110,363**	**48,312**	**50,658**	**98,970**	**15%**	**8%**	**12%**

As shown in Tables 5 and 6, the model is producing higher than observed trips, in general. To further investigate the issue, 2009 MTA APC data was used. Due to a glitch with the APC data, only data for a few routes were available. For those routes without 2009 APC data (Routes 1, 2, 38, and 5 in the evening), 2007 APC counts were used in order to obtain an estimate of total boardings in the corridor.

Table 7 breaks down the Geary and parallel route boardings by route for PM peak period and daily trips, compared to 2007 and 2009 APC data. As shown in the table, the model produces better results when compared to 2009 APC data, especially for routes 2 and 5 in the pm peak period, where the ridership grows significantly between the two years of data.

Figure 2 and Figure 3 depict daily and PM peak period ridership for all 38 Muni routes.

Table 7. 2008 estimated systemwide MUNI boardings compared with 2007 observations for the Geary Corridor and its Parallel Routes (which includes Routes 1, 2, 3, 5, 31, and 38 and their limited and express services)

				Observed Boardings (2007 APC Data)						Observed Boardings (2009 APC Data)					
	2008 Modeled Boardings			2007 APC Observed Boardings			Percent Difference			2009 APC Observed Boardings			Percent Difference		
PM	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**
1*	3,923	2,137	6,060	2,230	3,530	5,760	76%	-39%	5%	2,230	3,530	5,760	76%	-39%	5%
1AX	-	258	258	-	293	293	0%	-12%	-12%	-	413	413	0%	-37%	-37%
1BX	-	217	217	-	523	523	0%	-58%	-58%	-	559	559	0%	-61%	-61%
2	1,198	1,427	2,625	632	1,198	1,830	90%	19%	43%	934	1,380	2,314	28%	3%	13%
3*	765	1,031	1,796	392	695	1,087	95%	48%	65%	392	695	1,087	95%	48%	65%
5	2,332	3,157	5,489	1,195	2,216	3,411	95%	42%	61%	2,447	3,115	5,562	-5%	1%	-1%
31	1,020	959	1,979	711	1,168	1,879	43%	-18%	5%	1,334	1,689	3,022	-24%	-43%	-35%
31AX	-	522	522	-	428	428	0%	22%	22%	-	630	630	0%	-17%	-17%
31BX	-	252	252	-	318	318	0%	-21%	-21%	-	357	357	0%	-29%	-29%
38*	3,208	4,346	7,554	3,027	3,878	6,905	6%	12%	9%	3,027	3,878	6,905	6%	12%	9%
38L	2,121	3,159	5,280	1,434	3,211	4,645	48%	-2%	14%	1,902	3,016	4,918	12%	5%	7%
38AX	-	231	231	-	463	463	0%	-50%	-50%	-	406	406	0%	-43%	-43%
38BX	-	229	229	-	533	533	0%	-57%	-57%	-	431	1,031	0%	-47%	-20%
PM Total	14,566	17,925	32,491	9,621	18,454	28,075	**51%**	**-3%**	**16%**	12,265	20,097	32,962	**19%**	**-11%**	**0%**
Daily	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**
1*	12,420	9,527	21,947	9,724	9,868	19,592	28%	-3%	12%	9,724	9,868	19,592	28%	-3%	12%
1AX	536	258	794	462	293	755	16%	-12%	5%	533	413	945	1%	-37%	-16%
1BX	1,246	217	1,464	1,200	523	1,723	4%	-58%	-15%	1,529	559	2,088	-19%	-61%	-30%
2*	2,327	2,931	5,258	2,842	3,108	5,950	-18%	-6%	-12%	2,880	3,040	5,920	-19%	-4%	-11%
3*	2,027	2,487	4,515	1,679	1,998	3,677	21%	24%	23%	1,679	1,998	3,677	21%	24%	23%
5	8,035	7,929	15,965	5,703	5,932	11,635	41%	34%	37%	7,616	8,140	15,756	6%	-3%	1%
31	3,136	2,907	6,043	3,742	3,844	7,586	-16%	-24%	-20%	5,655	5,535	11,190	-45%	-47%	-46%
31AX	994	522	1,516	470	428	898	111%	22%	69%	599	630	1,228	66%	-18%	23%
31BX	445	252	697	453	318	771	-2%	-21%	-10%	663	357	1,020	-33%	-30%	-32%
38*	14,554	17,569	32,124	12,033	14,874	26,907	21%	18%	19%	12,033	14,874	26,907	21%	18%	19%
38L	8,427	9,848	18,275	8,837	8,476	17,313	-5%	16%	6%	9,029	9,060	18,089	-7%	9%	1%
38AX	488	231	719	523	463	986	-7%	-50%	-27%	626	406	1,031	-22%	-43%	-30%
38BX	825	229	1,053	644	533	1,177	28%	-57%	-11%	600	431	-	37%	-47%	0%
Daily Total	55,461	54,908	110,363	48,312	50,658	98,970	**15%**	**8%**	**12%**	53,165	55,309	107,443	**4%**	**-1%**	**2%**

* 2009 APC Data not available for these routes.

Figure 2. Estimated daily outbound ridership on all 38 lines in 2008, compared to 2007 observed APC ridership

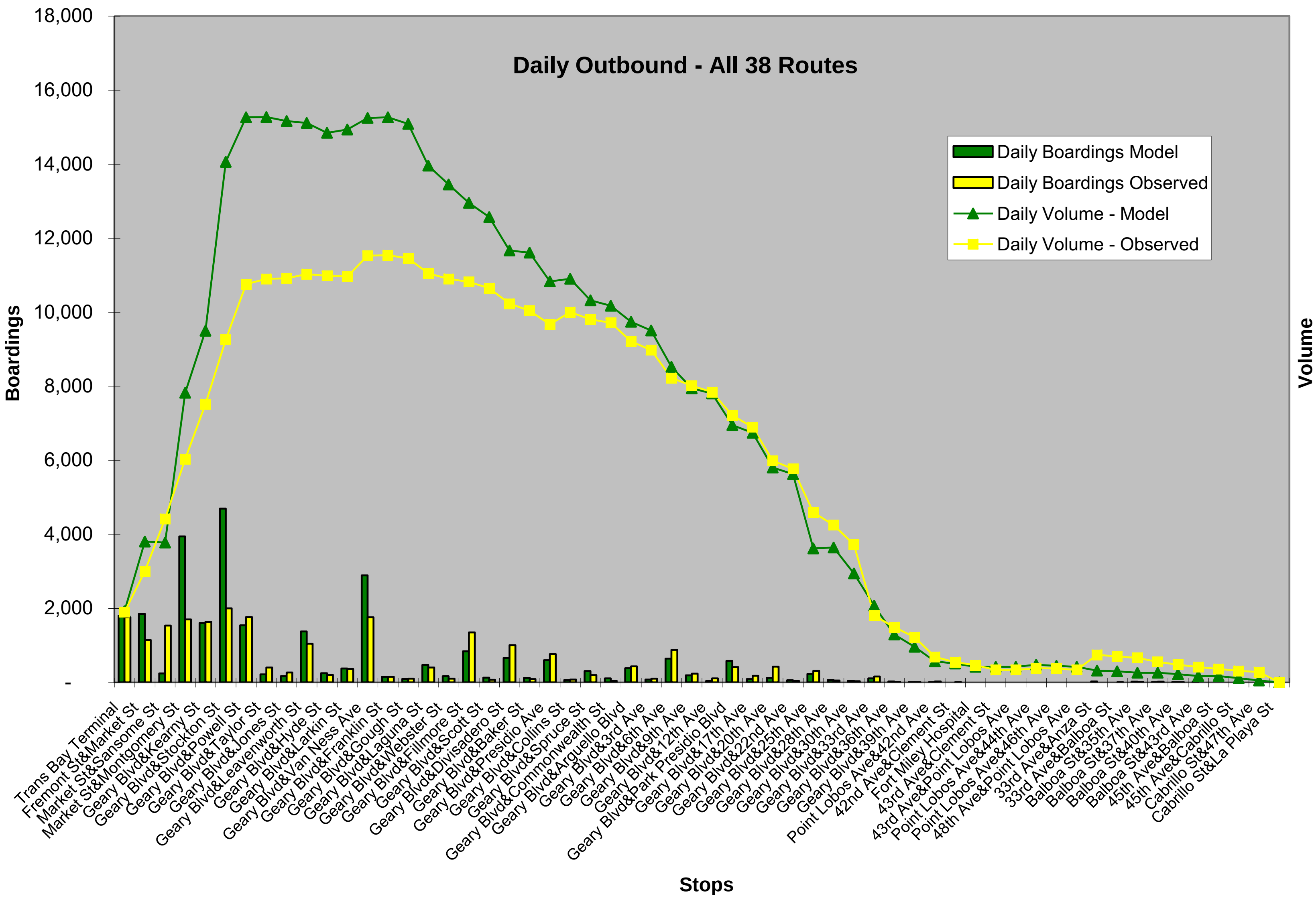
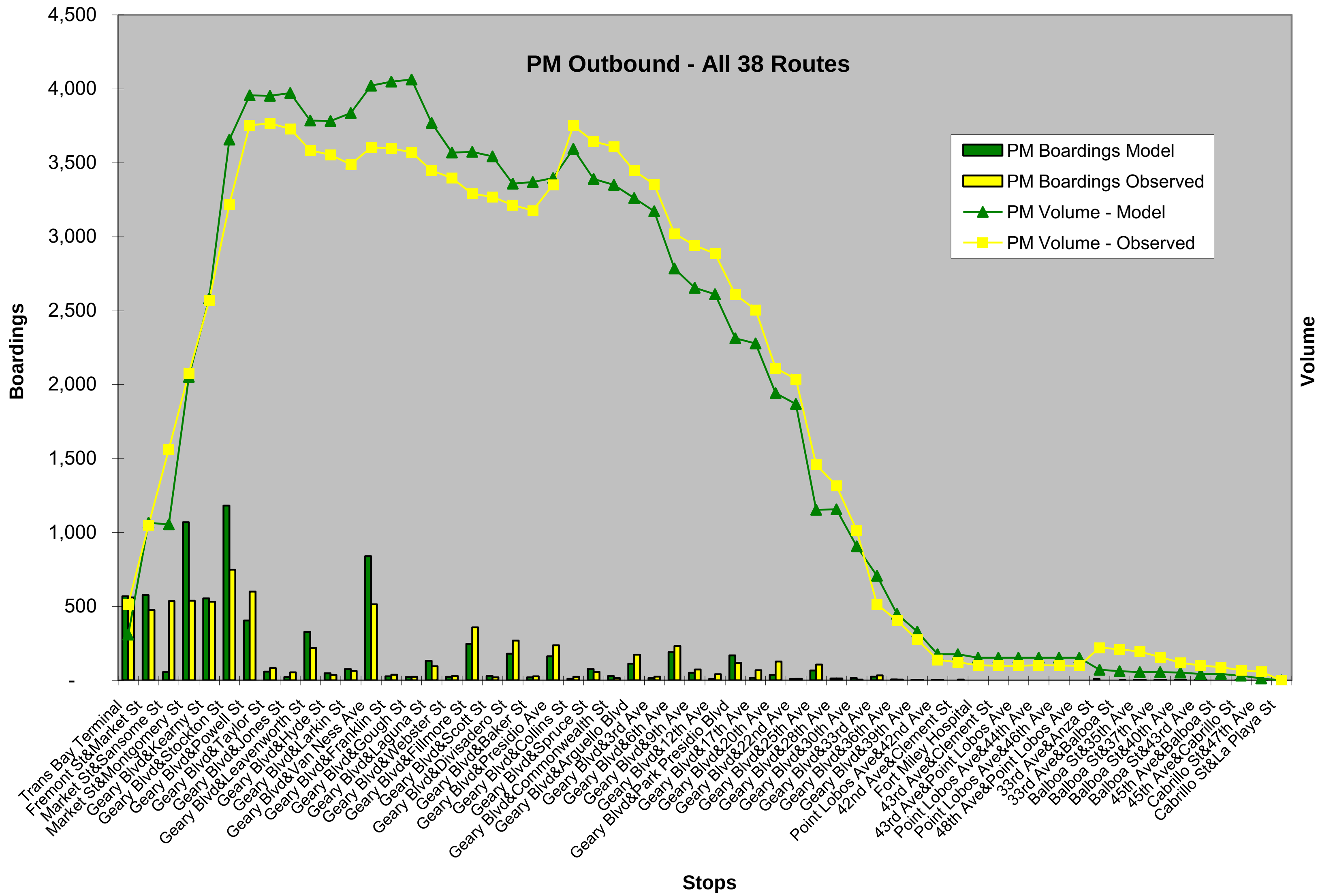


Figure 3. Estimated P.M. peak period outbound ridership on all 38 lines in 2008, compared to 2007observed APC ridership



Highway Validation

Regional Traffic

The modeling team validated to 2005 roadway volumes assembled from a variety of sources including Caltrans, MTC, and SFMTA. The following tables show the highway validation results for the Geary 2008 Base Year model run. Table 2 compares observed and estimated volumes for facilities categorized by their average daily traffic volumes. The high relative error on the lowest-volume category is expected because of the low overall volume on those links. Table 3 compares observed and estimated data results by facility type.

Table 2. Daily highway assignment results by observed average daily traffic (ADT) range

Observed ADT Range	Links	Observed Count	Estimated Volume	Est/Obs Ratio	Relative Error	%RMSE
0 - 5,000	405	680,257	825,889	1.21	21.4%	247%
5,000 - 10,000	118	919,481	922,912	1.00	0.4%	86%
10,000 - 15,000	94	1,162,756	1,088,979	0.94	-6.3%	62%
15,000 - 20,000	76	1,313,845	1,349,216	1.03	2.7%	74%
20,000 - 25,000	54	1,217,718	1,291,264	1.06	6.0%	41%
25,000 - 50,000	98	3,410,863	3,643,111	1.07	6.8%	35%
50,000 +	167	13,952,356	13,256,485	0.95	-5.0%	18%
Total	1,012	22,657,276	22,377,857	0.99	-1.2%	42%

Table 3. Daily highway assignment results by facility type

Facility Type	Links	Observed Count	Estimated Volume	Est/Obs Ratio	Relative Error	%RMSE
Interchange to Interchange	1	60,555	26,664	0.44	-56.0%	----
Freeway	258	16,244,712	16,564,698	1.02	2.0%	23%
Rural Arterial	55	1,003,028	1,499,851	1.50	49.5%	69%
Collector	119	338,943	326,244	0.96	-3.7%	99%
Ramp	7	122,559	110,088	0.90	-10.2%	22%
Major Arterial	257	3,710,975	2,851,725	0.77	-23.2%	56%
Local	254	394,126	259,915	0.66	-34.1%	90%
Minor Arterial	36	306,657	254,940	0.83	-16.9%	65%
Arterial Plus	25	475,721	483,732	1.02	1.7%	70%
Total	1,012	22,657,276	22,377,857	0.99	-1.2%	42%

Tables 7-9 show highway assignment validation results for major corridors at the San Francisco County lines. Counts on the Golden Gate bridge were obtained from the Golden Gate Bridge, Highway and Transportation District, and counts on the Bay Bridge, US 101, and I-280 were obtained from Caltrans Performance Measurement System (PeMS) data. As shown in Table 7, the model slightly underestimates Golden Gate traffic, while overpredicting Bay Bridge vehicles. Tables 8 and 9 show that the model overestimates US 101 traffic at the County border but underestimates I-280 traffic at the County border. Adding in 2005 counts on Brotherhood Way/Stanley Drive and the Great Highway, Table 10 shows that the model underestimates trips between San Francisco and San Mateo Counties by approximately 9%.

Table 4. 2008 Daily bridge traffic summary

BRIDGE	DIRECT	Obs	Est	(Est-Obs)/Obs	Obs / Est
Golden Gate	N	52,473	57,559	9.7%	0.91
Golden Gate	S	52,473	51,987	-0.9%	1.01
	Total	**104,945**	**109,546**	**4.4%**	**0.96**
Bay Bridge	E	116,124	144,091	24.1%	0.81
Bay Bridge	W	117,992	132,548	12.3%	0.89
	Total	**234,116**	**276,639**	**18.2%**	**0.85**

Table 5. 2008 U.S.-101 & San Mateo/San Francisco County line traffic summary

Roadway	Location	Direction	Obs	Est	(Est-Obs)/Obs	Obs / Est
US-101	S.M. / S.F. County Line	N	72,977	100,669	37.9%	0.72
US-101	S.M. / S.F. County Line	S	71,704	96,253	34.2%	0.74
	Total		**144,681**	**196,922**	**36.1%**	**0.73**

Table 6. 2008 I-280 & San Mateo/San Francisco County line traffic summary

Roadway	Location	Direction	Obs	Est	(Est-Obs)/Obs	Obs / Est
I-280	S.M. / S.F. County Line	N	91,133	69,861	-23.3%	1.30
I-280	S.M. / S.F. County Line	S	85,102	52,461	-38.4%	1.62
	Total		**176,235**	**122,322**	**-30.6%**	**1.44**

Table 10. Total San Mateo/San Francisco County line traffic summary

Roadway	Location	Direction	Year of Counts	Obs	Est	(Est-Obs)/Obs	Obs / Est
US-101	S.M. / S.F. County Line	N	2008	72,977	100,669	37.9%	0.72
US-101	S.M. / S.F. County Line	S	2008	71,704	96,253	34.2%	0.74
SR-1	BROTHERHOOD WAY/ STANLEY DRIVE	S	2005	53,783	36,386	-32.3%	1.48
SR-1	BROTHERHOOD WAY/ STANLEY DRIVE	N	2005	58,235	44,926	-22.9%	1.30
I-280	S.M. / S.F. County Line	N	2008	91,133	69,861	-23.3%	1.30
I-280	S.M. / S.F. County Line	S	2008	85,102	52,461	-38.4%	1.62
SKYLINE	GREAT HWY	N	2005	12,289	22,664	84.4%	0.54
SKYLINE	GREAT HWY	S	2005	13,764	22,128	60.8%	0.62
		N	Mixed	234,634	238,120	1.5%	0.99
		S	Mixed	224,353	207,228	-7.6%	1.08
Total		Both	Mixed	**779,903**	**764,592**	**-2.0%**	**1.02**

Study Area

In addition to the regionwide results presented above, additional PM peak period counts from a variety of sources (between 2005 and 2010) were gathered throughout the Study Area. Mainline counts along Geary Boulevard were taken in 2010. See Figure 4 for the spatial representation of counts within the study area. Tables 11 and 12 give the highway validation results by facility type and by count type, respectively. Figure 5 presents the geographical distribution of the validation results by plotting the difference between the estimated and observed vehicle trips.

Figure 4. Traffic counts within the study area

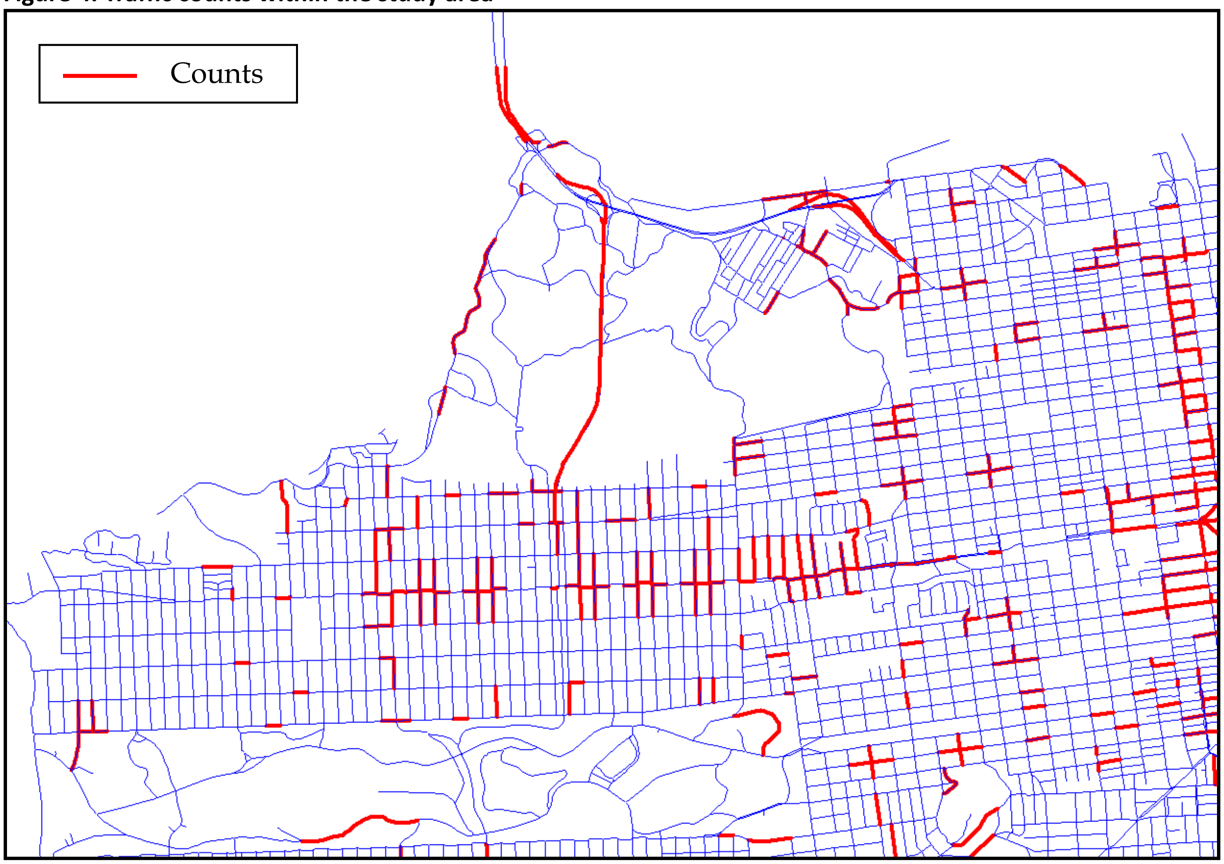


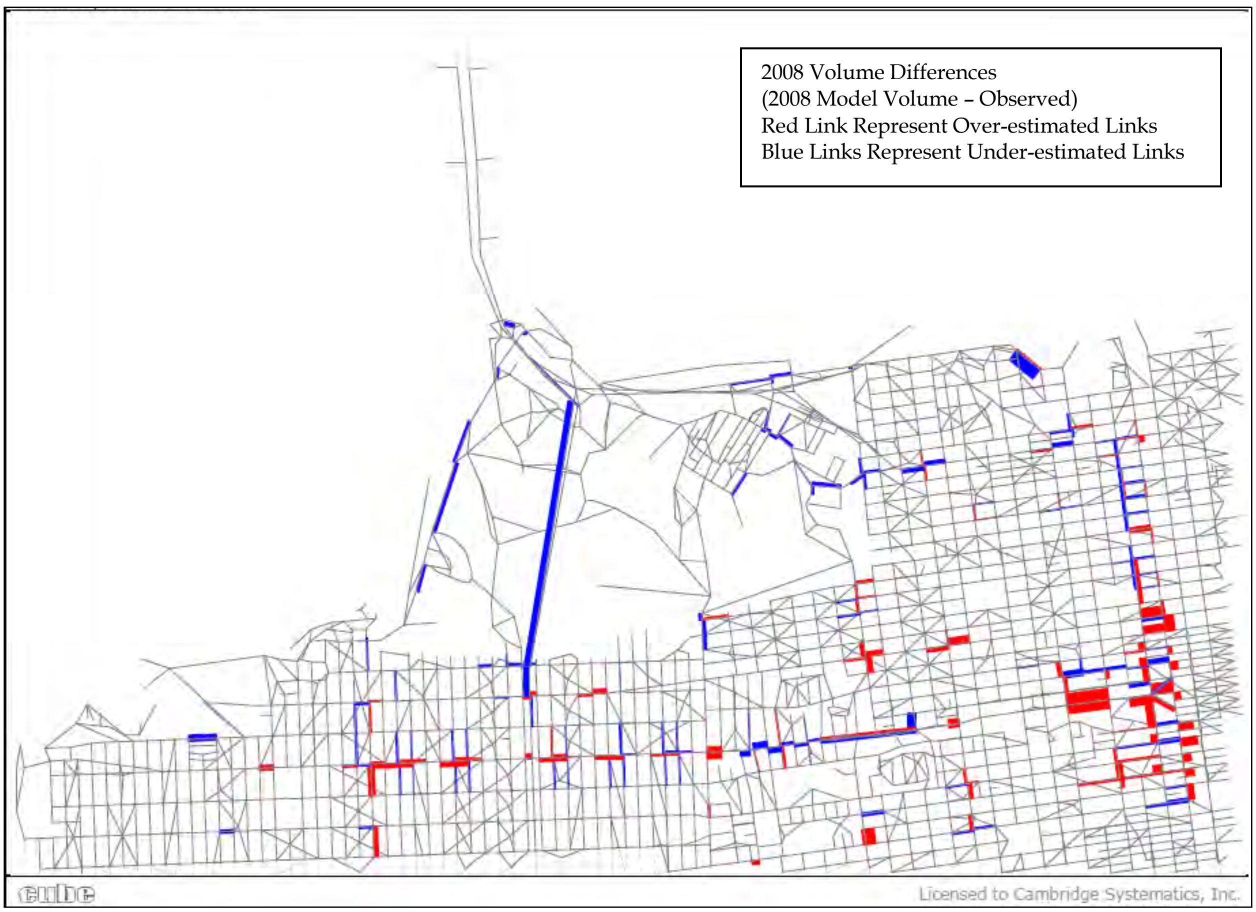
Table 11. Geary study area by facility type

Facility Type	Link Count	Observed PM Peak Period Count	Estimated PM Peak Period Volumes	Difference	Relative Error	RMSE
Expressway	1	6,844	5,446	-1,398	-20%	---
Arterial Plus	14	62,640	86,282	23,641	38%	42%
Major Arterial	86	333,590	382,566	48,976	15%	31%
Minor Arterial	24	33,595	42,294	8,699	26%	50%
Collector	73	66,366	41,335	-25,031	-38%	90%
Local	84	34,311	18,228	-16,083	-47%	84%
Total	282	537,346	576,149	38,803	7%	48%

Table 12. Geary study area by count type

Count Type	Link Count	Observed PM Peak Period Count	Estimated PM Peak Period Volumes	Difference	Relative Error	RMSE
2010 Mainline Counts	52	98,634	110,897	12,263	12%	62%
Other Turn Movement Counts	178	330,416	355,289	24,873	8%	49%
Feb 2010 Turn Movement Counts	52	108,296	109,963	1,667	2%	29%
Total	282	537,346	576,149	38,803	7%	48%

Figure 5. Difference in auto vehicle volume



Conclusion

Overall, the regional model performed well for year 2008. Systemwide, Muni boardings were within 0% of the observed when compared to 2007 data, and highway assignment results were within 2% of the observed when compared to 2005 data. Estimated BART boardings at San Francisco stations fared lower than observed.

Within the study area, counts were obtained along the corridor and additional counts scattered throughout the study area. Comparison of modeled versus observed data showed the best results when looking at major arterials, the higher volume facilities in the area. Modeled auto volumes were generally lower than the counts in the northern part of the study area, within the Presidio and on Lombard Street. Overall, within the study area, the model estimated vehicle traffic within 7% of observed data.

Modeled transit results within the Geary corridor and its parallel routes yielded slightly higher ridership compared to 2007 transit ridership data, but performed especially well, within 3%, in the PM peak period in the peak (outbound) direction, which is a critical travel pattern. When comparing to 2009 transit ridership data (where available), daily estimated boardings for the Geary corridor comes a little closer to the observed, from a difference of 11% using 2007 data to 2% using 2009 data. Modeled boardings do not show any bias along Geary routes when compared to the Geary corridor; both are estimated within 11%-12% of daily observed riders. The model performs better during the AM, midday, and PM peak periods (the vast majority of the boardings) while overestimating the evening and underestimating in the early AM. The model slightly overestimated in the PM and underestimated in the midday, which could be a result of school trips combined and assigned in the PM only whereas many of those trips are likely to occur in the midday in observed counts. Modeled transit boardings in the Geary corridor could be considered slightly high estimates and something to note for future model runs.

Due to poor economic conditions in 2008, travel patterns were drastically shifting throughout the City, State, and nation. High unemployment and frugality may have led many residents to travel less than other typical years and this may be one of the reasons that observed transit boardings are lower, in general, than the modeled boardings. Given the difficult year for validation, the model performs adequately, especially at the regional level.

Appendix D 3-2: Champ Validation Addendum

Addendum

TO: Elizabeth Sall, SFCTA

FROM: Ricky Angueira, SFCTA

DATE: August 12th, 2014

RE: **Geary BRT – 2012 CHAMP Model Validation Addendum**

This memorandum serves as an addendum to the Geary BRT – 2008 CHAMP Model Validation memorandum. This addendum verifies that the CHAMP existing conditions base year model calibrated to the year 2008 also validates to year 2012 data. Validation results presented in this addendum refer to the latest data available (date of data provided for each source) and focus on the Geary BRT Study Area, the neighborhoods of Richmond, Pacific Heights, Laurel Heights, and the Western Addition in the northwestern portion of San Francisco in order to validate the model for use in the Geary corridor, but also provide citywide and regional statistics as well.

Conclusion

The existing base year regional model, originally intended as a base year model for the year 2008, performed well for year 2012. Systemwide, Muni boardings were within 9% of the observed when compared to 2012 data, and highway assignment results were within 7% of the observed when compared to 2010 data. Transit ridership in the Geary BRT study area performs even better for the year 2012, with ridership on Geary Boulevard lines 4% below observed levels. Validation of the existing year model estimates against 2012 observed data shows that existing year model is also valid for representing 2012 conditions. Observed travel data has not changed sufficiently between 2008 and 2012 to dismiss the validity of the CHAMP model for use as a 2012 base year representation.

The following sections of this addendum present detailed validation statistics for transit ridership and traffic volumes using the traffic and transit data collected as close to the year 2012 as possible.

Transit Validation

The modeling team validated base year transit assignments to 2010-2012 observed ridership data with estimated ridership data for the major transit operators, including Muni and BART. For SF-CHAMP 4.1.0, the modeling team focused particularly on transit ridership along the Geary BRT corridor. Fall 2012 Automatic Passenger Counter (APC) ridership data provided by SFMTA was used for neighborhood and systemwide MUNI validation. 2012 BART ridership data was provided by BART for the months of April and May; the ridership numbers used in this report are an average of the two. AC Transit Transbay average weekday ridership for 2012 was provided by AC Transit. The transit ridership estimates were post processed. The post processor produces iterative transit assignment results, accounting for transit vehicle capacity and updating dwell times that account for various factors, such as the number of boardings and alightings at each stop.

Muni

The next figure and following tables compare model year 2012 estimated Muni boardings by line with Fall 2012 observed data from MTA's APC data. Table 1 provides the observed and estimated daily boardings by Muni service type.

Table 1. Daily boardings for different Muni modes

2012 Limited Buses entered as Express			
Mode	**Observed**	**Modeled**	**Difference**
Bus	513,730	455,761	-11%
LR & CC	187,863	184,909	-2%
Total	701,593	640,670	-9%

BART

Overall, modeled 2012 BART boardings are underestimated, especially at the San Francisco stations when compared to 2012 observed data for all San Francisco stations, as shown in Table 3. There is some obvious interplay between the boardings and exits at the downtown San Francisco stations, all of which are within easy walking distance from one-another. Furthermore the SFMTA offers transit passes for unlimited travel within San Francisco. Many riders are likely to use BART within the city more frequently than if they paid for each trip individually. The model may have a hard time simulating unlimited transit pass behavior without explicitly representing unlimited transit passes and consequently underestimates BART trips because it assumes the riders pay for each ride. Fortunately, tightly validated BART ridership is not a requirement for adequate modeling of Geary BRT Corridor travel patterns. Overall estimated daily system ridership on BART is within 20% of observed conditions in 2012. This is acceptable for the purposes of Geary BRT modeling.

Table 2. 2012 Daily estimated systemwide BART boardings compared with 2012 observations, averaged for the months of April and May

Operator	Observed	Modeled	Difference
BART	**375,314**	**314,200**	**-16%**

Table 3. 2012 Daily estimated BART boardings and exits for San Francisco stations compared with 2012 observations, averaged for the months of April and May

Station	Observed	Modeled	Difference
Embarcadero	34,889	32,413	-7%
Montgomery Street	35,104	20,455	-42%
Powell Street	30,040	13,859	-54%
Civic Center	21,237	10,787	-49%
16th Street Mission	11,550	5,789	-50%
24th Street Mission	13,052	8,137	-38%
Glen Park	7,781	3,431	-56%
Balboa Park	13,083	5,080	-61%
Total	**166,735**	**99,951**	**-40%**

Transbay

BART and AC Transit operate transit services between San Francisco and the East Bay counties of Alameda and Contra Costa. The model estimates of transbay corridor transit ridership are lower than observed conditions. Overall, the model results underestimate the total number of transit trips between San Francisco and the East Bay. Total estimated transit ridership on the transbay corridor is about 20% lower than observed conditions in 2012. This is acceptable for the purposes of Geary BRT modeling.

Table 4. 2012 Daily Transbay for Bart2012 (April/May Average) and AC Transit 2012 Fall

	Inbound (Westbound)			Outbound (Eastbound)		
Operator	**Observed**	**Modeled**	**Difference**	**Observed**	**Modeled**	**Difference**
BART	90,433	67,165	-26%	102,854	62,111	-40%
AC Transit	4,316	6,921	60%	5,546	8,415	52%
Total	**94,749**	**74,086**	**-22%**	**108,400**	**70,526**	**-35%**

Geary Corridor

Tables 5 and 6 compare modeled boardings with the 2012 automated passenger count (APC) data for select Muni lines serving Geary Boulevard and parallel routes, respectively. As shown in Tables 5 and 6, the model estimates fewer trips than observed, but total estimates for Geary Boulevard transit ridership are within 5% of observed values in 2012. This level is of accuracy indicates that the existing base year model is a reasonable representation of 2012 transit conditions in the Geary BRT corridor.

Table 5. 2012 estimated systemwide MUNI boardings compared with 2012 observations for Geary (which includes Routes 38 and its limited and express services)

Time Of Day	2012 Modeled Boardings			2012 Observed APC Boardings			Percent Difference		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
AM Total	6,479	4,649	11,128	6,443	3,781	10,224	1%	23%	9%
Midday Total	7,871	9,040	16,911	12,825	11,703	24,528	-39%.	-23%.	-31%.
PM Total	5,329	7,964	13,293	4,520	7,455	11,975	18%	7%	11%
Evening Total	3,938	6,120	10,058	2,381	4,286	6,667	65%	43%	51%
EA Total	676	103	780	487	295	782	39%	-65%.	-0%.
Daily Total	**24,294**	**27,876**	**52,170**	**26,656**	**27,680**	**54,336**	**-9%.**	**1%**	**-4%.**

Table 6. 2012 estimated systemwide MUNI boardings compared with 2012 observations for the Geary Corridor and its Parallel Routes (which includes Routes 1, 2, 3, 5, 31, and 38 and their limited and express services)

Time Of Day	2012 Modeled Boardings			2012 Observed APC Boardings			Percent Difference		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
AM Total	18,438	10,323	28,761	16,618	8,126	24,744	11%	27%	16%
Midday Total	15,321	16,719	32,040	28,222	26,108	54,330	-46%.	-36%.	-41%.
PM Total	14,566	17,920	32,486	10,494	18,855	29,349	39%	-5%.	11%
Evening Total	6,356	9,802	16,159	4,714	9,214	13,928	35%	6%	16%
EA Total	779	139	918	1,133	375	1,508	-31%.	-63%.	-39%.
Daily Total	**55,461**	**54,903**	**110,363**	**61,181**	**63,005**	**124,186**	**-9%.**	**-13%.**	**-11%.**

Table 7 breaks down the Geary and parallel route boardings by route for PM peak period and daily trips, compared to 2012 APC data. Figures 1 and 2 depict daily and PM peak period ridership for all 38 Muni routes.

Table 7. 2008 estimated systemwide MUNI boardings compared with 2008 observations for the Geary Corridor and its Parallel Routes (which includes Routes 1, 2, 3, 5, 31, and 38 and their limited and express services)

PM	2012 Modeled Boardings			2012 APC Observed Boardings			Percent Difference		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
1	3,923	2,137	6,060	2,258	3,899	6,157	74%	-45%.	-2%.
1AX	-	258	258	-	333	333	-	-23%.	-23%.
1BX	-	217	217	-	459	459	-	-53%.	-53%.
2	1,198	1,427	2,625	689	1,010	1,699	74%	41%	55%
3	765	1,031	1,796	462	598	1,060	66%	72%	69%
5	2,332	3,157	5,489	1,664	3,061	4,725	40%	3%	16%
31	1,020	959	1,979	901	1,294	2,195	13%	-26%.	-10%.
31AX	-	522	522	-	402	402	-	30%	30%
31BX	-	252	252	-	344	344	-	-27%.	-27%.
38	3,208	4,346	7,554	2,110	3,024	5,134	52%	44%	47%
38L	2,121	3,159	5,280	2,410	3,557	5,967	-12%.	-11%.	-12%.
38AX	-	231	231	0	424	424	-	-46%.	-46%.
38BX	-	229	229	0	450	450	-	-49%.	-49%.
PM Total	**14,566**	**17,925**	**32,491**	**10,494**	**18,855**	**29,349**	**39%**	**-5%.**	**11%**
Daily	**2012 Modeled Boardings**			**2012 APC Observed Boardings**			**Percent Difference**		
	Inbound	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**
1	12,420	9,527	21,947	12,492	13,518	26,010	-1%.	-30%.	-16%.
1AX	536	258	794	693	333	1,026	-23%.	-23%.	-23%.
1BX	1,246	217	1,464	1,117	459	1,576	12%	-53%.	-7%.
2	2,327	2,931	5,258	2,866	2,861	5,727	-19%.	2%	-8%.
3	2,027	2,487	4,515	1,737	1,605	3,342	17%	55%	35%
5	8,035	7,929	15,965	9,301	10,240	19,541	-14%.	-23%.	-18%.
31	3,136	2,907	6,043	5,287	5,563	10,850	-41%.	-48%.	-44%.
31AX	994	522	1,516	495	402	897	101%	30%	69%
31BX	445	252	697	537	344	881	-17%.	-27%.	-21%.
38	14,554	17,569	32,124	12,678	13,777	26,455	15%	28%	21%
38L	8,427	9,848	18,275	12,918	13,029	25,947	-35%.	-24%.	-30%.
38AX	488	231	719	495	424	919	-1%.	-46%.	-22%.
38BX	825	229	1,053	565	450	1,015	46%	-49%.	4%
Daily Total	**55,461**	**54,908**	**110,363**	**61,181**	**63,005**	**124,186**	**-9%.**	**-13%.**	**-11%.**

Figure 1. Estimated outbound daily boardings on all 38 lines in 2012, compared to 2012 observed APC boardings

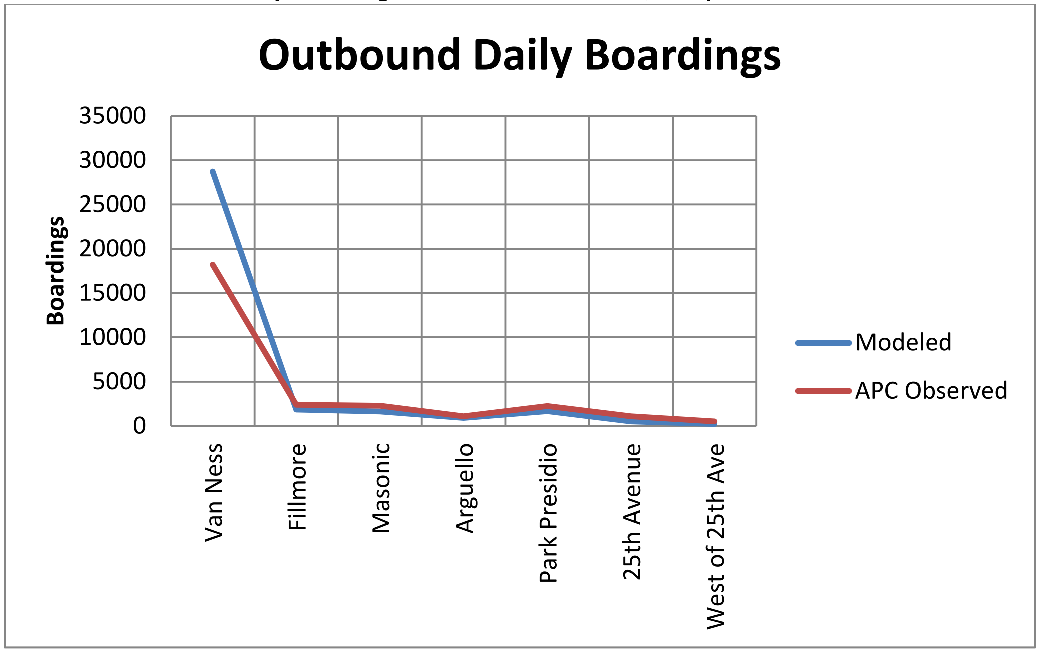
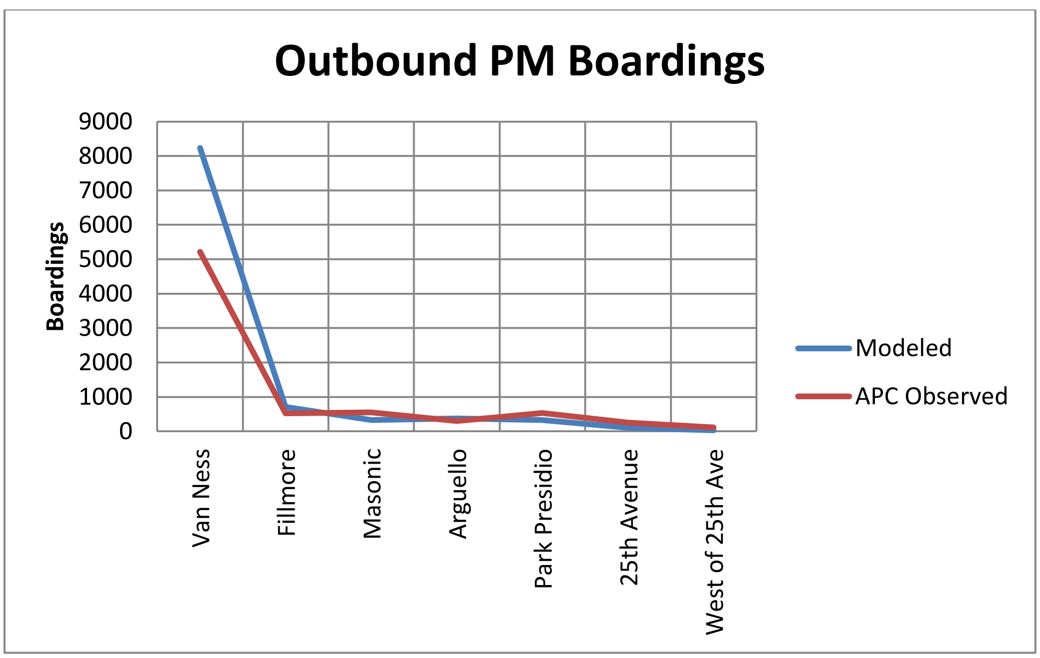


Figure 2. Estimated outbound PM boardings on all 38 lines in 2012, compared to 2012 observed APC boardings



Highway Validation

Regional Traffic

The modeling team validated to 2010 roadway volumes assembled from a variety of sources including Caltrans, MTC, and SFMTA. The following tables show the highway validation results for the Geary 2012 Base Year model run. Table 8 compares observed and estimated volumes for facilities categorized by their average daily traffic volumes. The high relative error on the lowest-volume category is expected because of the low overall volume on those links. Table 9 compares observed and estimated data results by facility type.

Table 8. Daily highway assignment results by observed average daily traffic (ADT) range

Observed ADT Range	Links	Observed	Estimated	Est/Obs Ratio	Relative Error
0 - 5,000	578	104,088	85,364	0.82	-18%
5,000 - 10,000	80	614,913	528,565	0.86	-14%
10,000 - 15,000	69	852,469	747,660	0.88	-12%
15,000 - 20,000	44	768,479	699,410	0.91	-9%
20,000 - 25,000	28	613,805	575,450	0.94	-6%
25,000 - 50,000	107	3,912,352	3,528,555	0.90	-10%
50,000 +	179	15,043,275	14,152,656	0.94	-6%
Total	**1,085**	**21,909,381**	**20,317,660**	**0.93**	**-7%**

Table 9. Daily highway assignment results by facility type

Facility Type	Link	Observed	Estimated	E/O Ratio	Relative Error
Interchange to Interchange	1	27,718	26,664	0.96	-4%
Freeway	266	17,699,722	16,561,607	0.94	-6%
Rural Arterial	53	1,499,551	1,390,305	0.93	-7%
Collector	49	129,073	110,493	0.86	-14%
Ramp	6	126,493	110,058	0.87	-13%
Major Arterial	199	2,371,857	2,073,606	0.87	-13%
Arterial Plus	1	54,967	44,926	0.82	-18%
Total	**575**	**21,909,381**	**20,317,659**	**0.93**	**-7%**

Tables 10-12 show highway assignment validation results for major corridors at the San Francisco County lines. Counts on the Golden Gate Bridge were obtained from the Golden Gate Bridge, Highway, and Transportation District. Counts on the Bay Bridge, US-101, and I-280 were obtained from Caltrans Performance Measurement System (PeMS) data. As shown in Table 10, the model slightly underestimates Golden Gate traffic, while overpredicting Bay Bridge vehicles. Tables 11 and 12 show that the model underestimates US-101 traffic at the County border and I-280 traffic at the County border. Adding in 2010 counts on Brotherhood Way/Stanley Drive and the Great Highway, Table 13 shows that the model underestimates trips between San Francisco and San Mateo Counties by approximately 6%.

Table 10. 2010 Daily bridge traffic summary

BRIDGE	Direction	Observed	Estimated	Percent Difference	Observed / Estimated
Golden Gate	N	58,191	57,559	-1%.	1.01
Golden Gate	S	52,767	51,987	-1%.	1.02
Total		**110,958**	**109,546**	-1%.	1.01
Bay Bridge	E	123,694	144,091	16%	0.86
Bay Bridge	W	126,257	132,548	5%	0.95
Total		**249,952**	**276,639**	11%	0.90

Table 11. 2010 U.S.-101 & San Mateo/San Francisco County line traffic summary

Roadway	Direction	Observed	Estimated	Percent Difference	Observed / Estimated
US-101	N	106,721	100,669	-6%.	1.06
US-101	S	106,971	96,253	-10%.	1.11
Total		**213,692**	**196,922**	-8%.	1.09

Table 12. 2010 I-280 & San Mateo/San Francisco County line traffic summary

Roadway	Direction	Observed	Estimated	Percent Difference	Observed / Estimated
I-280	N	66,657	69,861	5%	0.95
I-280	S	71,627	52,461	-27%.	1.37
Total		**138,284**	**122,322**	-12%.	1.13

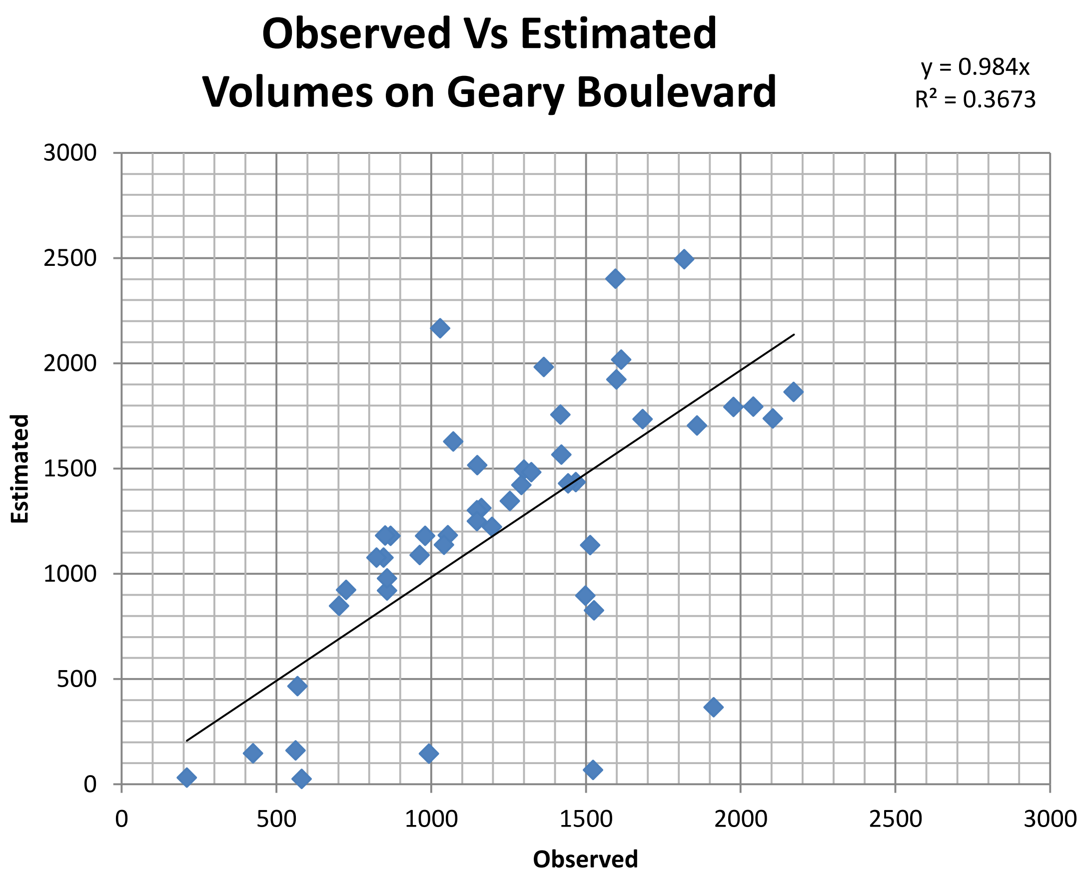
Table 13. 2010 Total San Mateo/San Francisco County line traffic summary

Roadway	Location	Direction	Observed	Estimated	Percent Difference	Observed / Estimated
US-101	SM / SF County Line	N	106,721	100,669	-6%.	1.06
US-101	SM / SF County Line	S	106,971	96,253	-10%.	1.11
SR-1	Brotherhood Way / Stanley Drive	N	49,416	44,926	-9%.	1.06
SR-1	Brotherhood Way / Stanley Drive	S	50,029	36,386	-27%.	1.06
I-280	SM / SF County Line	N	66,657	69,861	5%	0.95
I-280	SM / SF County Line	S	71,627	52,461	-27%.	1.37
Skyline (SR-35)	Great Hwy	N	12,297	22,664	84%	0.54
Skyline (SR-35)	Great Hwy	S	10,729	22,128	106%	0.48
Total		N	235,092	238,120	1%	0.99
		S	239,356	207,228	-13%.	1.16
		Both	**474,448**	**445,348**	-6%.	1.07

Study Area Road Volume Validation

In addition to the regionwide results presented above, additional PM peak period traffic counts were gathered throughout the Study Area. Counts along Geary Boulevard were taken in 2010 and 2012. Figure 3 presents a comparison between the observed data and the modeled data. The slope of the line is 0.984 and the Root-Squared Mean Error (RSME) is 39%.

Figure 3. Modeled volumes compared to 2012 and 2010 observed count data



Appendix D 4: DTA Model Validation

Memorandum

TO: Elizabeth Sall, SFCTA

FROM: Ricky Angueira and Dan Tischler, SFCTA

DATE: August 7th, 2014

RE: **Geary BRT – 2012 DTA Model Validation Memo**

In order to support alternatives analysis and environmental review for the Geary BRT project, a 2012 existing conditions dynamic traffic assignment (DTA) model was developed for the northwest quadrant of San Francisco. This model was validated against observed traffic behavior in this subarea of San Francisco. Additional focus was given to accurately reflect conditions on and near Geary Boulevard. Subsequent modeling efforts will forecast future traffic conditions under various Geary BRT alternatives. In order to effectively simulate the tradeoffs between various alternatives, it is necessary to first accurately simulate current conditions. This report summarizes the process of validating the existing conditions dynamic traffic assignment model relative to observed traffic behavior. Validation objectives, process, and results are presented in the following sections.

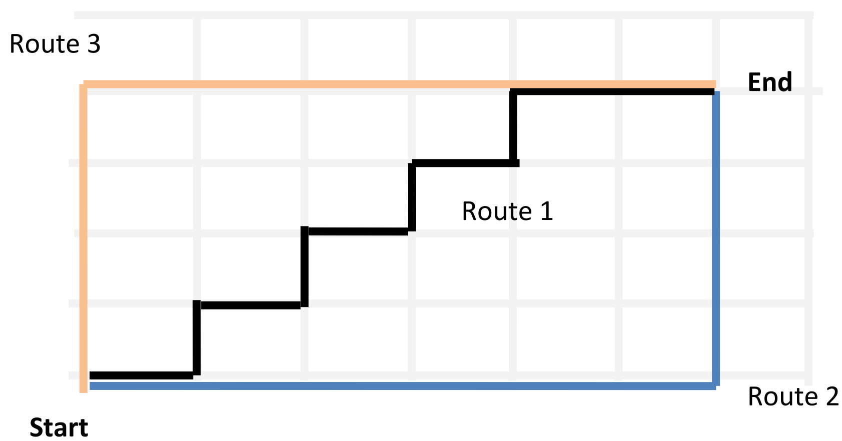
Objectives

Dynamic Traffic Assignment represents a compromise between the simulation fidelity achieved by microsimulating vehicles and the computational tractability of the static traffic assignment allowing the modeling of route choices of millions of individuals. Both static and dynamic traffic assignment are driven by the same optimization principle: drivers seek to independently minimize their travel time or generalized cost. But unlike static models where travel delay is dictated by a mathematical function of flow, delay in DTA models results from the interactions of vehicles with other vehicles and their physical environment including signals and weaving sections. Meanwhile, the biggest differences between DTA and traffic microsimulation models is that a) the simulation time step of DTA models is an order of magnitude higher (a few seconds vs 0.1 second) and that b) microsimulation software does not model route choice adequately enough for our planning needs.

The modeling team opted for a Dynameq DTA model in addition to the static component of CHAMP for the following two reasons:

1) Traveler route choice in DTA is superior to static models: While both approaches seek to minimize a traveler's perceived disutility, route travel time in static models is an aggregation of

link travel times as opposed to movement travel times in Dynameq. The difference that this may entail can be shown in the following figure. Assume for the sake of simplicity that in the following grid network all link travel times are equal in the east to west and north to south directions. A traveler going from the south west corner to the north east one can choose any of the three routes depicted in the following figure. Because of link travel times being equal the route choice component of the static assignment will consider all these options as equally likely to be chosen. In contrast, the DTA model will take into consideration movement travel times rather than link ones. In the DTA model, delay is incurred every time a traveler makes a turn. As a result routes 2 and 3 will be preferred over route 1 because they are associated with a lower cost.



2) Representation of traffic dynamics is more accurate in DTA: Dynameq borrows concepts and algorithms from microsimulation models such as car-following and lane changing, but implements them in a simplified way that significantly expedites computation time. The overall simulation fidelity is not as robust as that of a microsimulation model, but DTA represents a drastic improvement over static assignment. The following table summarizes the differences between the BPR functions embedded in the static assignment and the simulation-based approach of Dynameq. Of particular interest to us is the ability of Dynameq to better represent congestion by not allowing flows to exceed capacities and by modeling traffic spillbacks. In addition, transit vehicles and their impact to the traffic stream can be modeled directly. In static applications the modeler only approximates the impact of transit vehicles by reducing the capacity of the roadway by some arbitrary number.

Table 1: Comparison of Traffic Dynamics

Feature	Static Assignment	Dynamic Traffic Assignment
Simulation of individual vehicles	No	Yes. The time step is 5 seconds.

Travel time/delay calculations	BPR functions	Simplified car-following
Capacity constrains enforced	No (v / c > 1)	Yes
Compliance with a triangular fundamental traffic flow diagram	No	Yes
Models traffic signals and signal coordination	No	Yes
Takes into account lane configuration, turn bays and weaving sections	No. Each vehicle on a link experiences the same travel time regardless lane it's at or the movement it will execute	Yes. Vehicles on the same lane cannot overtake others unless they change lanes. But lane changes happen only at nodes.
Spillover effect	No	Yes
Transit Vehicle impact	No. The modeler may reduce the capacity of a link as a result of heavy transit usage	Impact of traffic flow depends on the frequency of the transit vehicles, the location of the stop and dwell times and the acceleration and speed a transit vehicle can achieve.

Validation Targets

In order to ensure that the DTA model is an effective tool for evaluating route diversions in the project area – particularly diversions from Geary Blvd to parallel streets – the modeling team strove to achieve count and speed accuracy benchmarks for different areas of the network. The calibration effort focused on meeting the following targets in the process of calibrating 2012 observed data to the 2012 base year DTA model:

1. Speeds on Geary Blvd: simulated values should be within 2 mph of observed values

2. Traffic volume on Geary Blvd: westbound simulated volumes should approximate observed counts, but eastbound volumes may deviate more due to the lower importance and more variable nature of PM peak period volume in this direction

3. Speeds on parallel streets to Geary Blvd: simulated values should be within 2 to 4 mph of observed speeds. This is particularly important in order to accurately represent tradeoffs experienced by travelers when choosing between alternate routes.

4. Speeds on perpendicular streets to Geary Blvd: simulated values should be "reasonable" in the absence of observed data

Moreover, an overarching goal of the validation effort was to replicate the patterns of observed traffic and not simply achieve a particular RMSE of modeled to observed counts. Therefore, many results are presented in geographic form.

Validation Data

The study team used three sources of traffic count data: turn movement counts conducted in 2010 and 2012 and Geary Boulevard mainline counts conducted in 2010.

The turn movement counts were collected in 5-minute intervals specifically for the purpose of this study. The 2010 turn counts cover 13 intersections along Geary Boulevard and the 2012 turn counts cover 9 additional intersections. The counts were aggregated to hourly intervals for the purpose of our analysis. The turn movement counts provide a good indication of the volume and location of vehicle turns within the study corridor. They also provide a good indication of the total volume of traffic traveling along Geary Boulevard at important locations.

For the westbound direction of Geary, west of Arguello, the three data sources are in general agreement. However, there is a significant disparity between the turn movement counts and mainline counts for the segment of Geary Blvd east of Arguello as shown in Figure 1. This shows evidence of undercounting the mainline counts since they are consistently lower than the turn movement counts. The modeling team chose to calibrate the model so that simulated flow in the WB direction is bounded by the values of the different datasets.

Route travel speeds depicted in Figure 5 have been derived from SFCTA's biannual speed survey for the Congestion Management Plan[1]. They represent mean speeds between 4:30 PM and 6:30 PM for particular routes. For each of the routes there are at least four and as many as eight observations in the specified time period.

In February 2012, a follow-up traffic observation was conducted to determine if and how traffic conditions have changed between 2010 and 2012. The follow-up traffic observation was conducted at the intersection of Gear Boulevard at Cook St. 15-minute eastbound and westbound traffic volumes were observed during the PM peak period between 4:30 PM and 6:15 PM. Peak hour volumes occurred between 5:00 PM and 6:00 PM. The observed volumes are within 1.5% of the mainline traffic volumes observed in 2010. These findings further support the baseline traffics counts used to validate the DTA model.

[1] 2009 SFCTA Congestion Management Plan (CMP) (http://www.sfcta.org/cmp)

Initial Validation

The Geary BRT existing conditions DTA model is based on the Dynameq network used for the Doyle Drive Construction Management Plan, which was used to model route diversions due to construction. Figures 1 and 2 depict westbound and eastbound traffic volumes along Geary in the Doyle Drive model. We observed that in the westbound direction the flows east of Collins are more or less in line with the mainline counts. However, the Doyle Drive DTA model simulates a significant number of turns off of Geary Blvd west of Arguello. As a result, the Doyle Drive DTA modeled flow west of that intersection is significantly lower than indicated by both the mainline and turn movement counts. Furthermore, the turn counts collected in 2010 do not support the model simulations of such high turn volumes at those intersections. At the same time, the flows in the eastbound direction of Geary west of Arguello were as much as 50% lower than the counts. This deviation indicated a systematic error in the way the model represented route choice options on both directions of Geary and raised questions about the overall validity of the model. Interestingly, the modeled average speed of westbound traffic on Geary was 15mph, 3mph lower than the observed value. This speed differential raised additional concerns about model validity given that the modeled flow is below the observed value. Upon further examination it was revealed that the speeds and flows on routes parallel to Geary such as Anza and Balboa were significantly higher than expected. These findings indicated that model calibration would be required for the purpose of adapting the Doyle Drive DTA network for use in the Geary BRT project.

Figure 1. Westbound Mainline Observed Vs Estimated Volumes

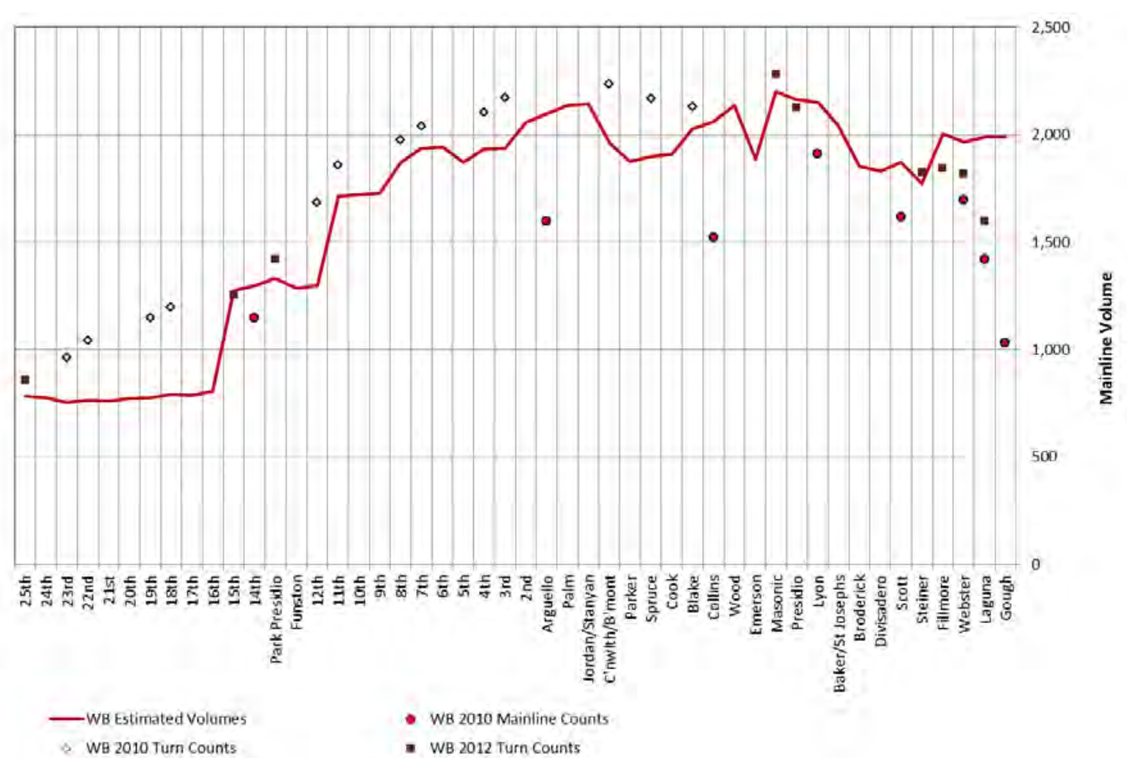
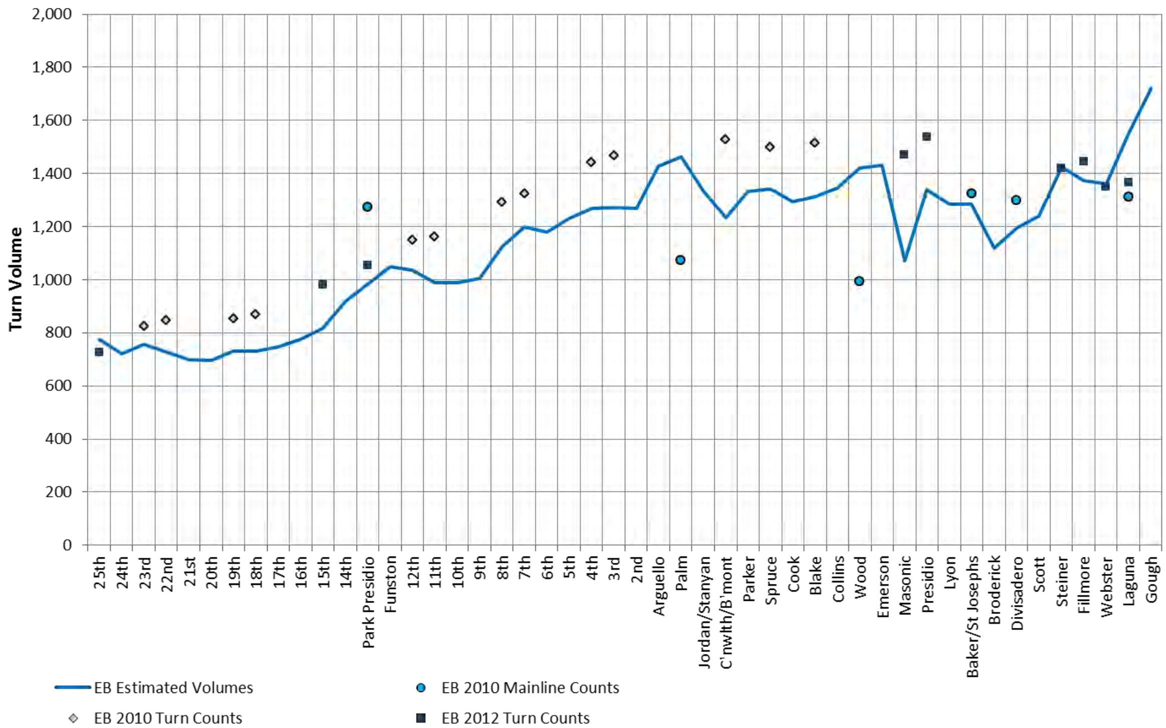


Figure 2. Eastbound Mainline Observed Vs Estimated Volumes



Calibration

Calibration efforts were focused on altering the speed limits on functional classes of streets to more accurately represent their free flow conditions. No adjustments were made to the CHAMP output demand matrix. At some study area network entry links the regional static assignment produced flows greater than capacity. Virtual or "ghost" links were added at relevant network boundary locations to remedy this problem. Alternative scenarios were run with different combinations of speed limits on various streets in order to induce or keep travelers on Geary without decreasing travel speed on the corridor. In the final stage of calibration, speed limits on Anza, Balboa, Cabrillo and Lake were reduced from 27mph to 18mph. In addition, the speed limit on all of the north-to-south streets west of Arguello was set to 15mph.

In order to match the actual posted speed limit, the DTA speed limit on Geary west of Masonic was increased to 35mph. This increased the simulated speed on WB Geary to 16mph, but also attracted higher flow. Additional attempts were made to raise simulated speed on WB Geary closer to 18mph from 16mph by further raising the speed limit. The model reacted as anticipated, yet additional volume was attracted from parallel streets thus further deviating from the observed counts. It is believed that no further improvements can be made to the simulated speed of Geary in the westbound direction without also modifying the speeds on parallel streets Pine, California, and Turk.

The simulated speed on Fulton west of Arguello was 5 to 6 miles lower than the observed speed in both directions. After increasing the modeled speed limit to 37mph (posted speed limit is 35mph) the simulated speed on both directions increased by 2mph. Attempts to improve the accuracy of modeled speed on Fulton resulted in significantly more volume than observed values. The turn count observations for Fulton and Crossover suggest that in the DTA simulation Fulton collects more eastbound traffic than it should. This results in simulated flows that are higher and simulated speeds that are lower than observed conditions.

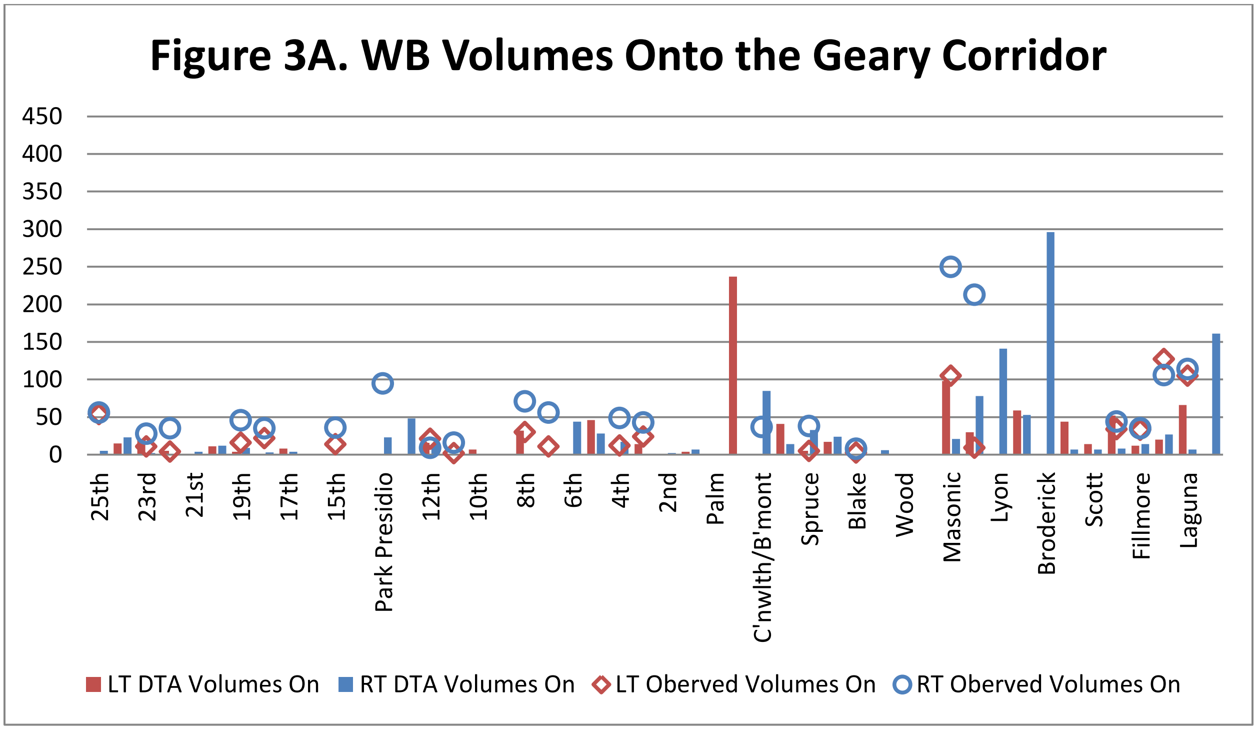
Final Validation

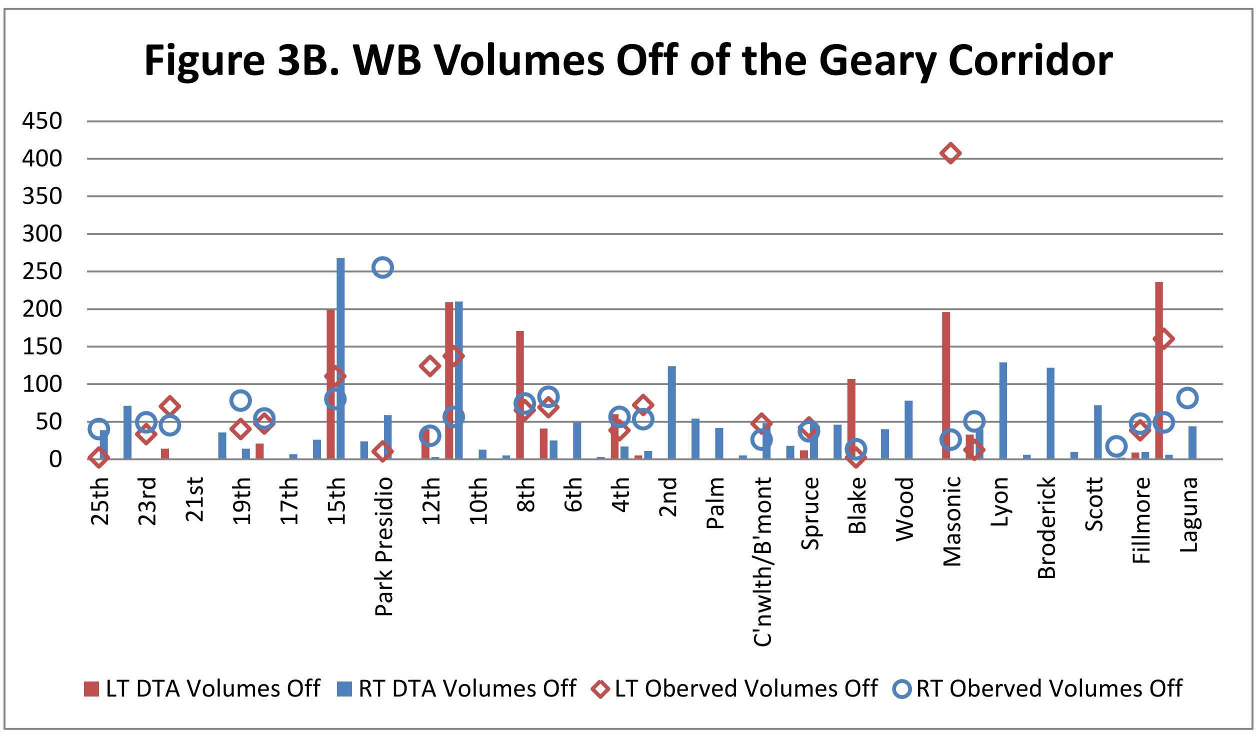
Calibration efforts were focused on achieving the validation targets described above. Westbound Geary was the key focus of calibration because Geary BRT alternatives will be evaluated for the PM peak period when westbound Geary Blvd traffic volumes are highest. A major element of the calibration process was attempting to increase simulated westbound Geary traffic volumes to match observations for the western segment of the corridor without significantly altering the flows or lowering the speeds of the eastern segment of Geary. This was achieved by more accurately simulating the speeds on routes parallel and perpendicular to Geary, especially on the part of the network west of Arguello. The resulting simulation has plausible flows for all of WB Geary while achieving speeds that do not differ more than 2mph from observed speeds (Figures 3 and 5). Furthermore, simulated travelers no longer pick Fulton, Anza or Balboa to travel eastbound to such a large extent. This results in more realistic eastbound traffic flows on Geary (Figure 4). Simulated speeds on Anza, Balboa and Cabrillo have been reduced significantly and appear much more plausible (Figure 7). As shown in Figure 5, the simulated speeds on all routes parallel to Geary in the southeast corner of the network are within 4mph of the observed speeds. The great majority of these are within 2mph of observed speeds. Finally, the speed on Fulton has been improved and is within 4mph of observed values in both directions.

Geary WB

The following figure (Figure 3) shows the flows on the westbound direction of Geary between 5:00 PM and 6:00 PM from Gough to 25th Ave. The observed volumes are compared to the volumes obtained from the DTA model. Although not always of the same magnitude, the estimated volumes show peaks around the same areas as the observed volumes. Please note that the volume on side streets has not been added to the plot.

Figure 3. Westbound Turn Observed Vs Estimated Volumes between 17:00 and 18:00

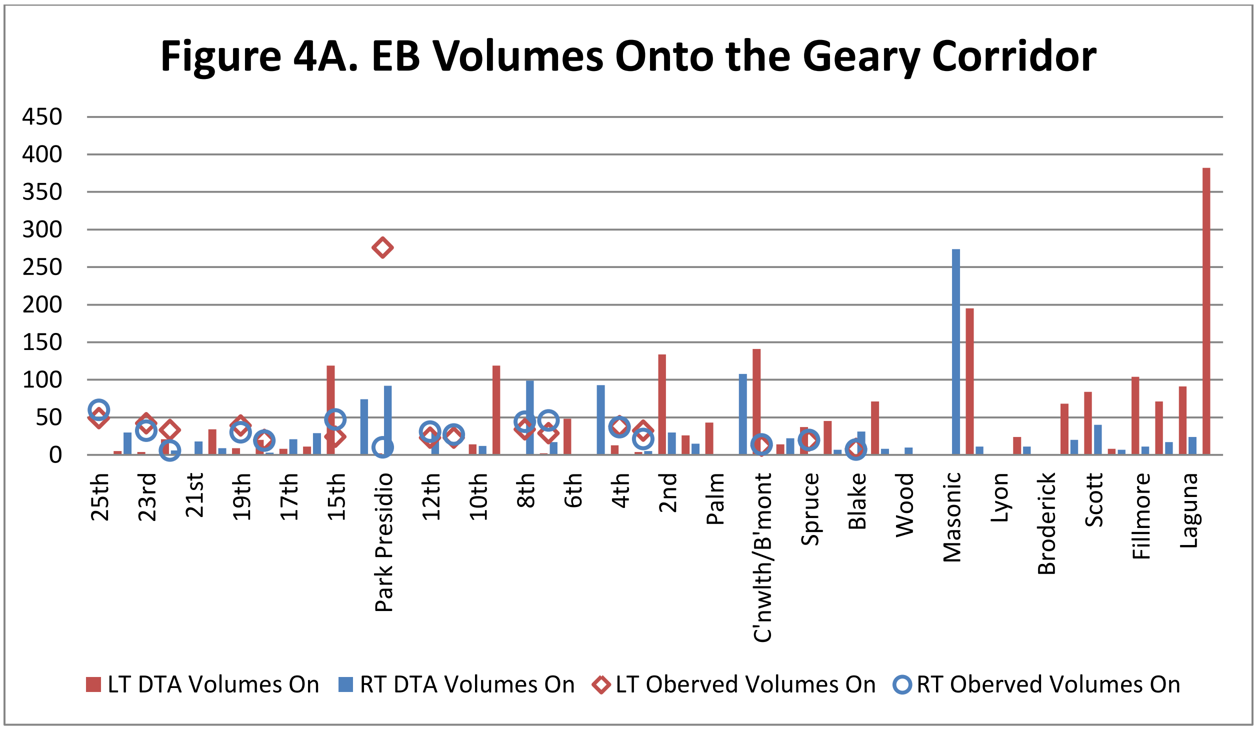


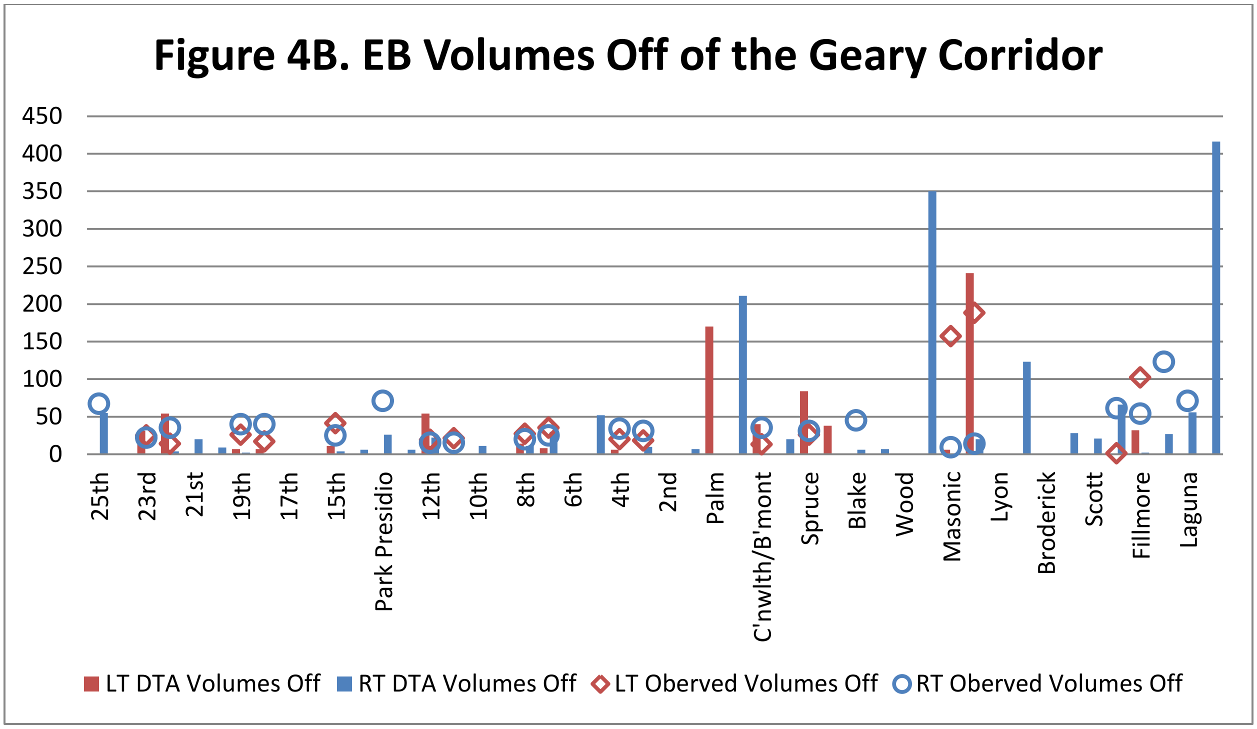


Geary EB

Figures 2 and 4 show an improvement in the simulated eastbound flows on Geary Blvd. Despite the improvement, the model continues to underestimate eastbound volume on Geary Blvd between Park Presidio and Baker. The model also underestimates volumes on Geary west of Park Presidio. This may be partly attributable to that the model predicting a) drivers traveling from the Golden Gate Bridge to the southeast part of our network do not choose to take Park Presidio and then westbound Geary b) incoming volume from the Golden Gate Bridge is as low as 1000 vehicles per hour lower than the average observed value. Further investigation is required to understand eastbound flow on Geary is below observed values despite numerous calibration attempts. One possible solution would be to reduce the high eastbound flow on Fulton by limiting the number of vehicles making left turns onto that street.

Figure 4. Eastbound Turn Observed Vs Estimated Volumes between 17:00 and 18:00

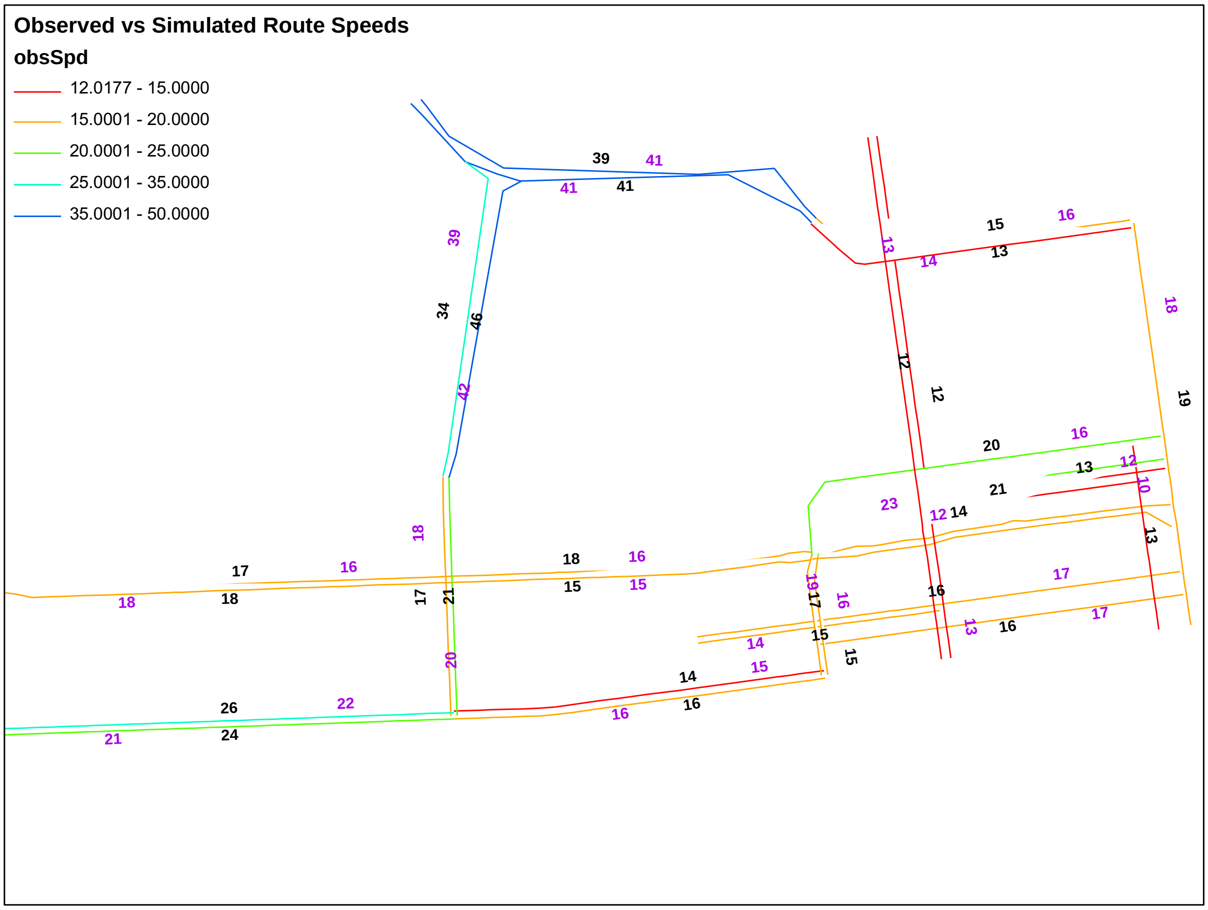




Observed and Simulated Speeds

Figure 5, below, compares observed and simulated speeds on the principle corridors of the Geary DTA model project area. The observed speeds respresent data collected between 4:30 and 6:30PM in 2009. Observed speeds are shown to the right of each route with black numbers. Simulated speeds are shown on the same side in purple. Overall, the simulated speeds are close to the oberved speeds. For the vast majority of the routes the difference is less than 2mph. Improvements can be made on Fulton, west of Park Presidio, where simulated speeds are 3 to 4mph below observed volumes and on Park Presidio between Doyle Drive and Lake. Also, the simulated traffic speed on westbound Pine is 4mph lower than the observed speed.

Figure 5. Average Traffic Speeds, North of Geary, Weekday PM Peak Period



Overall Model Fit

A primary method by which a model can be validated is by comparing observed and simulated traffic volumes. A simple linear regression between the observed and simulated volumes is a useful tool for evaluating model fit. The regression used in this analysis fixes the constant at zero so that the regression equation is the following:

$$ModelVol_i = \beta \cdot ObservedVol_i + \varepsilon$$

A model that simulates actual traffic conditions with a high degree of accuracy would have a coefficient β that is close to 1.0 and a high R^2 value. Figures 6, 7, and 8 below present scatter plot graphics representing DTA model simulated traffic volumes and observed counts for the same locations and time periods. The graphics are overlaid with model fit regression statistics.

Figures 6 and 7 show the counts and volumes in the westbound and eastbound directions respectively, and Figure 8 shows all the counts in the same scatterplot. The westbound volumes, in Figure 6, showed a β value of 0.9907 and an R^2 value of 0.5895. The eastbound volumes, in Figure 7, showed a β value of 0.0.9543 and an R^2 value of 0.2283. And finally, Figure 8 showed a β value of 0.0.0.9784 and an R^2 value of 0.6312 for the comparison between all observed volumes and estimated volumes.

All three linear regressions show a very good slope and decent R^2 values. This indicates that even though some values are overestimated and others are underestimated, overall the model has a good fit and represents the system appropriately, thus validating the model.

Figure 2. WB PM Peak Hour Observed Vs. Estimated Volumes on Geary Boulevard

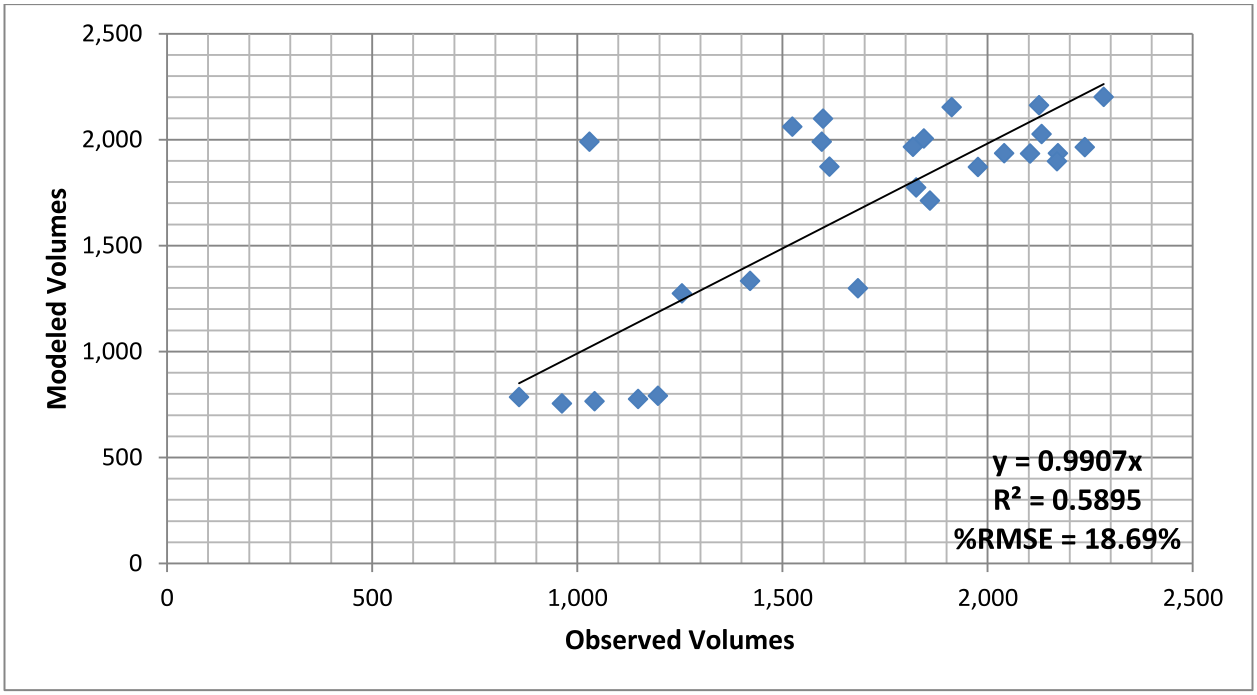


Figure 7. EB PM Peak Hour Observed Vs. Estimated Volumes on Geary Boulevard

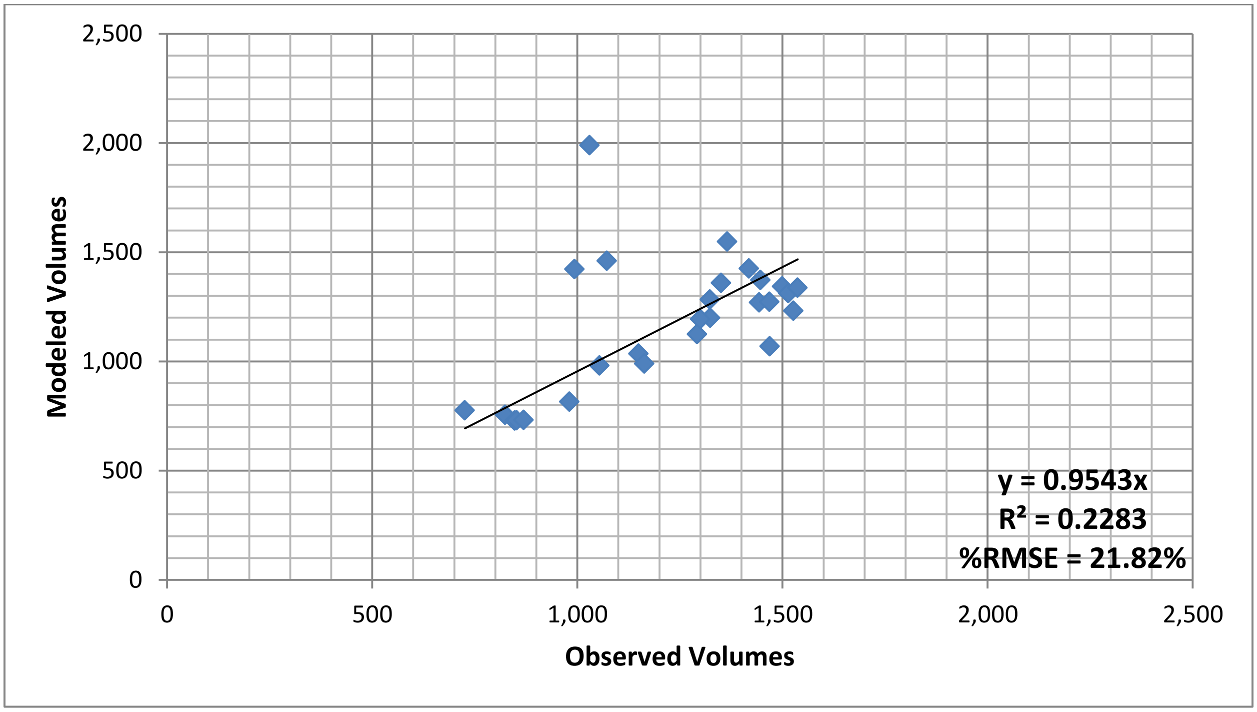
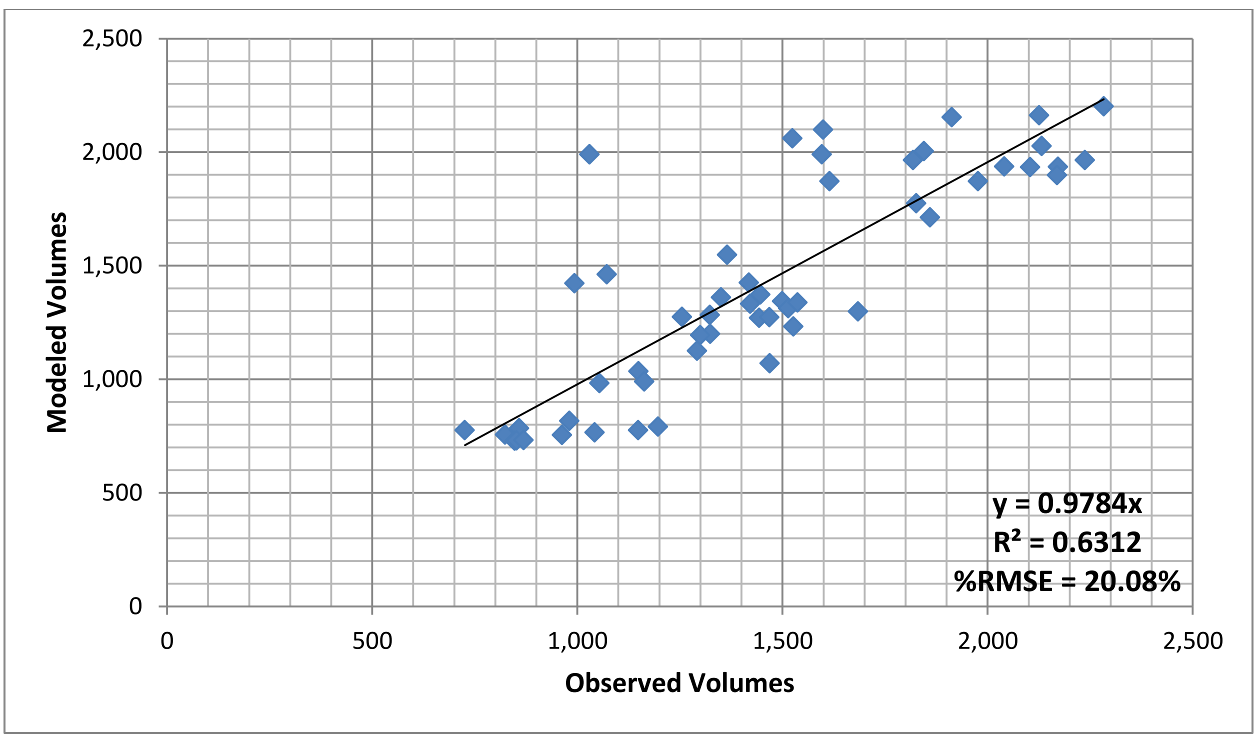


Figure 8. All PM Peak Hour Observed Vs. Estimated Volumes on Geary Boulevard



Previous Work:

- Sall et al. Rapid Implementation and Validation of Dynamic Traffic Assignment, presented at the 3rd Transportation Research Board Conference on Innovations on Travel Modeling, Tempe, AZ, May 2010.
- Xyntarakis, M., Sall, E., Hicks, J., Charlton, B., "Regional Dynamic Traffic Assignment for Real World Travel Demand Models", to be presented at the 89th Transportation Research Board Annual Meeting, Washington, DC, January 2010.

Appendix D5: VISSIM Model Calibration and Validation

TECHNICAL MEMORANDUM

Date: March 8, 2011

To: Geary BRT Project Team

From: David Stanek, Eric Womeldorff, and Matt Haynes, Fehr & Peers

Subject: Geary BRT – Existing Conditions VISSIM Model Calibration and Validation

SF08-0404

Fehr & Peers has developed a traffic micro-simulation model that will be used to analyze the environmental impacts of the proposed Geary Boulevard bus rapid transit (BRT) project in San Francisco. The study area for the micro-simulation model includes Geary Boulevard from Van Ness Avenue to 25th Avenue and O'Farrell Street from Van Ness Avenue to Franklin Street as shown in Figure 1.[1] To account for the complexities of high frequency transit service, high automobile traffic volumes, and transit signal priority employed on the Geary Boulevard corridor, as well as the system effects of automobile, transit, pedestrian and bicycle interaction, the VISSIM micro-simulation software is being used to determine the effect of the proposed project on transportation operations on Geary Boulevard.

Figure 1: Geary BRT Study Corridor

This memorandum describes the development of the VISSIM micro-simulation model for existing conditions, including the model calibration and validation processes. The VISSIM model development process includes three basic components: (1) network coding, (2) model calibration, and (3) model validation. The memorandum also summarizes key existing conditions analysis results produced by the model.

MODEL DEVELOPMENT PROCESS

The VISSIM model was constructed by digitizing the corridor roadway network using aerial photography as the background. The number of lanes and the location of lane additions and drops were confirmed by field observations. Additional detail was incorporated into the VISSIM network (posted speed limits, turning speed, etc.) to better reflect observed field conditions. At signalized intersections, traffic signal

[1] All figures contained in this technical memorandum are included in Appendix A in larger format.

timing plans (i.e., phasing, green time, transit signal priority, etc.) were entered using the D4 signal controller add-on for VISSIM so that the software emulates the actual signal controller. D4 signal technology is used by the San Francisco Municipal Transportation Agency (SFMTA) for traffic signal controls in San Francisco.

The *Geary Corridor BRT Feasibility Study* (2007) developed a planning level VISSIM model to analyze various BRT alternatives. The previous VISSIM model was used to perform a planning level alternatives analysis as part of the *Feasibility Study*.

As part of the current environmental phase of the BRT project, an additional level of analysis detail and precision is necessary to ensure consistency with California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) guidelines. As a result, a new VISSIM micro-simulation model was developed to provide additional detail and better replicate multimodal transportation patterns in the BRT corridor. Additional features of the updated VISSIM model include:

- *Origin-destination vehicle routing* – All automobiles, trucks and buses have one origin and one destination while traveling through the model. As a result, they are much less likely to make abrupt or last-minute lane changes when traveling between intersections.
- *D4 traffic signal control* – All signals have been specified using the virtual D4 software to emulate the signal control including transit signal priority.
- *Bicycles* – Bicycle traffic has been added to the network. Except on Polk Street, Webster Street, Presidio Avenue and Arguello Boulevard, where Class II bicycle lanes are provided, bicycles are modeled to “take the lane” and are routed along the “upper” portion of Geary Boulevard at Fillmore Street and Masonic Avenue.
- *Pedestrians* – Pedestrian crossings were modeled at all intersections where a marked crosswalk is present.
- *Transit coding* – Bus stop dwell times were entered according to route and stop location, and near-side bus stops are coded to match actual bus pull-out and traffic reentry movements observed along the corridor.
- *Larger geographical extent* – The modeled area has been extended eastward to include the intersections up to Van Ness Avenue. The previous models eastern terminus was the intersection of Geary Boulevard and Webster Street.
- *On-street parking maneuvers* – The modeled area includes additional refinements to replicate capacity restrictions due to on-street parallel and angled parking activity in the corridor.

The VISSIM model was validated to existing conditions using criteria suggested by the California Department of Transportation (Caltrans), the Federal Highway Administration (FHWA), and additional criteria developed by Fehr & Peers. A number of iterations were required to successively adjust the default VISSIM parameters for geometrics and driver behavior until the model was validated to observed conditions. Validation criteria and results are presented later in this memorandum.

Once the model was successfully calibrated and validated, it was used to generate measures of corridor performance such as vehicle and transit average speeds, vehicle hours of delay and other performance measures consistent with the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2000) such as intersection delay and level of service.

Because micro-simulation models like VISSIM rely on the random arrival of vehicles, multiple runs are needed to provide a reasonable level of statistical accuracy and validity. The model was run twenty times (each using a different random seed number), and then the ten most average runs were selected and averaged to determine model results. The selection of the ten most average runs is designed to remove outliers from the process.

MODEL NETWORK CODING

Development of the street network and automobiles, buses, bicyclists, and pedestrians that comprise the VISSIM model required the input of geometric, traffic control and traffic flow data, each of which is described in this section. An overview of the micro-simulation model development process is described below.

Geometric Data

Roadway geometric data (traffic lanes, turn pockets, bus lanes, bus stop locations, etc.) were gathered using aerial photographs and field observations. Lane configurations were initially taken from aerial photographs and were then confirmed or revised based on field observations.

Traffic Control Data

The SFMTA provided signal timing plans for the traffic signals in the study area. The signal plans were specified using the Virtual D4 Suite software. The signal timing settings include vehicle and pedestrian signal phases and transit signal priority for several intersections. The posted speed limits for streets in the study area were collected during field observations. Maximum vehicle speeds in the model are consistent with posted speed limits, although a random speed variability is assigned to each vehicle, causing them to drive above or below the speed limit, to mimic prevailing driver behavior.

Transit Data

In addition to the key Geary Boulevard bus lines, the 38/38L Geary/Limited and the 38 AX/BX Geary Express, the following bus lines were included in the model: 19 Polk, 22 Fillmore, 24 Divisadero, 28/28L 19th Avenue/Limited, 29 Sunset, 31 AX/BX Balboa Express, 33 Stanyan, 43 Masonic, 44 O'Shaughnessy, 47 Van Ness, 49 Van Ness/Mission, and Golden Gate Route 92 (GG).

Bus route schedules and stop locations for the study area were coded based on information from the SFMTA. The average dwell times for stops on the 38 Geary and 38L Geary Limited lines were provided by SFMTA. Dwell times for stops on other routes were assumed to average 15 seconds, with a random variability assigned to replicate actual dwell time variations. The 38 Geary and 49 Van Ness/Mission lines were modeled as articulated buses while all other lines were modeled as standard motorcoaches or trolleycoaches. Figure 2 shows the bus routes in the study area.

Figure 2: Weekday Transit Service Along Geary Study Corridor

Traffic Flow Data

Fehr & Peers collected intersection PM peak period (4:00 to 6:00 PM)[2] turning movement counts at 13 of the 58 study area intersections. This data was supplemented with counts from other studies for 15 additional intersections and balanced using the Synchro program. Balancing is the adjustment of turning movement volumes to reduce unexpected changes in through-volumes between adjacent intersections. Traffic volumes at the remaining 30 intersections (generally lower-volume intersections) were estimated from adjacent intersections or from travel demand forecasting model data (Dynameq) in a process described below.

The San Francisco County Transportation Authority (SFCTA) provided 15-minute origin-destination outputs from the City's SF-CHAMP travel demand forecasting model. For the Geary Boulevard corridor from Franklin Street to 25th Avenue, the outputs from the SF-CHAMP model were dynamically assigned to the network using the Dynameq software program. Then, using an origin-destination estimator in the VISUM software, the peak-hour matrix from Dynameq was iteratively adjusted to better match peak-hour intersection turning movement counts.

The dynamic assignment process resulted in the PM peak hour average roadway volumes, shown in Figure 3. Average roadway volumes are highest in both directions from Lyon Street east of the Masonic Avenue ramps in the west to Divisadero Street or Webster Street in the east.

Figure 3: Weekday PM Peak Hour Average Roadway Volumes

Based on corridor observations, trucks were assumed to be two percent of the overall traffic flow throughout the corridor. Truck types are distributed evenly between UPS-type delivery trucks (2-axle), tractor trailer trucks (3+-axle), and delivery vans (2-axle). Pedestrian counts were available from the 13 intersections where Fehr & Peers collected traffic counts. Bicycle counts were available at study

[2] The PM peak period was chosen as the analysis time period as it represents the period when the maximum use of the transportation system occurs. It is also consistent with the approach suggested in the San Francisco Planning Department, *Transportation Impact Analysis Guidelines*, the document which largely guides CEQA-level analysis in the City of San Francisco.

intersections where Fehr & Peers collected counts for the *Geary Boulevard Bicycle Demand Study* (2008). Where count data was not available, pedestrian and bicycle volumes were estimated from counts at adjacent locations or facilities or based on the adjacent land uses.

Travel Time Data

Bus travel time information, including average dwell time per stop, was provided by the SFMTA. The data was collected by Automatic Passenger Counter (APC) devices which, despite their name, also collect data via global positioning technology to identify individual buses locations and progress throughout their route.

Automobile travel time surveys were conducted in October 2010 by three drivers on consecutive weekdays during the PM peak period for a total of 15 round-trips of Geary Boulevard. Drivers were instructed to abide by the 'floating car' methodology, in which an approximately equal number of vehicles on Geary Boulevard both pass and are passed by the survey vehicle.

Figures 4 and 5 show the PM peak hour average speed of the 38/38L Geary/Limited buses and autos in the study corridor based on the results of the travel time surveys and bus travel time data provided by SFMTA.

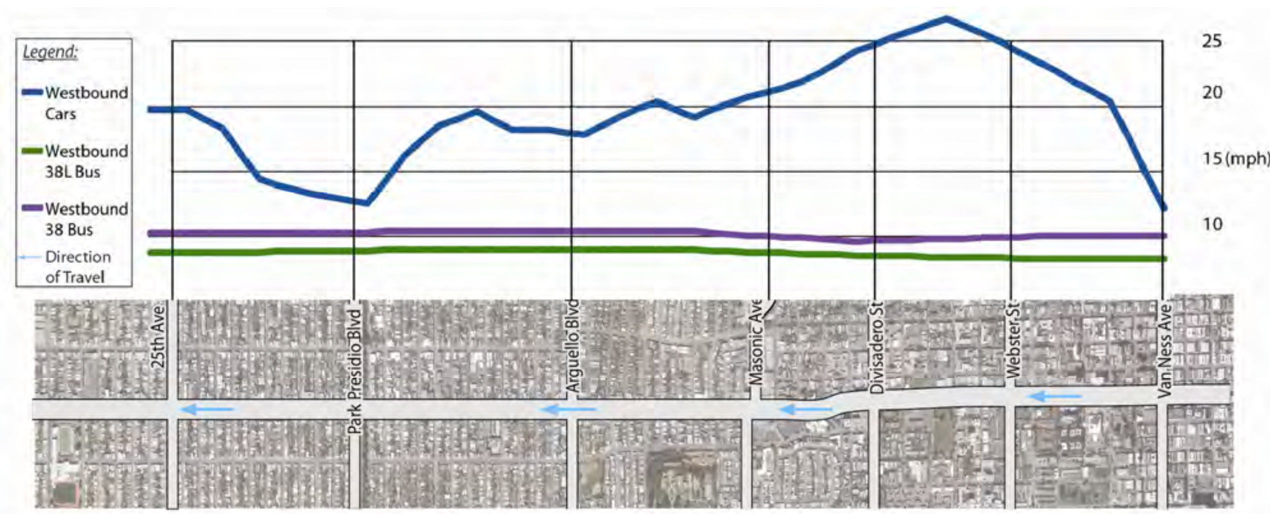


Figure 4: Weekday PM Peak Hour Westbound Average Roadway Speeds - Measured/Reported Results

As shown in Figure 4, westbound travel speeds for the 38/38L Geary/Limited buses remain relatively consistent through the study network; average speeds are approximately 8 and 10 mph, for the 38 Geary and 38L Geary Limited , respectively. For westbound autos, the segment with the highest sustained average travel speed is from Gough Street to Masonic Street, where average speeds are greater than 20 mph (average speeds are greater than 25 mph in the brief segment between Fillmore Street and Scott Street). There are two other locations where average travel speeds approach 20 mph, but are not sustained: 7th Avenue and 21st Avenue. The segment with the lowest average travel speed is the section immediately upstream and downstream of Park Presidio Boulevard, where average speeds are between 12 and 15 mph.

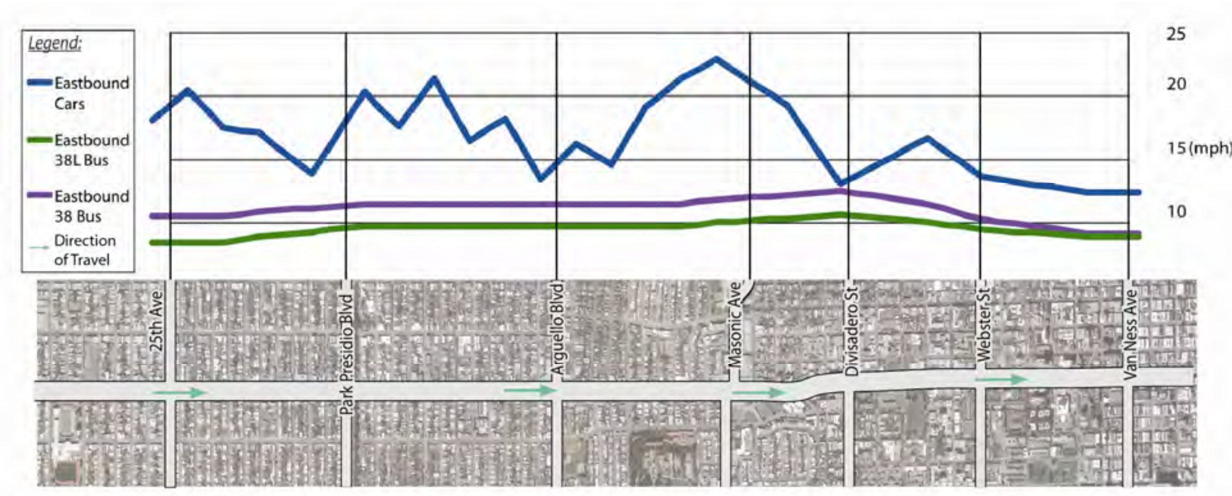


Figure 5: Weekday PM Peak Hour Eastbound Average Roadway Speeds - Measured/Reported Results

As shown in Figure 5, eastbound travel speed for the 38/38L Geary/Limited buses is relatively consistent throughout the study network with somewhat higher average speeds prior to Divisadero Street and lower average speeds after Webster Street. Excluding the segment between Webster Street and Van Ness Avenue, the 38L Geary Limited's average travel speed is at or just greater than 10 mph for the duration of the network. The same is true for the Geary 38 between Park Presidio Boulevard and Steiner Street. For eastbound autos, the segment with the highest average speed is the partially limited access section from Spruce Street to Baker Street, where average speeds are between 20 and 23 mph. There are three other locations where average travel speeds approach 20 mph, but are not sustained: 8th Avenue, 12th Avenue, and 22nd Avenue. The segment with the lowest average speed is the uphill section east of Webster Street, where the average travel speed is approximately 12 mph.

MODEL CALIBRATION

During calibration of a VISSIM model, individual components are adjusted to match collected and field-observed data. Once developed, calibration of a model is necessary to ensure that the model provides a visually accurate depiction of the field-observed condition and that model outputs can be trusted to inform the best possible analysis.

Adjustments to the VISSIM model focus on the model components related to driver behavior including yielding right-of-way at intersections, driver performance such as aggressiveness, vehicle fleet mix, and vehicle performance. The following VISSIM model parameters are subject to adjustment:

- Vehicle fleet composition (passenger cars, pickup trucks, SUVs, heavy trucks, etc.)
- Vehicle headways
- Distance between stopped vehicles (standstill distance)
- Driver behavior when changing lanes

The VISSIM model was calibrated by replacing the default values with the adjusted values as shown in Table 1 (during the validation step, these values may be adjusted further to refine the VISSIM model) to more accurately reflect observed conditions.

TABLE 1 – CALIBRATION ADJUSTMENTS

Category	Parameter				Default Value	Adjusted Value
	Vehicle					
	Type	Traffic	Sub-Category			
Vehicle Fleet Composition[1]	Car	98%	Sedans		98%	60%
			Sports Cars		2%	5%
			SUVs/Vans/Pickups		0%	35%
	Truck[2]	2%	2-axle trucks		0%	67%
			3+-axle trucks		100%	33%
Driving Behavior[4] with On-street Parallel and (Angled Parking)	Average Standstill Distance[3]				6.56 ft	8.0 ft, (8.2 ft)
	Additive Part of Safety Distance				2.0	2.5 (2.55)
	Multiplicative Part of Safety Distance				3.0	3.5 (3.55)
	Maximum Look Ahead Distance				820.21 ft	500 ft 500 ft
	Maximum Look Back Distance				492.13 ft	300 ft
Lane Changing Behavior	Safety distance reduction factor				0.6	0.1
	Max. decel. for cooperative braking				-9.84 ft/s^2	-29.53 ft/s^2

Note:
1. Vehicle fleet composition is uniform throughout the study area.
2. The truck vehicle type does not include buses.
3. The default average standstill distance varies for freeway (4.92 ft) and urban (6.56) driving behavior models
4. Driving behavior for streets with no on-street parking is equal to default values.

Source: Fehr & Peers, 2010

The calibrated values in Table 1 better represent field observations and our experiences with similar urban area projects elsewhere in northern California than the default VISSIM input parameter values. For example, the default vehicle composition contains 98 percent standard sedans and two percent sports cars. However, a substantial portion of vehicles in the Bay Area (and most U.S. metropolitan areas) are SUVs and light trucks. As a result, the traffic composition has been revised to reflect this condition.

Although on-street parking was not explicitly included in the model, the effect on traffic has been captured in the driver behavior model of vehicle headways (the bumper-to-bumper distance between vehicles). For streets with on-street parking (both angled and parallel), the average vehicle headway is assumed to be longer than streets without on-street parking. This change in vehicle headway is across all lanes of travel for a given direction, as the model does not allow driving parameters to be set by lane (inside vs. outside). This results in a lower observed capacity of approximately ten percent for streets with on-street parking across all lanes of travel. Due to the back-out maneuver, streets with angled parking were given slightly lower capacity than those with parallel parking. Default driving and lane changing behavior values were used for roadway segments where on-street parking was not present.

MODEL VALIDATION

The parameters affecting the street network capacity were adjusted so that the observed traffic and transit operations (speed and queuing) were replicated in the VISSIM models.

Table 2 lists the adjustments made to the VISSIM model parameters as part of the validation process.

TABLE 2 – VALIDATION ADJUSTMENTS

Category	Parameter	Default Value	Adjusted Value(s)
Lane Change Behavior	Emergency Stop Distance	16 ft	50 ft
	Anticipatory Lane Change Distance	656 ft	1,000 or 1,500 ft

Source: Fehr & Peers, 2010

For turn movements, the anticipatory lane change distance was adjusted so that vehicles did not make last-minute lane changes. These adjustments were made for the eastbound left turn from O'Farrell Street to Franklin Street, the northbound left turn from Franklin Street to Geary Boulevard, and for the ramps to upper Geary Boulevard at Masonic Avenue and Fillmore Street. With these changes, the model showed queues that better matched field observations.

During validation, the VISSIM model output is compared against field data to determine if the output is within acceptable levels. Caltrans and the FHWA suggest the following validation criteria: (*Guidelines for Applying Traffic Microsimulation Modeling Software*, California Department of Transportation, 2002; *Volume III - Guidelines for Applying Traffic Microsimulation Modeling Software*, Federal Highway Administration, 2003).

- Link volumes for more than 85 percent of cases meet the following criteria:
  - For volumes less than 700 vph, within 100 vph
  - For volumes between 700 and 2,700 vph, within 15 percent
  - For volumes greater than 2,700 vph, within 400 vph
- Link volumes for more than 85 percent of cases have a GEH[3] statistic less than 5 (a measure of how well the model replicates actual conditions)
- Sum of link volumes within 5 percent
- Sum of link volumes have a GEH statistic less than 4
- Average travel times within 15 percent (or one minute, if higher) of measured/reported travel times, for more than 85 percent of measured travel time paths
- Individual link speeds have a visually acceptable speed-flow relationship
- Bottlenecks create visually acceptable queuing and agree with observed conditions

Fehr & Peers has developed the following additional validation criterion, which has a narrower tolerance for intersection volumes (which are aggregated link volumes) than the criteria suggested by FHWA and Caltrans.

- Peak-hour volumes for more than 85 percent of intersections within 5 percent of traffic counts

[3] GEH, which received its name from its inventor Geoffrey E. Havers, is a validation statistic that is used to interpret the correlation of two sets of traffic volumes. With respect to the validation of traffic model, the two volumes present in the GEH computation formulae are observed traffic volumes and model estimated traffic volumes.

Table 3 shows how the results for the existing conditions VISSIM models compare to the validation criteria thresholds recommended in the FHWA and Caltrans guidelines and intersection volume validation developed by Fehr & Peers. The results reflect the average of 10 of 20 micro-simulation model runs.

TABLE 3 – VALIDATION CRITERIA THRESHOLDS COMPARISON

Criteria	Criteria Threshold	% Met Target	% Met	Pass/Fail
Link Volumes				
< 700 vph	100 vph	> 85%	100%	Pass
between 700 & 2,700 vph	15%			
> 2,700 vph	400 vph			
GEH Statistic	5	> 85%	96%	Pass
Sum of Link Volumes				
Sum of All Links	5%	-	(+0.6%)	Pass
GEH Statistic	4	-	(2.9)	Pass
Aggregated Volumes				
Intersections[2]	5%	>85%	95%	Pass
Travel Time				
Travel Paths	15%[1]	> 85%	100%	Pass
Visual Inspection				
Travel Speeds	match observations		-	Pass
Queuing	match observations		-	Pass

Notes: **Bold** and underline font indicates that the criteria are not met.
1. For travel times, the criterion is to be within 15% or one minute, if higher.
2. Fehr & Peers developed criterion.

Source: Fehr & Peers, 2010

The link volumes for all street segments meet the criteria threshold. Aggregations of link volumes for more than 85 percent of the study intersections meet the five percent tolerance. The GEH statistic was met for the link volumes and for the sum of all link volumes during the peak hour. The peak hour travel times met the validation criteria. The speed-flow relationship and queuing at bottlenecks were visually inspected and found to be acceptable.

Table 4 compares the measured travel time and the modeled travel time for selected network paths.

FEHR & PEERS
TRANSPORTATION CONSULTANTS

TABLE 4 – PM PEAK HOUR TRAVEL TIME VALIDATION RESULTS

Mode	Limits		Travel Time (min:sec)			
			Measured/ Reported	Modeled	Percent Difference	Pass/Fail
38 Bus	**EB: Park Presidio Blvd to Van Ness Ave**		**21:00**	**21:52**	**+4.2%**	**--**
	Eastbound Segments	Park Presidio to Presidio	10:42	10:27	-2.4%	Pass
		Presidio to Fillmore	4:36	5:20	+16.1%	Pass
		Fillmore to Van Ness	5:42	6:05	+6.8%	Pass
	WB: Van Ness Ave to Park Presidio Blvd		**21:36**	**21:48**	**+0.9%**	**--**
	Westbound Segments	Van Ness to Fillmore	5:54	6:11	+4.9%	Pass
		Fillmore to Presidio	5:48	4:49	-16.9%	Pass
		Presidio to Park Presidio	9:54	10:47	+9.0%	Pass
38L Bus	**EB: Park Presidio Blvd to Van Ness Ave**		**18:06**	**19:25**	**+7.2%**	**--**
	Eastbound Segments	Park Presidio to Presidio	8:42	8:36	-1.1%	Pass
		Presidio to Fillmore	4:12	5:09	+22.8%	Pass
		Fillmore to Van Ness	5:12	5:39	+8.6%	Pass
	WB: Park Presidio Blvd to Van Ness Ave		**18:24**	**19:39**	**+6.8%**	**--**
	Westbound Segments	Van Ness to Fillmore	4:54	5:21	+9.2%	Pass
		Fillmore to Presidio	5:18	4:30	-15.0%	Pass
		Presidio to Park Presidio	8:12	9:48	+19.6%	Fail
Autos	**EB: 22nd Ave to Van Ness Ave**		**15.28**	**13.51**	**-11.6%**	**--**
	Eastbound Segments	22nd Ave to Park Presidio	2:24	2:04	-13.8%	Pass
		Park Presidio to Arguello	3:18	2:43	-17.7%	Pass
		Arguello to Masonic	3:06	2:16	-26.7%	Pass
		Masonic to Divisadero	1:21	1:20	-1.1.%	Pass
		Divisadero to Webster	2.20	1.80	-18.1%	Pass
		Webster to Van Ness	2:55	3:19	+13.5%	Pass
	WB: Van Ness Ave to 22nd Ave		**12:31**	**14:41**	**+17.4%**	**--**
	Westbound Segments	Van Ness to Webster	2:16	2:38	+15.6%	Pass
		Webster to Divisadero	1:03	1:06	+4.5%	Pass
		Divisadero to Masonic	1:04	0:54	-16.1%	Pass
		Masonic to Arguello	2:11	1:59	-9.0%	Pass
		Arguello to Park Presidio	3:36	5:10	+43.6%	Fail
		Park Presidio to 22nd	2:20	2:54	+24.4%	Pass

Note: The modeled and measured automobile travel times are based on vehicles traveling through the Geary Blvd tunnel at Masonic Ave and through the underpass at Fillmore St. Bus travel times are based on actual bus routing for the 38/38L routes.

Source: Fehr & Peers, 2010

The automobile travel time from the VISSIM model runs was generally higher in the westbound direction and lower in the eastbound direction than the measured/reported travel times. However, both auto travel time measurements, eastbound and westbound, are within the 15 percent validation threshold. The modeled Geary 38/38L bus travel times are somewhat higher than the measured/reported travel time but also within the 15 percent validation threshold.

Due to the fact that measured/reported travel times are from 2007 and 2010 for transit and auto modes, respectively, and traffic volumes are from a mix of several other periods, including 2005, 2008, and 2010, it is difficult for the model to replicate both travel times and traffic volumes to a tight tolerance. As a result, the validation criterion has some leeway – that is, it allows a validated model to be up to 15 percent off of the measured values for both travel times and traffic volumes. Two travel modeled time paths were found to not meet the 15 percent validation threshold, specifically, the westbound Geary 38L travel time segment from Presidio Avenue to Park Presidio Boulevard and the westbound auto travel time segment from Arguello Boulevard from to Park Presidio Boulevard. However, the validation criteria summarized in Table 3 was found to be met.

In both figures, an overlay of measured/reported travel times for the Geary 38/38L and autos is included. The overlay appears as a swath, rather than a single line, in order to represent daily fluctuations in speed of up to 3 mph. As shown, both directions show good general agreement.

Figures 6 and 7 show the PM peak hour average speed of Geary 38 and 38L buses and autos in the study area based on the travel time measurements taken from the model in the westbound and eastbound directions, respectively. Additionally, an overlay of measured/reported travel times for the respective modes is included as reference points.

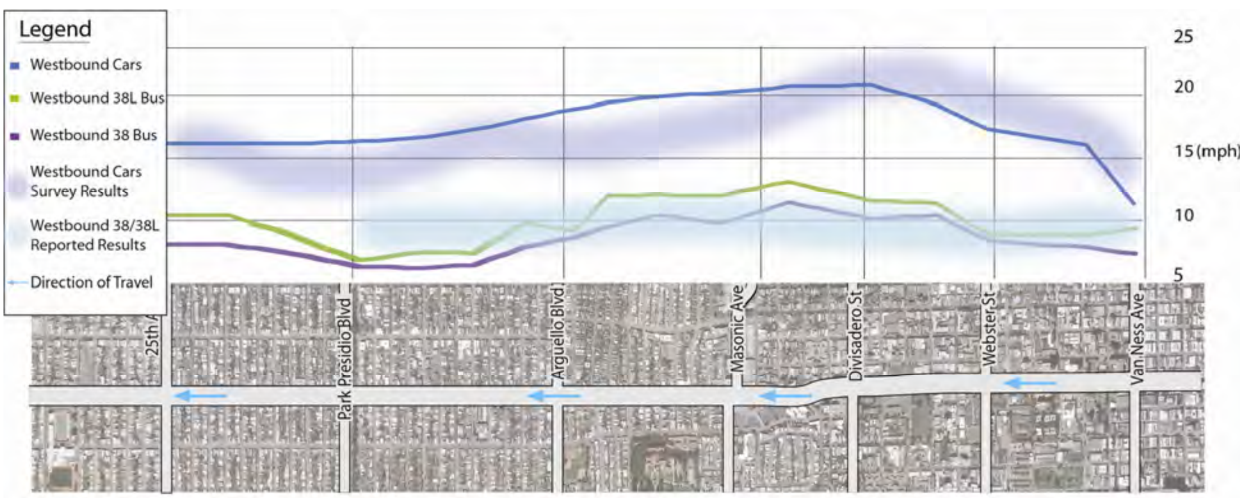


Figure 6: Weekday PM Peak Hour Westbound Average Roadway Speeds - Model Results

Similar to Figure 4, in the westbound direction the highest average auto speeds in the network are found in the eastern portions of the network. In the westbound direction, although displaying more variation in travel speed than travel time data obtained from SFMTA, Geary 38 and 38L buses travel at a similar average speed in the model.

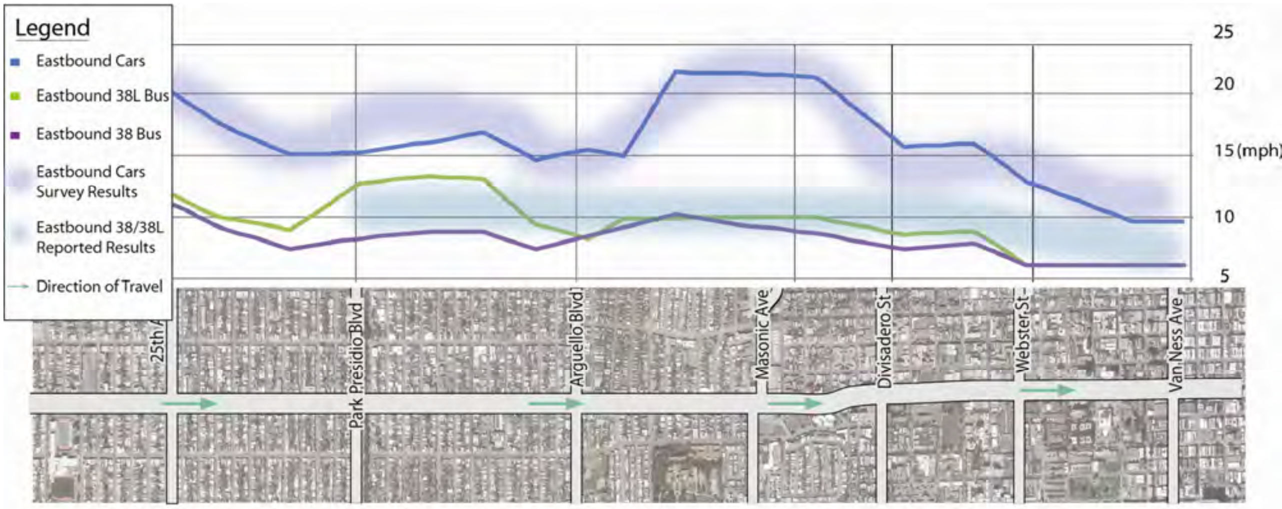


Figure 7: Weekday PM Peak Hour eastbound Average Roadway Speeds - Model Results

Similar to Figure 5, in the eastbound direction the highest average auto speeds in the network are in the westernmost and central portions of the network. Eastbound travel speeds for the Geary 38 and 38L buses show a similar pattern, with the highest operating speeds between Park Presidio and just before Arguello Boulevard, and slightly higher speeds between Lyon Street and Divisadero Street.

The modeled automobile queues were compared to observed conditions for the PM peak period. Queues form in the model at the eastbound approaches to the Geary Boulevard frontage street entrances at Fillmore Street and Masonic Avenue. A substantial eastbound queue forms at Franklin Street that can extend west to Laguna Street. In the westbound direction, queues sometimes form at 15th Avenue, where Geary Boulevard narrows from three lanes to two, and at Park Presidio Boulevard where the traffic signal provides less green time to Geary Boulevard due to the high cross-street demand. Queues observed in the model are visually consistent with observed conditions.

Figure 8 shows intersections where transit congestion, defined by an average travel speed less than or equal to 6 mph, occurs along the Geary corridor. In the westbound direction, there are four segments, three out of four of which are east of Divisadero Street. In the eastbound direction there are also four segments, but they appear either immediately before or after the major cross streets of Arguello Boulevard, Masonic Avenue, Webster Street, and Van Ness Avenue.

Figure 8: Weekday PM Peak Hour Areas of Transit Congestion

INTERSECTION ANALYSIS RESULTS

Traffic operations analysis results were determined using the validated PM peak hour VISSIM model. The intersection analysis results include a descriptive term known as level of service (LOS). LOS is a measure of traffic operating conditions, which varies from LOS A, which represents free flow conditions, with little or no delay, to LOS F, which represents congested conditions, with extremely long delays. Table B-1, found in Appendix B, describes the auto LOS thresholds from the HCM for signalized intersections.

Table 5 shows the auto LOS and average auto delay at the study intersections under existing conditions. during the PM peak hour. Existing conditions refers approximately to the year 2008, when project-level environmental analysis began. The analysis results show that, with the exception of the stop-controlled intersection of Presidio Aveneu/Geary Boulevard, all intersections operate at LOS D or better conditions. Figure 9 shows intersections where congestion (LOS D or E) is present during the PM peak hour. A more detailed PM peak hour intersection LOS table, which includes delay and LOS by approach direction (northbound, southbound, etc.), is included in Appendix B.

TABLE 5 – PM PEAK HOUR INTERSECTION ANALYSIS RESULTS

Intersection	LOS / Delay[1]	Intersection	LOS / Delay[1]
1. 25th Ave / Geary Bl	B / 19	25. 2nd Ave / Geary Bl	A / 7
2. 24th Ave / Geary Bl	A / 5	26. Arguello Bl / Geary Bl	B / 11
3. 23rd Ave / Geary Bl	B / 13	29. Stanyan St / Geary Bl	B / 17
5. 21st Ave / Geary Bl	A / 6	31. Parker Ave / Geary Bl	A / 6
6. 20th Ave / Geary Bl	B / 11	32. Spruce St / Geary Bl	A / 9
7. 19th Ave / Geary Bl	B / 12	34. Blake St / Geary Bl	A / 8
8. 18th Ave / Geary Bl	B / 12	35. Collins St / Geary Bl	A / 10
9. 17th Ave / Geary Bl	B / 14	38. Masonic Ave / Geary Bl	C / 26
10. 16th Ave / Geary Bl	B / 12	39. Presidio Ave / Geary Bl[2]	E / 37
11. 15th Ave / Geary Bl	C / 33	41. Baker St / Geary Bl	A / 8
13. Park Presidio Bl / Geary Bl	C / 28	43. Divisadero St / Geary Bl	B / 20
15. 12th Ave / Geary Bl	B / 21	44. Scott St / Geary Bl	B / 17
16. 11th Ave / Geary Bl	C / 27	45. Steiner St / Geary Bl	B / 11
17. 10th Ave / Geary Bl	B / 19	47. Fillmore St / Geary Bl	C / 31
18. 9th Ave / Geary Bl	C / 26	48. Webster St / Geary Bl	B / 17
19. 8th Ave / Geary Bl	C / 22	49. Laguna St / Geary Bl	B / 19
20. 7th Ave / Geary Bl	B / 16	51. Gough St / Geary Bl	C / 35
21. 6th Ave / Geary Bl	B / 18	52. Franklin St / Geary Bl	C / 29
22. 5th Ave / Geary Bl	B / 19	53. Franklin St / O'Farrell St	D / 36
23. 4th Ave / Geary Bl	B / 12	54. Van Ness St / Geary Bl	D / 53
24. 3rd Ave / Geary Bl	B / 13	55. Van Ness St / O'Farrell St	C / 35

Notes: 1. Average total delay is reported in seconds per vehicle.
2. This intersection has all-way stop control. The LOS thresholds are lower for unsignalized intersections.
Source: Fehr & Peers, 2010

Figure 9: Weekday PM Peak Hour Congested Intersections

MODEL PERFORMANCE MEASURES

Table 6 shows estimated PM peak hour network-wide performance measures. These measures will be compared against those from the project alternatives to show overall changes to traffic operations.

TABLE 6 – PM PEAK HOUR NETWORK PERFORMANCE RESULTS

Performance Measure	Modes	Average
Vehicles Served	All	96,900
Vehicle Miles of Travel	All	43,600
Vehicle Hours of Delay	All	2,050
Average Delay per Vehicle (seconds)	All	74.5
Average Speed (mph)	All	13.7
CO Emissions (kilograms)	Car, Truck, & Bus	33.2
NOx Emissions (kilograms)	Car, Truck, & Bus	6.5
VOC Emissions (kilograms)	Car, Truck, & Bus	7.7
Fuel Consumption (gallons)	Car, Truck, & Bus	470

Source: Fehr & Peers, 2010

Performance Measure Definitions

This section contains brief definitions of each performance measure included in Table 6.

Vehicles Served – refers to the amount of vehicles that are processed through the study area during the analysis peak hour: i.e., the total number of vehicles that both enter and exit the study network during the peak hour.

Vehicle Miles of Travel – refers to the distance of vehicle travel (in miles) that are observed in the study area during the analysis peak hour: i.e. the total distance traveled by all vehicles during the peak hour.

Vehicle Hours of Delay – refers to the total additional amount of time traveled by vehicles in the study area compared to traveling at free-flow speed.

Average Delay per Vehicle (seconds) – refers to the additional amount of time, per vehicle, traveled by vehicles in the study area compared to traveling at free-flow speed.

Average Speed (mph) – refers to the average of vehicle travel speeds for all vehicles in the study area

CO Emissions (kilograms) – refers to the amount of carbon monoxide emitted by vehicles traveling in the study area. The emission rate is based on the estimated fuel consumption.

NOx Emissions (kilograms) – refers to the amount of nitrogen oxides emitted by vehicles traveling in the study area. The emission rate is based on the estimated fuel consumption.

VOC Emissions (kilograms) – refers to the amount of volatile organic compounds emitted by vehicles traveling in the study area. The emission rate is based on the estimated fuel consumption.

Fuel Consumption (gallons) – refers to the amount of petroleum based fuel (or gasoline) burned by the vehicles served in the study area. The fuel consumption rates are based on studies from the early 1980s.

The results summarized in Table 6 reflect the average of 10 of 20 micro-simulation model runs. The micro-simulation model network's extents are Geary Boulevard from Van Ness Avenue to 25th Avenue and O'Farrell Street from Van Ness Avenue to Franklin Street. Images of the model, beginning at the eastern extent are included in Appendix C.

Appendix D6: Transit and Traffic Operations (Study Criteria, Modeling Methodology and Analysis Results)

CEQA SIGNFICANCE CRITERIA AND STUDY INTERSECTION SELECTION

CEQA SIGNIFICANCE CRITERIA: TRANSIT

Based on the City's impact analysis guidelines, the project would have a significant effect on the environment if:

- It would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service; or
- Cause a substantial increase in operating costs or delays such that significant adverse impacts in transit service levels could result. With the Muni and regional transit screenlines analyses, the project would have a significant effect on the transit provider if project-related transit trips would cause the capacity utilization standard to be exceeded during the peak hour.

CEQA SIGNIFICANCE CRITERIA: AUTOMOBILE TRAFFIC

Under the requirements of CEQA and consistent with City of San Francisco guidelines, the project would create a significant impact to the traffic and roadway system if any of the following criteria are met or exceeded:

- Deterioration in the level of service (LOS) at a signalized intersection from LOS D or better to LOS E or LOS F, or from LOS E to LOS F.
- The operational impacts on unsignalized intersections are considered potentially significant if project-related traffic causes the level of service at the worst approach to deteriorate from LOS D or better to LOS E or LOS F and Caltrans signal warrants would be met, or causes Caltrans signal warrants to be met when the worst approach is already at LOS E or LOS F.

For an intersection that operates at LOS E or LOS F under existing conditions, there may be a significant adverse impact depending upon the magnitude of the project's contribution to the worsening of delay. In addition, a project would have a significant adverse effect if it would cause major traffic hazards, or would contribute considerably to the cumulative traffic increases that would cause the deterioration in LOS to unacceptable levels (i.e., to LOS E or LOS F).

CEQA SIGNIFICANCE CRITERIA: BICYCLES & PEDESTRIANS

Pedestrians

The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.

Bicycles

The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.

CEQA SIGNIFICANCE CRITERIA: PARKING & LOADING

Parking

Parking conditions are not static, as parking supply and demand changes from hour to hour, day to day, year to year, and in response to changing land uses and transportation options, among other factors. Hence, the availability of parking spaces is not a permanent physical condition but changes over time as people change their modes and patterns of travel. While parking conditions change over time, a project could adversely affect the physical environment if it results in a substantial deficit in parking that causes hazardous conditions or significant delays to traffic, transit, bicycles or pedestrians. Whether a deficit in parking creates such conditions would depend on the magnitude of the shortfall and the ability of drivers to change travel patterns or switch to other travel modes. If a substantial deficit in parking caused by a project creates hazardous conditions or significant delays in travel, such a condition also could result in secondary physical environmental impacts (e.g., air quality or noise impacts caused by congestion), depending on the project and its setting.

The limited supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, induces many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service or other modes (walking and biking), would be in keeping with the City's Transit First Policy and numerous San Francisco General Plan Polices, including those in the Transportation Element. The City's Transit First Policy, established in the City's Charter Article 8A, § 8A.115 provides that "parking policies for areas well served by public transit shall be designed to encourage travel by public transportation and alternative transportation."

The transportation analysis accounts for potential secondary effects, such as vehicles circling and looking for a parking space in areas of limited parking supply, by assuming that all drivers would attempt to find parking at or near their destinations and then seek parking farther away if convenient parking is unavailable. The secondary effects of drivers searching for parking are typically offset by a reduction in vehicle trips due to others who are aware of constrained parking conditions in a given area, and thus choose to reach their destinations by other modes (i.e., walking, biking, transit, taxi). If this occurs, any secondary environmental impacts that may result from a shortfall in parking in the vicinity of the corridor would be minor, and the traffic assignments used in the transportation analysis, as well as in the associated air quality, noise and pedestrian safety analyses, would reasonably address potential secondary effects.

In evaluating whether a parking deficit is substantial and thus, could result in hazardous conditions or delays, the following was considered: if the parking demand resulting from elimination of on-street spaces could not be met either with other on-street spaces or existing off-street parking facilities within a half-mile; and whether the vicinity is adequately served by other modes of transportation (i.e., taxis, Muni, regional transit providers, bicycle and pedestrian facilities). Generally, where the parking loss is not substantial, it is anticipated that it would not create hazardous conditions or significant delays to other modes. In situations where a parking deficit would be considered substantial, potential hazardous conditions related to the parking loss would be considered. The potential hazards or delays considered included: whether the parking loss would lead to additional traffic circling in the area that could result in vehicles double parking in a bicycle lane or in mixed-flow/transit-only lanes; whether vehicles would substantially increase instances of blocking the sidewalks and/or driveways in an attempt to locate parking; and, whether vehicles could form a queue in a mixed-flow/transit-only lane in an attempt to enter off-street parking facilities.

Loading

The removal of some commercial loading spaces is not considered a significant impact when other loading spaces would remain in the vicinity, or the loading spaces could be relocated nearby (within 250 feet). Removal of multiple commercial loading spaces without replacement could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street loading zones resulting in potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. Such a circumstance would be considered a significant commercial loading impact.

Passenger loading zones need permits managed by SFMTA, and if removal of these passenger loading zones is required and no alternative locations are identified, the resulting loss of passenger loading/unloading zones would be considered an inconvenience, and passengers may need to walk further to access the destination. While the loss of passenger loading zones may be an inconvenience, it would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles; therefore, the loss of passenger loading zones would be considered a less-than-significant impact.

Although removal of passenger loading zones is not considered a significant impact, the Project would prioritize the retention or relocation of both commercial and passenger loading spaces. If the Project would eliminate loading spaces on a specific block face, SFCTA would seek to relocate the lost spaces nearby wherever feasible.

INTERSECTION SELECTION CRITERIA

There are approximately 100 intersections along the Geary corridor from Market Street to 48th Avenue, and of these 78 were selected as study intersections (49 on-corridor intersections and 29 off-corridor intersections). Intersections that were not selected were either minor unsignalized intersections with low side street traffic volumes, intersections located directly adjacent to other selected intersections along a Geary corridor that have similar operating characteristics, or intersections that would not experience major changes in travel patterns as a result of the project. Intersections with unique geometry, those more prone to peak hour congestion, those maintained by other jurisdictions (e.g., Caltrans) or those that intersect a street with a Muni Rapid line were included as study intersections.

TECHNICAL MEMORANDUM

Date: April 9, 2014

To: Geary BRT Project Team

From: Eric Womeldorff and Matt Haynes, Fehr & Peers

Subject: Geary BRT – Future Conditions VISSIM Model Documentation

SF08-0404

This document serves as a clearinghouse for Geary bus rapid transit (BRT) Team-cleared inputs and assumptions that went into the development of VISSIM micro-simulation models as well as model results used to analyze the environmental impacts of the Geary BRT project in San Francisco.

NETWORK CODING ASSUMPTIONS

TABLE A presents the general model network coding assumptions that were applied to each of the analysis scenarios. These outline the high-level differences between the No Build and Build Alternatives (Alternative 2: side-running alternative; Alternative 3: center-running alternative; and Alternative 3C Side/Center-Running alternative) as well as any differences between the alternatives.

For the No Build and Alternative 2 scenario, left-turns across Geary Boulevard at signalized intersections were not changed from the way that they operate in the existing condition i.e. permissive or protected left-turn movements, based on location, since left-turning vehicles would face no new conflicts in the No Build scenario and would not be in conflict with a BRT vehicle travelling in the same direction in Alternative 2. In Alternative 3 and Alternative 3C, where BRT vehicles operate in the center of Geary Boulevard, vehicular left turns from Geary Boulevard must have a protected traffic signal phase in order to prevent conflict with BRT vehicles.

332 Pine Street | 4th Floor | San Francisco, CA 94104 | (415) 348-0300 | Fax (415) 773-1790

www.fehrandpeers.com

Geary Express bus ('38AX', '38BX') stop locations are outlined for the Build scenarios, with the Alternative 2 and Alternative 3C scenarios using the same stops as BRT stops and the Alternative 3 scenario using the existing stop locations.

Signal cycle lengths have been lengthened from 90 seconds in the No Build scenario to 105 seconds for all build scenarios while maintaining offset coordination, with the exception of the Geary Boulevard intersections with Masonic Avenue, Presidio Avenue, Fillmore Street, Gough Street, Franklin Street, Van Ness Avenue, and Polk Street. These intersections are set for coordination in the north-south direction, and thus the existing offset coordination was kept in place. Peer-to-peer transit signal priority, in which a bus receives an extended- or early-green signal phase was implemented for all signal controls along the corridor for all scenarios.

Currently, Golden Gate Transit (GGT) Route 92 shares some stops with the 38 Geary along Geary Boulevard. Where the Build scenarios propose to relocate 38 Geary stops, the GGT Route 92 is assumed to use the nearest 38 Geary stop instead of the stop it currently uses. Further, dwell time for GGT Route 92 was assumed to use the same calculated dwell times as the 38 Geary for all Build scenarios.

TABLE B presents area-specific coding assumptions. These pertain to attributes of specific intersections or corridor segments that vary between the Build scenarios and expand on some of the general assumptions presented in TABLE A. This includes assumptions about new traffic and pedestrian signals, left-turn phasing, pedestrian phases, bicycle lanes, and re-routing of bicycle volumes due to turn restrictions.

TABLE C presents the coding assumptions for interactions between vehicle types. With the exception of Alternative 2 for all vehicle interactions and Alternative 3 for bus interactions, the other alternatives vehicle headway factors (i.e. how closely vehicles follow one another and accelerate/decelerate) were carried over from the calibrated and validated existing conditions model to account for the potential for passenger vehicle and bus delay due to on-street parking and double-parked vehicles. In Alterative 2 off-model methods were used to account for the potential for buses to incur delay due to vehicles maneuvering into on-street parking spaces or double parking, blocking the BRT lane. The potential for this added delay is not accounted for in Alternative 3 and Alternative 3C, since the BRT lane is in the center of Geary Bouelvard where no on-street parking is present. The rest of the interactions listed in the table (e.g. bus and turning vehicles, bus and pedestrians, etc.) are inherently captured by the model due to the default behavior and programmed hierarchy of conflict priorities.

TABLE D-1 presents the bus dwell times used for each transit stop for the No Build and Alternative 2 scenarios. **TABLE D-2** presents the same information for the Alternative 3 and Alternative 3C scenarios. The dwell times were derived by first comparing existing conditions dwell times to dwell times reported for each scenario by the SF-CHAMP model. A factor was then developed to adjust the existing dwell times for future conditions. The variance in future dwell times was then determined by factoring the variance of existing dwell times.

TABLE E presents the pedestrian and bicycle volumes used in the existing conditions scenario. These volumes are based on existing conditions counts, intersection location, and surrounding land uses. **TABLE E** presents the growth percentages applied to the existing pedestrian and bicycle volumes to account for land use growth along the corridor and increased transit ridership in the future years 2020 and 2035. The growth factors were derived after review of land use and transit ridership growth in those areas as output by the SF-CHAMP model.

TABLE G presents the scenario and model assumptions for left turn locations on Geary Boulevard. For each scenario, intersection, and direction, the table indicates if a left turn remains, is added, or is removed compared to the existing configuration.

TABLE A: GENERAL NETWORK CODING ASSUMPTIONS

Network Attribute	2020 No Build	2020 Alt 2	2020 Alt 3	2020 Alt 3C	2020 LPA
Left-turn Control	No change from Existing		All Left turns across Center-Running BRT are Protected Only	All Left turns across Center-Running BRT are Protected Only	West of Stanyan, all left turns across Center-Running BRT are Protected Only; East of Stanyan, no change from Existing
Dwell Time	Dwell at the stop level were derived by a process that factored up existing average dwell based on a comparison of existing dwell to dwells as reported for each respective CHAMP run (see tab)				
Express Bus Stop Locations	No change from Existing	Assumed to be same as BRT stops			
Signal Cycle Length	No change from Existing	105 second cycle lengths, except Masonic, Presidio, Fillmore, Gough, Franklin, and Van Ness			

TSP	Peer to Peer TSP in place at all signals			
Golden Gate Bus #92 Stops	No change from Existing	GG92 Buses Stop at same locations as Local Buses		
Golden Gate Bus #92 Dwell Time	No change from Existing	GG92 Buses use same dwell time assumptions as Local Bus		
Driving Behavior	No change from Existing	Parking friction has been reduced due to side-running BRT	No change from Existing	West of Stanyan, no change from Existing; East of Stanyan, parking friction has been reduced due to side-running BRT

Source: Fehr & Peers, 2014

TABLE B: AREA SPECIFIC NETWORK CODING ASSUMPTIONS

Location	2020 No Build	2020 Alt 2	2020 Alt 3	2020 Alt 3C	2020 LPA
23rd Avenue	No change from Existing	Assume left turn lanes are permissive only	No change from Existing		
22nd Avenue	Traffic Signal Added				
19th Avenue	No change from Existing	Assume left turn lanes are permissive only	No change from Existing		
12th Avenue	No change from Existing	Assume left turn lanes are permissive only	No change from Existing		
14th Avenue	No change from Existing		Assumed Pedestrian Signal at this Location		
Funston	No change from Existing		Assumed Pedestrian Signal at this Location		
8th Avenue	No change from Existing	Assume left turn lanes are permissive only	No change from Existing	Assume EB/WB Left turns; Shifted left turning bicycles from 7th Ave	
7th Avenue	No change from Existing			Assume NO EB/WB Left turns; Shifted left turning bicycles to 8th Ave	
4th Avenue	No change from Existing	Assume left turn lanes are permissive only	No change from Existing		

TABLE B: AREA SPECIFIC NETWORK CODING ASSUMPTIONS

Arguello Street	No change from Existing	Assume Local Buses stop only on the East side of Arguello	No change from Existing	
Palm Street	Traffic Signal Added			
Commonwealth Avenue	RIRO Only	No EB LT allowed		
Beaumont Avenue	Traffic Signal Added			
Spruce Street	No change from Existing	WB U-turn added; Assume left turn lanes are permissive only	No change from Existing	
Cook Street	Traffic Signal Added			
Wood Street	No change from Existing	Assumed Pedestrian Signal at this Location		
Presidio Avenue to Masonic Avenue	No change from Existing	Assume Bus will stay side running throughout Masonic/Presidio area	Model NB/SB Bike Lanes through Area	
Presidio Avenue	No change from Existing	Swapped heavy WBRT with WBRT at Divisadero	No change from Existing	
Lyon Street	No change from Existing	Assumed Pedestrian Signal at this Location		
Broderick Street	No change from Existing	Assumed Pedestrian Signal at this Location		
Pierce Street	No change from Existing	Assumed Pedestrian Signal at this Location		
Steiner Street	No change from Existing	Assumed multiple-stage pedestrian crossing at this location; Assume EB LT is Protected Only		
Webster Street	No change from Existing	Assumed multiple-stage pedestrian crossing at this location		
Webster Street to Laguna Street	No change from Existing		Assume BRT Transitions from Side to Center in this area. Will be provided a queue jump if leaving from a red indication. If not, will have to merge into traffic, change lanes twice.	No change from Existing
Buchanan Street	No change from Existing	Assumed Pedestrian Signal at this Location		
Buchanan Street to Franklin Street	No change from Existing		Updated Driver Behavior consistent with Alt 2 for Side Running BRT (side running in this area)	No change from Existing

TABLE B: AREA SPECIFIC NETWORK CODING ASSUMPTIONS		
O'Farrell Street (Franklin Street to Van Ness Avenue)	No change from Existing	Assume 2 GP lanes EB Capacity

Source: SFCTA; SFMTA; Fehr & Peers, 2014

TABLE C: VEHICLE INTERACTION CODING ASSUMPTIONS					
Interaction	**2020 No Build**	**2020 Alt 2**	**2020 Alt 3**	**2020 Alt 3C**	**2020 LPA**
How do we account for Passenger Vehicle-OSP[1] Interactions?	Vehicle Headway Adjustment	N/A	Vehicle Headway Adjustment		West of Stanyan, Vehicle Headway Adjustment; East of Stanyan,N/A
How do we account for Bus-OSP Interactions?	Vehicle Headway Adjustment	Off-Model Method	N/A		West of Stanyan, N/A; East of Stanyan, Off-Model Method
How do we account for Passenger Vehicle-DP[2] Interactions?	Vehicle Headway Adjustment	N/A	Vehicle Headway Adjustment		West of Stanyan, Vehicle Headway Adjustment; East of Stanyan,N/A
How do we account for Bus-DP Interactions?	Vehicle Headway Adjustment	Off-Model Method	N/A		West of Stanyan, N/A; East of Stanyan, Off-Model Method
How do we account for Passenger Vehicle-Turning Vehicle Interactions?	Captured in Model				
How do we account for Bus-Turning Vehicle Interactions?	Captured in Model		N/A		Captured in Model
How do we account for Passenger Vehicle-Ped/Bike Interaction?	Captured in Model				
How do we account for Bus-Ped/Bike Interaction?	Captured in Model		N/A		Captured in Model

Notes:
1. OSP = On Street Parking
2. DP = Double Parking

Source: SFCTA; SFMTA; Fehr & Peers, 2014

TABLE D-1: TRANSIT DWELL TIMES, NO BUILD AND ALT 2 SCENARIOS

	2020 No Build												2020 Alt 2											
	WB 38			EB 38			WB 38L			EB 38L			WB 38			EB 38			WB 38L			EB 38L		
Intersection	New 85th (sec)	New max (sec)	New average (min)	New 85th (sec)	New max (sec)	New average (min)	New 85th (sec)	New max (sec)	New average (min)	New 85th (sec)	New max (sec)	New average (min)	New 85th (sec)	New max (sec)	New average (min)	New 85th (sec)	New max (sec)	New average (min)	New 85th (sec)	New max (sec)	New average (min)	New 85th (sec)	New max (sec)	New average (min)
O'Farrell & Van Ness				54	68	0.54				59	128	0.65				48	61	0.48				46	99	0.5
Geary & Van Ness	56	102	0.59				61	123	0.66				53	97	0.57				47	94	0.51			
Geary & Franklin	26	48	0.28																					
Geary & Gough	14	26	0.15	12	25	0.13							13	24	0.14	11	22	0.12						
Geary & Laguna	35	64	0.37	33	70	0.36	34	69	0.37	38	82	0.42												
Geary & Webster	23	41	0.24										33	61	0.35	29	62	0.32						
Geary & Fillmore	40	73	0.43	33	70	0.36	57	114	0.62	58	125	0.64	38	69	0.41	36	76	0.4	43	87	0.47	45	97	0.49
Geary & Avery				40	86	0.44																		
Geary & Scott	18	32	0.19	40	86	0.44							17	30	0.18	36	76	0.4						
Geary & Divisadero	60	109	0.63	57	120	0.62	57	115	0.62	68	146	0.75	57	104	0.6	51	107	0.56	43	88	0.47	52	113	0.58
Geary & Baker	25	45	0.26										23	43	0.25	8	17	0.09						
Geary & St Josephs				9	19	0.1																		
Geary & Presidio				24	49	0.26				38	82	0.42	38	70	0.41				32	64	0.35			
Geary & Masonic	40	74	0.43	34	73	0.38	42	84	0.45							31	65	0.34				29	64	0.32
Geary & Collins	14	26	0.15	9	19	0.1							13	25	0.14									
Geary & Spruce	12	23	0.13	12	25	0.13	21	42	0.23	13	27	0.14	12	22	0.12	11	22	0.12						
Geary & Commonwealth / Beaumont	9	16	0.09										8	16	0.09									
Geary & Stanyan				13	28	0.15										12	25	0.13						
Geary & Arguello	33	60	0.35	24	50	0.26	42	85	0.45	28	61	0.31	32	57	0.34	21	45	0.23	50	101	0.54	34	74	0.38
Geary & 3rd	23	41	0.24	24	50	0.26							22	39	0.23	21	45	0.23						
Geary & 6th	46	83	0.48	46	98	0.51	51	103	0.55	45	97	0.5	43	79	0.46	41	88	0.45	61	122	0.66	54	117	0.6
Geary & 9th	23	41	0.24	19	40	0.21							22	39	0.23	17	36	0.19						
Geary & 12th	16	29	0.17	15	31	0.16							15	28	0.16									
Geary & Park Presidio	23	41	0.24	43	92	0.48	30	61	0.33	56	121	0.62	22	39	0.23	39	82	0.42						
Geary & 14th																			36	72	0.39	68	146	0.75
Geary & 15th																								
Geary & 17th	32	58	0.34	34	73	0.38							30	55	0.32	31	65	0.34						
Geary & 19th																								
Geary & 20th	44	79	0.46	40	85	0.44	40	81	0.44	46	100	0.51	42	75	0.44	36	75	0.39						
Geary & 21st																								
Geary & 22nd	14	26	0.15										13	24	0.14									
Geary & 23rd				13	28	0.15										12	25	0.13						
Geary & 25th	33	61	0.35	24	50	0.26	33	67	0.36	35	77	0.39	32	58	0.34	21	45	0.23	39	80	0.43	43	93	0.47

Source: SFCTA, SFMTA, Fehr & Peers, 2014

TABLE D-2: TRANSIT DWELL TIMES, ALT 3 AND ALT 3C SCENARIOS

	2020 Alt 3												2020 Alt 3C					
	WB 38			EB 38			WB 38L			EB 38L			WB 38L			EB 38L		
Intersection	**New 85th (sec)**	**New max (sec)**	**New average (min)**	**New 85th (sec)**	**New max (sec)**	**New average (min)**	**New 85th (sec)**	**New max (sec)**	**New average (min)**	**New 85th (sec)**	**New max (sec)**	**New average (min)**	**New 85th (sec)**	**New max (sec)**	**New average (min)**	**New 85th (sec)**	**New max (sec)**	**New average (min)**
O'Farrell & Van Ness				55	70	0.54										48	102	0.52
Geary & Van Ness	55	99	0.58				65	130	0.7	59	128	0.65	48	96	0.52			
Geary & Franklin																		
Geary & Gough	14	25	0.15	12	26	0.13							27	54	0.29			
Geary & Laguna	34	63	0.36	34	71	0.37										31	66	0.34
Geary & Webster	22	40	0.24				60	121	0.65				44	89	0.48			
Geary & Fillmore				41	87	0.45				58	126	0.64				46	101	0.51
Geary & Avery																		
Geary & Scott	17	31	0.18	41	87	0.45												
Geary & Divisadero	58	107	0.62	58	122	0.64	60	122	0.65	68	146	0.75	44	90	0.48	54	117	0.6
Geary & Baker	24	44	0.25	9	20	0.1							44	90	0.48			
Geary & St Josephs																54	117	0.6
Geary & Presidio	39	72	0.42				44	89	0.48				33	66	0.36			
Geary & Masonic				35	74	0.38				38	83	0.42				31	66	0.34
Geary & Collins																		
Geary & Spruce	12	23	0.13	12	25	0.13							16	33	0.18	10	22	0.11
Geary & Commonwealth / Beaumont																		
Geary & Stanyan																		
Geary & Arguello	33	59	0.34	24	51	0.27	44	89	0.48	28	61	0.31	33	66	0.36	23	49	0.25
Geary & 3rd																		
Geary & 6th	45	81	0.47	47	100	0.52	54	108	0.58	45	97	0.5	40	80	0.43	36	78	0.4
Geary & 9th	22	40	0.24	20	41	0.22												
Geary & 12th																		
Geary & Park Presidio	15	28	0.16	15	32	0.17	32	64	0.34	57	122	0.62	23	48	0.25			
Geary & 14th																		
Geary & 15th	22	40	0.24	44	93	0.49										45	97	0.5
Geary & 17th													32	63	0.34	37	81	0.41
Geary & 19th	43	77	0.45	41	86	0.45												
Geary & 20th																		
Geary & 21st													32	63	0.34	37	81	0.41
Geary & 22nd				14	29	0.15												
Geary & 23rd																		
Geary & 25th	33	60	0.35	24	51	0.27	35	70	0.38	35	77	0.39	26	52	0.28	28	62	0.31

Source: SFCTA; SFMTA; Fehr & Peers, 2014

TABLE E: PEDESTRIAN AND BICYCLE VOLUMES

Intersection	Pedestrian Volumes		Bicycle Volumes												Assumed ped/bike growth from Existing to 2020	Assumed ped/bike growth from Existing to 2035
	Volume Crossing N-S Leg[1]	Volume Crossing E-W Leg[1]	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR		
Geary & 25th	100	40													2%	9%
Geary & 24th	100	40													2%	9%
Geary & 23rd	100	40		6	2		10	1	1	3	1		5	1	2%	9%
Geary & 22nd	200	80													2%	9%
Geary & 21st	200	80													2%	9%
Geary & 20th	250	80													2%	9%
Geary & 19th	250	80													2%	9%
Geary & 18th	250	80													2%	9%
Geary & 17th	250	80													2%	9%
Geary & 16th	250	80													2%	9%
Geary & 15th	250	80	1	10	1		9	1		4	1	1	4	3	2%	9%
Geary & 14th	100	40													2%	9%
Geary & Park Presidio	100	40													2%	9%
Geary & Funston	100	40													2%	9%
Geary & 12th	100	40													2%	9%
Geary & 11th	100	40													2%	9%
Geary & 10th	80	30													2%	9%
Geary & 9th	80	30													2%	9%
Geary & 8th	100	50		9	2		9	1		4	1	1	7	3	2%	9%
Geary & 7th	100	50													2%	9%
Geary & 6th	100	50													2%	9%
Geary & 5th	100	50													2%	9%
Geary & 4th	80	40													2%	9%
Geary & 3rd	80	40													2%	9%
Geary & 2nd	80	40													2%	9%
Geary & Arguello	80	40	2	32	2	4	57	1	2	4		3	8	2	2%	9%
Geary & Palm	80	40													2%	9%

TABLE E: PEDESTRIAN AND BICYCLE VOLUMES

Intersection	Pedestrian Volumes		Bicycle Volumes												Assumed ped/bike growth from Existing to 2020	Assumed ped/bike growth from Existing to 2035
	Volume Crossing N-S Leg[1]	Volume Crossing E-W Leg[1]	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR		
Geary & Stanyan	80	40													2%	9%
Geary & Beaumont	70	30													2%	9%
Geary & Parker	70	30													2%	9%
Geary & Spruce	70	30													2%	9%
Geary & Cook	60	10													2%	9%
Geary & Blake	50	20													2%	9%
Geary & Collins	50	20													2%	9%
Geary & Wood	50	20													2%	9%
Geary & Emerson	50	20													2%	9%
Geary & Masonic (over)	80	80	5		15					7	3	15	8		2%	9%
Geary & Presidio (over)	80	80				2		18	17	5		1	5		2%	9%
Geary & Lyon	100	100													2%	9%
Geary & Baker/St Josephs	100	100													2%	9%
Geary & Broderick	100	100													2%	9%
Geary & Divisadero	100	100													4%	16%
Geary & Scott	100	100													4%	16%
Geary & Pierce	100	100													4%	16%
Geary & Steiner	100	100	2	4	1	3	13	1	2	4	1		4	1	4%	16%
Geary & Avery	100	100													4%	16%
Geary & Fillmore	100	100													4%	16%
Geary & Webster	100	100	1	13	2		18	2		5	3		4	1	4%	16%
Geary & Buchanan	100	100													4%	16%
Geary & Laguna	100	100													4%	16%
Geary & Cleary	100	100													20%	30%
Geary & Gough	100	100													20%	30%

TABLE E: PEDESTRIAN AND BICYCLE VOLUMES																
	Pedestrian Volumes		**Bicycle Volumes**												**Assumed ped/bike growth from Existing to 2020**	**Assumed ped/bike growth from Existing to 2035**
Intersection	**Volume Crossing N-S Leg[1]**	**Volume Crossing E-W Leg[1]**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**		
Geary & Franklin	200 N / 100 S	70 E / 200 W													20%	30%
O'Farrell & Franklin	200 N / 100 S	70 E / 200 W													20%	30%
Geary & Van Ness	200 N / 100 S	400 E / 200 W													20%	30%
O'Farrell & Van Ness	200 N / 100 S	400 E / 200 W													20%	30%
Geary & Polk	150	150	1	13			19	1				2	3	2	20%	30%
O'Farrell & Polk	150	150		14	1	1	21			4	3				20%	30%

1. Indicates pedestrian volume per leg

Source: SFCTA, SFMTA, Fehr & Peers, 2014

TABLE F: PEDESTRIAN AND BICYCLE GROWTH FACTORS BY CORRIDOR SECTION		
Section	**2010-2020**	**2020-2035**
25th Avenue to Broderick Street	2%	7%
Broderick Street to Laguna Street	4%	12%
Laguna Street to Van Ness Avenue	20%	8%

Source: SFCTA; SFMTA; Fehr & Peers, 2014

TABLE G: ASSUMPTIONS FOR LEFT TURN LOCATIONS

Intersection	Alt 2		Alt3		Alt 3C		LPA	
	EBL	WBL	EBL	WBL	EBL	WBL	EBL	WBL
Geary & 35th	Remain	Remain	Remain	Remain	Remain	Remain	Remain	Remain
Geary & 34th	Remain	Remain	Remain	Remain	Remain	Remain	Remain	Remain
Geary & 33rd	Remain	Remain	Remain	Remain	Remain	Remain	Remain	Remain
Geary & 31st	Remain	--	Remain	--	Remain	--	Remain	--
Geary & 30th	Remain	Remain	Remain	Remain	Remain	Remain	Remain	Remain
Geary & 27th	Remain	Remain	Remain	Removed	Remain	Removed	Remain	Removed
Geary & 26th	Remain	Remain	Removed	Removed	Removed	Removed	Removed	Removed
Geary & 23rd	Remain	Remain	Remain	Removed	Removed	Removed	Removed	Removed
Geary & 22nd	Remain	Remain	Removed	Removed	Remain	Remain	Remain	Remain
Geary & 21st	--	--	--	Added	--	--	--	--
Geary & 19th	Removed	Remain	Removed	Removed	Removed	Removed	Removed	Removed
Geary & 18th	Remain	Remain	Removed	Remain	Remain	Remain	Remain	Remain
Geary & 17th	--	--	--	Added	--	--	--	--
Geary & 15th	Remain	Remain	Removed	Removed	Remain	Remain	Remain	Remain
Geary & 12th	Remain	Remain	Removed	Remain	Removed		Removed	Remain
Geary & 11th	Remain	Remain	Remain	Remain	Remain	Remain	Remain	Remain
Geary & 8th	Remain	Remain	Removed	Removed	Remain	Remain	Remain	Remain
Geary & 7th	Remain	Remain	Remain	Remain	Removed	Removed	Removed	Removed
Geary & 4th	Remain	Remain	Removed	Removed	Removed	Removed	Removed	Removed
Geary & 3rd	Remain	Remain	Remain	Remain	Remain	Remain	Remain	Remain
Geary & Palm Avenue	Remain	--	Removed	--	Removed	--	Remain	--
Geary & Stanyan	--	Remain	--	Remain	--	Remain	--	Remain
Geary & Commonwealth/Beaumont	Removed	Remain	Removed	Removed	Removed	Removed	Removed	Remain
Geary & Spruce	Remain	Remain	Removed	Removed	Removed	Removed	Remain	Remain
Geary & Cook	Remain	--	Removed	--	Removed	--	Remain	--
Geary & Blake	Remain	Remain	Remain	Removed	Remain	Removed	Remain	Remain
Geary WB Presidio OC & Masonic	Remain	Remain	Removed	Remain	Removed	Remain	Remain	Remain
Geary WB Presidio OC & Presidio	Remain	Removed	Remain	Removed	Remain	Removed	Remain	Removed
Geary & Steiner	Added	--	--	--	--	--	Added	--
Geary Frontage & Fillmore	Removed	Removed	Removed	Removed	Removed	Removed	Removed	Removed
Geary Frontage & Webster	--	Remain	--	Removed	--	Removed	--	Remain

Source: SFCTA; SFMTA; Fehr & Peers, 2014

Existing and 2020 Travel Time Summary - Geary BRT - *VISSIM Results
06/27/14

Mode	Description	Existing Average[4]	Existing St Dev	Existing Running Time[1]	Existing Dwell[2]	2020 No Build Average	2020 No Build St Dev	2020 No Build Running Time[1]	2020 No Build Dwell[2]	2020 Alt 2: Side Running[3] Average	2020 Alt 2: Side Running[3] St Dev	2020 Alt 2: Side Running[3] Running Time[1]	2020 Alt 2: Side Running[3] Dwell[2]	2020 Alt 3: Center Running Average	2020 Alt 3: Center Running St Dev	2020 Alt 3: Center Running Running Time[1]	2020 Alt 3: Center Running Dwell[2]	2020 Alt 3C: Center Consolidation Average	2020 Alt 3C: Center Consolidation St Dev	2020 Alt 3C: Center Consolidation Running Time[1]	2020 Alt 3C: Center Consolidation Dwell[2]	2020 LPA Average	2020 LPA St Dev	2020 LPA Running Time[1]	2020 LPA Dwell[2]
EB 38 Bus	25th to Park Presidio	05:34	00:54	04:25	01:08	06:47	01:06	05:09	01:42	05:09	00:50	03:37	01:31	05:08	01:01	03:45	01:21	-	-	-	-	04:59	00:52	04:06	00:53
	Park Presidio to Stanyan	07:04	00:58	06:01	01:02	08:37	01:11	07:09	01:34	06:28	00:55	05:07	01:21	06:09	01:04	04:57	01:10	-	-	-	-	05:31	00:46	04:35	00:56
	Stanyan to Broderick	*04:42*	*00:50*	*04:03*	*00:39*	*05:44*	*01:02*	*04:50*	*00:58*	*05:15*	*00:58*	*04:37*	*00:38*	*04:09*	*00:43*	*03:25*	*00:43*	-	-	-	-	*05:16*	*01:02*	*04:44*	*00:32*
	Broderick to Laguna	05:56	01:32	04:26	01:30	07:14	01:53	05:04	02:14	05:12	01:01	03:31	01:40	04:59	01:03	03:24	01:32	-	-	-	-	05:03	00:57	03:46	01:17
	Laguna to Polk	04:00	00:48	03:34	00:27	04:54	00:58	04:16	00:40	03:20	00:39	02:44	00:36	03:42	01:01	02:38	01:03	-	-	-	-	03:42	00:53	03:08	00:34
	TOTAL[5]	**27:15**		**22:30**	**04:46**	**33:17**	**02:48**	**26:27**	**07:08**	**25:23**	**02:00**	**19:35**	**05:46**	**24:06**	**02:34**	**18:09**	**05:50**	**-**	**-**	**-**	**-**	**24:31**	**01:49**	**20:18**	**04:12**
WB 38 Bus	Polk to Laguna	03:54	00:50	03:19	00:35	05:02	01:04	03:50	01:24	03:15	00:40	02:34	00:42	03:25	00:40	02:21	01:05	-	-	-	-	03:44	00:46	03:18	00:30
	Laguna to Broderick	04:50	00:56	03:46	01:04	06:15	01:13	05:00	01:29	05:05	00:56	03:35	01:32	04:01	00:48	03:01	01:02	-	-	-	-	05:03	00:57	03:36	01:32
	Broderick to Stanyan	*06:44*	*01:26*	*06:08*	*00:36*	*08:43*	*01:51*	*07:58*	*01:04*	*05:15*	*01:03*	*04:17*	*01:01*	*04:01*	*00:51*	*03:15*	*00:48*	-	-	-	-	*05:56*	*01:49*	*05:14*	*00:47*
	Stanyan to Park Presidio	06:32	01:02	05:41	00:51	08:27	01:20	07:17	01:29	05:34	00:55	04:12	01:25	05:22	01:04	04:12	01:13	-	-	-	-	05:32	01:00	04:39	00:58
	Park Presidio to 25th	04:57	00:52	04:04	00:53	06:24	01:08	05:05	01:33	04:11	00:49	02:46	01:28	04:05	00:45	03:04	01:02	-	-	-	-	04:20	01:01	03:21	01:02
	TOTAL[5]	**26:56**		**22:57**	**03:59**	**34:51**	**02:59**	**29:10**	**06:58**	**23:20**	**02:14**	**17:25**	**06:08**	**20:54**	**01:50**	**15:52**	**05:11**	**-**	**-**	**-**	**-**	**24:35**	**02:29**	**20:07**	**04:49**
EB 38L Bus	25th to Park Presidio	04:53	00:44	03:48	01:05	06:04	00:55	04:33	01:31	03:58	00:42	02:46	01:13	03:14	00:40	02:51	00:23	04:11	00:47	02:33	01:38	04:14	00:49	03:09	01:06
	Park Presidio to Stanyan	05:54	00:51	05:20	00:34	07:20	01:04	06:32	00:48	05:22	00:48	04:24	00:59	05:43	00:56	04:18	01:26	05:34	00:57	04:55	00:39	05:56	00:57	04:33	01:24
	Stanyan to Broderick	*04:24*	*00:49*	*04:01*	*00:24*	*05:29*	*01:01*	*04:56*	*00:34*	*04:13*	*00:54*	*03:54*	*00:19*	*03:32*	*00:44*	*03:07*	*00:25*	*04:03*	*00:49*	*02:59*	*01:03*	*04:51*	*01:01*	*04:04*	*00:48*
	Broderick to Laguna	05:15	01:04	03:58	01:17	06:32	01:19	04:44	01:48	04:25	01:00	03:22	01:04	04:20	00:58	02:57	01:23	04:17	00:47	03:10	01:07	03:58	00:57	02:55	01:04
	Laguna to Polk	03:51	00:48	03:24	00:28	04:48	00:59	04:09	00:39	02:49	00:39	02:19	00:30	03:02	00:58	02:23	00:39	03:15	00:55	02:23	00:52	03:14	00:54	02:44	00:30
	TOTAL[5]	**24:18**		**20:30**	**03:48**	**30:12**	**02:11**	**24:55**	**05:21**	**20:46**	**01:35**	**16:45**	**04:06**	**19:50**	**01:34**	**15:36**	**04:17**	**21:20**	**01:24**	**16:00**	**05:18**	**22:13**	**01:58**	**17:25**	**04:52**
WB 38L Bus	Polk to Laguna	03:01	00:39	02:34	00:27	03:48	00:49	02:52	01:02	02:44	00:41	02:15	00:30	02:35	00:39	01:54	00:42	02:48	00:38	02:00	00:49	02:44	00:36	02:18	00:30
	Laguna to Broderick	04:45	00:56	03:40	01:04	05:59	01:11	04:55	01:14	04:09	00:54	03:14	00:57	03:47	00:50	02:30	01:18	03:31	00:44	02:33	00:58	03:57	00:50	03:06	00:57
	Broderick to Stanyan	*06:06*	*01:23*	*05:39*	*00:27*	*07:42*	*01:44*	*07:14*	*00:41*	*04:27*	*01:08*	*04:08*	*00:21*	*03:11*	*00:49*	*02:43*	*00:29*	*03:50*	*00:51*	*02:49*	*01:01*	*05:21*	*01:53*	*05:01*	*00:29*
	Stanyan to Park Presidio	05:40	00:54	05:00	00:40	07:09	01:08	06:21	01:00	04:42	00:53	03:31	01:12	04:47	00:57	03:25	01:24	04:46	01:07	03:44	01:03	05:14	00:56	04:26	00:56
	Park Presidio to 25th	04:29	00:39	03:44	00:45	05:39	00:49	04:42	01:07	02:38	00:39	01:50	00:49	02:33	00:41	02:11	00:23	04:02	00:54	03:05	00:58	03:58	00:55	03:11	00:53
	TOTAL[5]	**24:01**		**20:37**	**03:24**	**30:16**	**02:37**	**26:04**	**05:05**	**18:40**	**01:41**	**14:58**	**03:49**	**16:53**	**01:28**	**12:43**	**04:16**	**18:57**	**01:38**	**14:12**	**04:48**	**21:15**	**01:43**	**18:02**	**03:45**
EB Cars	25th to Park Presidio	02:57	00:23	-	-	05:08	00:41	-	-	03:49	00:29	-	-	03:51	00:34	-	-	03:55	00:35	-	-	03:59	00:35	-	-
	Park Presidio to Stanyan	03:51	00:40	-	-	06:43	01:11	-	-	05:19	00:38	-	-	05:47	00:44	-	-	05:36	00:47	-	-	05:37	00:47	-	-
	Stanyan to Broderick	*02:09*	*00:30*	-	-	*03:46*	*00:51*	-	-	*04:20*	*00:52*	-	-	*04:40*	*00:54*	-	-	*04:14*	*00:52*	-	-	*04:10*	*00:58*	-	-
	Broderick to Laguna	02:25	00:25	-	-	04:13	00:43	-	-	03:26	00:39	-	-	03:37	00:46	-	-	03:28	00:40	-	-	03:20	00:42	-	-
	Laguna to Polk	02:33	00:36	-	-	04:27	01:02	-	-	03:09	00:58	-	-	03:38	01:10	-	-	03:09	00:51	-	-	04:44	01:29	-	-
	TOTAL	**13:55**		**-**	**-**	**24:16**		**-**	**-**	**20:03**		**-**	**-**	**21:32**		**-**	**-**	**20:21**		**-**	**-**	**21:50**		**-**	**-**
WB Cars	Polk to Laguna	01:38	00:26	-	-	02:23	00:38	-	-	03:20	00:48	-	-	03:06	00:46	-	-	02:22	00:42	-	-	03:31	00:47	-	-
	Laguna to Broderick	03:32	01:02	-	-	05:08	01:30	-	-	03:41	00:56	-	-	04:43	02:15	-	-	02:55	00:42	-	-	03:29	01:13	-	-
	Broderick to Stanyan	*04:18*	*01:16*	-	-	*06:15*	*01:50*	-	-	*07:26*	*03:19*	-	-	*07:58*	*02:49*	-	-	*05:30*	*02:29*	-	-	*08:42*	*03:36*	-	-
	Stanyan to Park Presidio	03:51	00:35	-	-	05:35	00:51	-	-	05:28	00:54	-	-	05:56	01:03	-	-	06:25	01:08	-	-	06:29	00:58	-	-
	Park Presidio to 25th	02:52	00:37	-	-	04:10	00:54	-	-	02:16	00:35	-	-	02:46	00:43	-	-	02:53	00:45	-	-	03:02	00:47	-	-
	TOTAL	**16:11**		**-**	**-**	**23:31**		**-**	**-**	**22:11**		**-**	**-**	**24:28**		**-**	**-**	**20:05**		**-**	**-**	**25:13**		**-**	**-**

Mode	Description	2020 Alt 2 Average	2020 Alt 2 St Dev	2020 Alt 3 Average	2020 Alt 3 St Dev	2020 Alt 3C / LPA Description	2020 LPA Average	2020 LPA St Dev
Transition - EB 38L Bus (centerline to centerline)	Webster to Laguna	00:43	00:16	00:41	00:19	Palm to Stanyan	00:22	00:14
Transition - WB 38L Bus (centerline to centerline)	Laguna to Webster	00:32	00:17	00:39	00:28	Stanyan to Palm	00:44	00:22

Travel Time measured through Masonic tunnel

Travel Time measured at surface

Notes:

1. Running Time equals total bus travel time minus the sum of average dwell times by section.
2. Dwell Time is the average bus dwell time by section
3. Bus-on-street parking interactions are included in these results. It was developed as part of an off-model process.
4. Existing average travel time eastern extent is Van Ness Avenue.
5. Total bus average travel time and standard deviation are measured directly from simulation model.

***VISSIM Results do not include any additional adjustments**

2035 Travel Time Summary - Geary BRT - *VISSIM Results
6/27/14

Mode	Description	2035 No Build				2035 Alt 2: Side Running[3]				2035 Alt 3: Center Running				2035 Alt 3C: Center Consolidation				2035 LPA			
		Average	St Dev	Running Time[1]	Dwell[2]	Average	St Dev	Running Time[1]	Dwell[2]	Average	St Dev	Running Time[1]	Dwell[2]	Average	St Dev	Running Time[1]	Dwell[2]	Average	St Dev	Running Time[1]	Dwell[2]
EB 38 Bus	25th to Park Presidio	07:03	01:15	05:44	01:42	05:03	00:46	03:33	01:31	05:06	01:03	03:46	01:21	-	-	-	-	04:56	00:49	04:01	00:53
	Park Presidio to Stanyan	11:26	02:54	10:32	01:34	06:26	01:00	05:07	01:21	06:06	00:59	04:57	01:10	-	-	-	-	05:29	00:49	04:31	00:56
	Stanyan to Broderick	*06:03*	*01:07*	*05:26*	*00:58*	*05:18*	*01:02*	*04:42*	*00:38*	*04:19*	*00:42*	*03:37*	*00:43*	-	-	-	-	*05:21*	*00:58*	*04:47*	*00:32*
	Broderick to Laguna	08:40	02:41	06:55	02:14	05:03	01:00	03:24	01:40	04:56	01:02	03:25	01:32	-	-	-	-	05:06	00:54	03:47	01:17
	Laguna to Polk	05:34	01:26	05:13	00:40	03:28	00:46	02:54	00:36	03:24	00:51	02:22	01:03	-	-	-	-	03:25	00:45	02:50	00:34
	TOTAL[5]	**38:45**	**03:44**	**33:50**	**07:08**	**25:18**	**02:15**	**19:40**	**05:46**	**23:50**	**02:07**	**18:06**	**05:50**	**-**	**-**	**-**	**-**	**24:17**	**01:50**	**19:56**	**04:12**
WB 38 Bus	Polk to Laguna	06:31	02:28	05:30	01:24	03:11	00:40	02:28	00:42	03:31	00:39	02:31	01:05	-	-	-	-	03:38	01:01	03:14	00:30
	Laguna to Broderick	07:56	02:50	06:53	01:29	05:03	00:56	03:31	01:32	04:50	01:07	03:56	01:02	-	-	-	-	05:15	01:08	03:51	01:32
	Broderick to Stanyan	*09:22*	*03:00*	*08:50*	*01:04*	*05:40*	*01:14*	*04:40*	*01:01*	*03:59*	*00:52*	*03:18*	*00:48*	-	-	-	-	*07:10*	*02:36*	*06:34*	*00:47*
	Stanyan to Park Presidio	08:38	01:26	07:38	01:29	05:41	00:53	04:16	01:25	05:08	00:54	04:04	01:13	-	-	-	-	05:41	01:03	04:51	00:58
	Park Presidio to 25th	06:28	01:09	05:17	01:33	04:08	00:42	02:39	01:28	03:52	00:43	02:57	01:02	-	-	-	-	04:16	00:57	03:20	01:02
	TOTAL[5]	**38:55**	**03:38**	**34:09**	**06:58**	**23:43**	**02:02**	**17:34**	**06:08**	**21:22**	**02:00**	**16:46**	**05:11**	**-**	**-**	**-**	**-**	**26:01**	**02:30**	**21:49**	**04:49**
EB 38L Bus	25th to Park Presidio	06:09	01:05	05:14	01:31	03:57	00:44	02:44	01:13	03:18	00:42	02:55	00:23	04:19	00:51	02:41	01:38	04:14	00:44	03:07	01:06
	Park Presidio to Stanyan	09:31	03:02	09:39	00:48	05:22	00:51	04:24	00:59	05:43	00:56	04:17	01:26	05:35	00:57	04:56	00:39	06:03	00:56	04:38	01:24
	Stanyan to Broderick	*05:24*	*01:00*	*05:23*	*00:34*	*04:24*	*00:55*	*04:04*	*00:19*	*03:33*	*00:43*	*03:08*	*00:25*	*04:11*	*00:53*	*03:08*	*01:03*	*05:04*	*01:04*	*04:14*	*00:48*
	Broderick to Laguna	07:31	02:16	06:28	01:48	04:15	00:51	03:11	01:04	04:17	01:02	02:55	01:23	04:08	00:51	03:01	01:07	04:06	00:57	03:01	01:04
	Laguna to Polk	05:30	02:05	05:24	00:39	02:57	00:47	02:27	00:30	02:49	00:49	02:10	00:39	03:26	00:59	02:34	00:52	02:55	00:44	02:24	00:30
	TOTAL[5]	**34:05**	**03:22**	**32:07**	**05:21**	**20:54**	**01:45**	**16:50**	**04:06**	**19:40**	**01:28**	**15:25**	**04:17**	**21:40**	**01:36**	**16:20**	**05:18**	**22:21**	**01:45**	**17:23**	**04:52**
WB 38L Bus	Polk to Laguna	05:27	01:59	04:26	01:02	02:41	00:35	02:11	00:30	02:41	00:42	02:02	00:42	02:45	00:40	01:56	00:49	02:40	00:35	02:15	00:30
	Laguna to Broderick	07:46	02:41	06:34	01:14	04:13	00:55	03:17	00:57	04:43	01:15	03:30	01:18	03:28	00:45	02:30	00:58	04:00	00:56	03:11	00:57
	Broderick to Stanyan	*08:31*	*02:47*	*07:53*	*00:41*	*04:32*	*01:15*	*04:13*	*00:21*	*03:09*	*00:53*	*02:44*	*00:29*	*03:51*	*00:52*	*02:51*	*01:01*	*06:45*	*02:53*	*06:30*	*00:29*
	Stanyan to Park Presidio	07:46	01:24	06:48	01:00	04:45	00:52	03:34	01:12	04:38	01:00	03:18	01:24	04:39	01:00	03:38	01:03	05:23	01:02	04:38	00:56
	Park Presidio to 25th	05:59	00:58	04:54	01:07	02:40	00:35	01:52	00:49	02:28	00:39	02:08	00:23	04:00	00:49	03:03	00:58	03:58	00:55	03:13	00:53
	TOTAL[5]	**35:27**	**03:23**	**30:35**	**05:05**	**18:50**	**01:42**	**15:07**	**03:49**	**17:38**	**01:57**	**13:41**	**04:16**	**18:42**	**01:27**	**13:57**	**04:48**	**22:46**	**02:30**	**19:47**	**03:45**
EB Cars	25th to Park Presidio	05:30	00:53	-	-	03:52	00:31	-	-	03:50	00:34	-	-	03:53	00:36	-	-	04:02	00:36	-	-
	Park Presidio to Stanyan	09:01	02:30	-	-	05:34	00:50	-	-	05:38	00:42	-	-	05:46	00:53	-	-	06:03	00:52	-	-
	Stanyan to Broderick	*04:20*	*01:11*	-	-	*04:37*	*00:56*	-	-	*04:25*	*00:54*	-	-	*04:18*	*00:52*	-	-	*04:36*	*01:05*	-	-
	Broderick to Laguna	06:11	02:32	-	-	03:21	00:39	-	-	03:03	00:40	-	-	03:28	00:51	-	-	03:55	01:14	-	-
	Laguna to Polk	05:23	01:59	-	-	04:00	01:15	-	-	03:15	01:15	-	-	04:11	01:31	-	-	05:29	01:46	-	-
	TOTAL	**30:25**		**-**	**-**	**21:24**		**-**	**-**	**20:11**		**-**	**-**	**21:35**		**-**	**-**	**24:06**		**-**	**-**
WB Cars	Polk to Laguna	04:09	02:39	-	-	03:34	01:17	-	-	05:53	03:14	-	-	02:15	00:40	-	-	03:40	00:53	-	-
	Laguna to Broderick	08:10	04:04	-	-	06:23	03:44	-	-	11:35	02:51	-	-	04:32	01:34	-	-	04:39	02:54	-	-
	Broderick to Stanyan	*09:50*	*03:48*	-	-	*11:00*	*04:14*	-	-	*07:17*	*01:59*	-	-	*08:04*	*02:29*	-	-	*13:23*	*05:06*	-	-
	Stanyan to Park Presidio	06:13	01:08	-	-	05:35	00:53	-	-	05:22	00:57	-	-	06:31	01:14	-	-	06:46	01:02	-	-
	Park Presidio to 25th	04:14	00:57	-	-	02:19	00:36	-	-	02:47	00:43	-	-	02:49	00:45	-	-	03:03	00:46	-	-
	TOTAL	**32:36**		**-**	**-**	**28:52**		**-**	**-**	**32:55**		**-**	**-**	**24:11**		**-**	**-**	**31:31**		**-**	**-**

Transition - EB 38L Bus (centerline to centerline)	Webster to Laguna					00:40	00:13			00:37	00:17										
Transition - WB 38L Bus (centerline to centerline)	Laguna to Webster					00:34	00:17			01:35	00:57										

Travel Time measured through Masonic tunnel

Travel Time measured at surface

Notes:

1. Running Time equals total bus travel time minus the sum of average dwell times by section.
2. Dwell Time is the average bus dwell time by section
3. Bus-on-street parking interactions are included in these results. It was developed as part of an off-model process.
4. Existing average travel time eastern extent is Van Ness Avenue.
5. Total bus average travel time and standard deviation are measured directly from simulation model.

***VISSIM Results do not include any additional adjustments**

2020 ON-CORRIDOR INTERSECTION LOS SUMMARY										
	2020 No Build		2020 Alt 2		2020 Alt 3		2020 Alt 3C		2020 LPA	
Intersection	Control	LOS	Control	LOS	Control	LOS	Control	LOS	Control	LOS
25th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
24th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	A
23rd Ave/Geary Blvd	Signal	C	Signal	A	Signal	B	Signal	A	Signal	B
22nd Ave/Geary Blvd	Signal	B	Signal	A	Signal	A	Signal	B	Signal	B
21st Ave/Geary Blvd	Signal	C	Signal	A	Signal	A	Signal	A	Signal	B
20th Ave/Geary Blvd	Signal	B	Signal	A	Signal	A	Signal	A	Signal	A
19th Ave/Geary Blvd	Signal	B	Signal	A	Signal	A	Signal	A	Signal	A
18th Ave/Geary Blvd	Signal	B	Signal	A	Signal	B	Signal	B	Signal	B
17th Ave/Geary Blvd	Signal	B	Signal	A	Signal	B	Signal	B	Signal	B
16th Ave/Geary Blvd	Signal	B	Signal	A	Signal	A	Signal	B	Signal	B
15th Ave/Geary Blvd	Signal	C	Signal	B	Signal	B	Signal	C	Signal	C
Park Presidio Blvd/Geary Blvd	Signal	D	Signal	C	Signal	D	Signal	C	Signal	C
12th Ave/Geary Blvd	Signal	B	Signal	A	Signal	B	Signal	B	Signal	B
11th Ave/Geary Blvd	Signal	B	Signal	A	Signal	C	Signal	C	Signal	B
10th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
9th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
8th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
7th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	A
6th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
5th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	C	Signal	B
4th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	C
3rd Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	C	Signal	C
2nd Ave/Geary Blvd	Signal	C	Signal	B	Signal	B	Signal	C	Signal	C
Arguello Blvd/Geary Blvd	Signal	C	Signal	C	Signal	C	Signal	C	Signal	C
Stanyan St/Geary Blvd	Signal	C	Signal	D	Signal	D	Signal	D	Signal	D
Commonwealth Ave/Geary Blvd	SSSC	F	SSSC	F	SSSC	F	SSSC	F	SSSC	F
Beaumont Ave/Geary Blvd	Signal	C	Signal	C	Signal	C	Signal	C	Signal	D
Parker Ave/Geary Blvd	Signal	D	Signal	D	Signal	D	Signal	C	Signal	D
Spruce St/Geary Blvd	Signal	C	Signal	C	Signal	C	Signal	C	Signal	D
Cook St/Geary Blvd	Signal	B	Signal	C	Signal	C	Signal	C	Signal	C
Blake St/Geary Blvd	Signal	C	Signal	C	Signal	C	Signal	C	Signal	C
Collins St/Geary Blvd	Signal	F	Signal	C	Signal	C	Signal	B	Signal	D
Wood St/Geary Blvd	SSSC[1]	C	Signal	F	Signal	D	Signal	D	Signal	F

2020 ON-CORRIDOR INTERSECTION LOS SUMMARY										
Intersection	2020 No Build		2020 Alt 2		2020 Alt 3		2020 Alt 3C		2020 LPA	
	Control	LOS	Control	LOS	Control	LOS	Control	LOS	Control	LOS
Masonic Ave/Geary Blvd	Signal	E	Signal	D	Signal	D	Signal	D	Signal	D
Presidio Ave/Geary Blvd	SSSC[1]	F	Signal	B	Signal	B	Signal	C	Signal	C
Lyon St/Geary Blvd	SSSC[1]	D	Signal	C	Signal	C	Signal	B	Signal	D
Baker St/Geary Blvd	Signal	C	Signal	C	Signal	D	Signal	C	Signal	C
Divisadero St/Geary Blvd	Signal	C	Signal	D	Signal	D	Signal	D	Signal	D
Scott St/Geary Blvd	Signal	F	Signal	D	Signal	D	Signal	C	Signal	D
Pierce St/Geary Blvd	N/A	N/A	Signal	B	Signal	C	Signal	A	Signal	B
Steiner St/Geary Blvd	Signal	E	Signal	C	Signal	E	Signal	D	Signal	C
Fillmore St/Geary Blvd	Signal	C	Signal	C	Signal	D	Signal	C	Signal	C
Webster St/Geary Blvd	Signal	C	Signal	D	Signal	C	Signal	C	Signal	D
Buchanan St/Geary Blvd	N/A	N/A	Signal	B	Signal	C	Signal	A	Signal	B
Laguna St/Geary Blvd	Signal	C	Signal	D	Signal	E	Signal	C	Signal	E
Gough St-Peter Yorke Way/Geary Blvd	Signal	C	Signal	E	Signal	F	Signal	E	Signal	F
Franklin St/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
Franklin St/O'Farrell St	Signal	F	Signal	D	Signal	D	Signal	D	Signal	D
Van Ness Ave/Geary Blvd	Signal	E	Signal	E	Signal	E	Signal	E	Signal	E
Van Ness Ave/O'Farrell St	Signal	E	Signal	E	Signal	E	Signal	E	Signal	E

Notes:
Green highlighted cells indicate an improvement in LOS over the no build scenario.
Red highlighted cells indicate a decline in LOS over the no build scenario.

1. Side street stop control changed to a signal in build scenarios; color coding removed as comparison is not appropriate

Source: Fehr & Peers, 2014

2035 ON-CORRIDOR INTERSECTION LOS SUMMARY										
	2035 No Build		2035 Alt 2		2035 Alt 3		2035 Alt 3C		2035 LPA	
Intersection	**Control**	**LOS**	**Control**	**LOS**	**Control**	**LOS**	**Control**	**LOS**	**Control**	**LOS**
25th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
24th Ave/Geary Blvd	Signal	B	Signal	A	Signal	B	Signal	B	Signal	A
23rd Ave/Geary Blvd	Signal	C	Signal	A	Signal	B	Signal	B	Signal	B
22nd Ave/Geary Blvd	Signal	B	Signal	A	Signal	A	Signal	B	Signal	B
21st Ave/Geary Blvd	Signal	C	Signal	A	Signal	A	Signal	A	Signal	A
20th Ave/Geary Blvd	Signal	B	Signal	A	Signal	A	Signal	A	Signal	A
19th Ave/Geary Blvd	Signal	B	Signal	A	Signal	A	Signal	A	Signal	B
18th Ave/Geary Blvd	Signal	C	Signal	A	Signal	B	Signal	B	Signal	B
17th Ave/Geary Blvd	Signal	B	Signal	A	Signal	B	Signal	B	Signal	B
16th Ave/Geary Blvd	Signal	B	Signal	A	Signal	B	Signal	B	Signal	B
15th Ave/Geary Blvd	Signal	C	Signal	B	Signal	B	Signal	C	Signal	C
Park Presidio Blvd/Geary Blvd	Signal	E	Signal	D	Signal	E	Signal	C	Signal	D
12th Ave/Geary Blvd	Signal	C	Signal	A	Signal	B	Signal	B	Signal	B
11th Ave/Geary Blvd	Signal	B	Signal	A	Signal	C	Signal	C	Signal	B
10th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
9th Ave/Geary Blvd	Signal	C	Signal	B	Signal	B	Signal	B	Signal	B
8th Ave/Geary Blvd	Signal	B	Signal	B	Signal	B	Signal	B	Signal	B
7th Ave/Geary Blvd	Signal	C	Signal	B	Signal	B	Signal	B	Signal	B
6th Ave/Geary Blvd	Signal	C	Signal	B	Signal	B	Signal	B	Signal	B
5th Ave/Geary Blvd	Signal	C	Signal	B	Signal	B	Signal	B	Signal	C
4th Ave/Geary Blvd	Signal	C	Signal	B	Signal	B	Signal	B	Signal	C
3rd Ave/Geary Blvd	Signal	D	Signal	B	Signal	B	Signal	C	Signal	C
2nd Ave/Geary Blvd	Signal	E	Signal	C	Signal	B	Signal	C	Signal	C
Arguello Blvd/Geary Blvd	Signal	D	Signal	C	Signal	C	Signal	C	Signal	C
Stanyan St/Geary Blvd	Signal	D	Signal	D	Signal	C	Signal	D	Signal	D
Commonwealth Ave/Geary Blvd	SSSC	F	SSSC	F	SSSC	F	SSSC	F	SSSC	F
Beaumont Ave/Geary Blvd	Signal	C	Signal	D	Signal	C	Signal	C	Signal	D
Parker Ave/Geary Blvd	Signal	D	Signal	D	Signal	D	Signal	D	Signal	E
Spruce St/Geary Blvd	Signal	C	Signal	D	Signal	C	Signal	C	Signal	D
Cook St/Geary Blvd	Signal	C	Signal	C	Signal	B	Signal	C	Signal	D
Blake St/Geary Blvd	Signal	C	Signal	C	Signal	C	Signal	C	Signal	C
Collins St/Geary Blvd	Signal	F	Signal	D	Signal	B	Signal	C	Signal	D

2035 ON-CORRIDOR INTERSECTION LOS SUMMARY										
	2035 No Build		2035 Alt 2		2035 Alt 3		2035 Alt 3C		2035 LPA	
Intersection	Control	LOS	Control	LOS	Control	LOS	Control	LOS	Control	LOS
Wood St/Geary Blvd	SSSC[1]	F	Signal	F	Signal	D	Signal	D	Signal	F
Masonic Ave/Geary Blvd	Signal	D	Signal	D	Signal	D	Signal	D	Signal	D
Presidio Ave/Geary Blvd	SSSC[1]	D	Signal	C	Signal	C	Signal	C	Signal	D
Lyon St/Geary Blvd	SSSC[1]	F	Signal	D	Signal	C	Signal	C	Signal	E
Baker St/Geary Blvd	Signal	D	Signal	D	Signal	D	Signal	E	Signal	D
Divisadero St/Geary Blvd	Signal	E	Signal	F	Signal	E	Signal	D	Signal	E
Scott St/Geary Blvd	Signal	F	Signal	E	Signal	E	Signal	D	Signal	E
Pierce St/Geary Blvd	N/A	N/A	Signal	E	Signal	D	Signal	C	Signal	D
Steiner St/Geary Blvd	Signal	F	Signal	F	Signal	E	Signal	D	Signal	E
Fillmore St/Geary Blvd	Signal	C	Signal	D	Signal	E	Signal	D	Signal	D
Webster St/Geary Blvd	Signal	F	Signal	F	Signal	E	Signal	E	Signal	E
Buchanan St/Geary Blvd	N/A	N/A	Signal	D	Signal	D	Signal	B	Signal	D
Laguna St/Geary Blvd	Signal	F	Signal	F	Signal	F	Signal	D	Signal	E
Gough St-Peter Yorke Way/Geary Blvd	Signal	F	Signal	F	Signal	F	Signal	F	Signal	F
Franklin St/Geary Blvd	Signal	D	Signal	B	Signal	D	Signal	B	Signal	B
Franklin St/O'Farrell St	Signal	D	Signal	D	Signal	F	Signal	F	Signal	D
Van Ness Ave/Geary Blvd	Signal	F	Signal	E	Signal	E	Signal	E	Signal	E
Van Ness Ave/O'Farrell St	Signal	E	Signal	E	Signal	E	Signal	E	Signal	E

Notes:

Green highlighted cells indicate an improvement in LOS over the no build scenario.

Red highlighted cells indicate an decline in LOS over the no build scenario.

1. Side street stop control changed to a signal in build scenarios; color coding removed as comparison is not appropriate

Source: Fehr & Peers, 2014

2020 Off-Corridor Intersection LOS Summary						
Study Intersection	**Traffic Control**	**2020 No Build**	**2020 Alt 2**	**2020 Alt 3**	**2020 Alt 3C**	**2020 LPA**
Geary Blvd/40th Ave	AWSC	B	B	B	B	B
Geary Blvd/30th Avenue	Signal	A	A	A	B	A
Balboa St/25th Ave	Signal	C	C	C	C	C
California St/Park Presidio Blvd	Signal	C	C	C	C	C
Clement St/Park Presidio Blvd	Signal	C	C	D	D	D
Anza St/Park Presidio Blvd	Signal	C	D	D	D	D
Fulton St/Park Presidio Blvd	Signal	**E**	**E**	**E**	**E**	**E**
California St/Arguello Blvd	Signal	C	C	D	C	D
Anza St/Arguello Blvd	Signal	C	C	C	D	D
Fulton St/Stanyan	Signal	**F**	**F**	**F**	**F**	**F**
Turk St/Parker Ave	Signal	C	C	C	D	D
California St/Presidio Ave	Signal	D	D	D	D	D
Bush St/Masonic Ave	Signal	C	C	B	C	C
Anza St/Masonic Ave	Signal	C	C	C	C	D
California St/Divisadero St	Signal	B	B	B	B	B
Pine St/Divisadero St	Signal	C	C	C	C	C
Pine St/Fillmore St	Signal	B	C	C	B	B
Eddy St/Fillmore St	Signal	B	B	B	B	B
Pine St/Franklin St	Signal	D	D	D	D	D
Bush St/Franklin St	Signal	D	D	D	D	D
O'Farrell St./Van Ness Ave.	Signal	C	C	C	C	C
Turk St/Franklin St	Signal	C	C	C	C	C
Golden Gate Ave/Gough St	Signal	C	C	C	C	C
Geary St./Polk St.	Signal	D	D	D	D	D
O'Farrell St./Polk St.	Signal	C	C	C	C	C
Geary St./Larkin St.	Signal	B	B	B	B	B
O'Farrell St./Hyde St.	Signal	D	D	D	D	D
Geary St./Stockton St.	Signal	B	B	B	B	B
O'Farrell St./Stockton St.	Signal	C	C	C	C	C

Notes:
Bold represents LOS E or LOS F operating conditions
Highlight indicates LOS degrades in Build scenario when compared to No Build scenario of the same analysis year
Green indicates significant impacts based on increase in delay / LOS.
Blue indicates significant impact based on contribution to poorly operating intersection (per SF criteria)

2035 Off-Corridor Intersection LOS Summary							
Study Intersection	**Traffic Control**	**2035 No Build**	**2035 Alt 2**	**2035 Alt 3**	**2035 Alt 3C**	**2035 LPA**
Geary Blvd/40th Ave	AWSC	B	C	C	C	C
Geary Blvd/30th Avenue	Signal	A	B	B	B	B
Balboa St/25th Ave	Signal	C	C	C	C	C
California St/Park Presidio Blvd	Signal	C	C	C	C	D
Clement St/Park Presidio Blvd	Signal	D	C	D	**E**	D
Anza St/Park Presidio Blvd	Signal	**E**	**E**	D	**E**	**E**
Fulton St/Park Presidio Blvd	Signal	**F**	**F**	**F**	**F**	**F**
California St/Arguello Blvd	Signal	D	D	**E**	D	**E**
Anza St/Arguello Blvd	Signal	D	D	D	D	D
Fulton St/Stanyan	Signal	**F**	**F**	**F**	**F**	**F**
Turk St/Parker Ave	Signal	C	D	**E**	**E**	D
California St/Presidio Ave	Signal	D	D	**E**	**E**	**E**
Bush St/Masonic Ave	Signal	B	B	C	C	B
Anza St/Masonic Ave	Signal	C	C	D	C	C
California St/Divisadero St	Signal	B	B	B	B	B
Pine St/Divisadero St	Signal	D	C	C	C	B
Pine St/Fillmore St	Signal	C	C	B	C	C
Eddy St/Fillmore St	Signal	B	C	B	B	C
Pine St/Franklin St	Signal	D	D	D	D	D
Bush St/Franklin St	Signal	**E**	D	D	D	**E**
O'Farrell St./Van Ness Ave.	Signal	C	C	C	C	C
Turk St/Franklin St	Signal	C	C	C	C	C
Golden Gate Ave/Gough St	Signal	C	C	D	C	C
Geary St./Polk St.	Signal	**E**	**E**	**E**	**E**	**E**
O'Farrell St./Polk St.	Signal	C	D	D	D	C
Geary St./Larkin St.	Signal	B	B	B	B	B
O'Farrell St./Hyde St.	Signal	**E**	**E**	**E**	**E**	**E**
Geary St./Stockton St.	Signal	B	C	C	B	B
O'Farrell St./Stockton St.	Signal	C	C	C	C	C

Notes:

Bold represents LOS E or LOS F operating conditions

Highlight indicates LOS degrades in Build scenario when compared to No Build scenario of the same analysis year

Green indicates significant impacts based on increase in delay / LOS.

Blue indicates significant impact based on contribution to poorly operating intersection (per SF criteria)

Appendix D7: Change in Vehicular Traffic Volumes, Parallel Streets

CONTENTS

Explanation

This appendix reports vehicle traffic volume forecasts produced by the San Francisco Northwest Quadrant Dynamic Traffic Assignment Model. These traffic volumes are not post-processed, but they are rounded to the nearest ten vehicles. Rounding to the nearest ten vehicles does not indicate precision to within ten vehicles.

Time of Day

Traffic volumes are reported for the weekday PM peak hour, which is defined as the period between 5:00 PM and 6:00 PM. PM peak hour volumes are calculated as the total amount of traffic passing through a roadway link during the PM peak hour.

Reported Volumes

Traffic volumes are reported for east-west oriented traffic passing select north-south screenlines. Each of the screenlines is a north-south oriented street that runs through the Geary Transportation Study Area. The reported volumes are the average of the flows on the link approaching the intersection and the link departing the intersection. For example, the volume reported for eastbound Fulton Street at the 30th Avenue screenline is the average of the PM peak hour hourly flow rates on eastbound Fulton Street between 31st Avenue and 30th Avenue and on eastbound Fulton Street between 30th Avenue and 29th Avenue.

Consistency with Other Reports

Some of the locations included in this appendix are also intersections where traffic level-of-service (LOS) analysis was conducted for the EIR/EIS. In order to meet the demands for LOS analysis peak hour turning movement volumes at those intersections were carefully post-processed using existing observed volumes and output from the San Francisco Northwest Quadrant DTA model. Since the volumes reported in this appendix are raw model outputs, they may differ slightly from the peak hour volumes used for LOS analysis. The volumes reported in this appendix are intended to be indicative of general traffic flow changes in the Geary Transportation Study Area as a result of the project alternatives.

Westbound Volumes on Parallel Roadways

Table D7-1: Westbound Volumes on Parallel Roadways at Select Screenlines, 2020 PM Peak Hour

SCREENLINE	PARALLEL STREET	BASELINE	ALT. 2	ALT. 3	ALT. 3-C	HYBRID ALT.
30TH AVE	EL CAMINO DEL MAR	40	40	30	40	40
	LAKE	10	20	10	10	10
	SEA VIEW TERRACE	0	0	0	0	0
	CALIFORNIA	100	70	100	120	100
	CLEMENT	170	200	200	230	180
	ANZA	50	90	60	60	50

	BALBOA	120	80	160	150	140
	CABRILLO	70	80	80	70	80
	FULTON	1,340	1,350	1,380	1,360	1,390
PARK PRESIDIO	LAKE	260	310	250	320	290
	CALIFORNIA	560	490	580	590	560
	CLEMENT	280	340	340	440	380
	ANZA	330	400	390	360	390
	BALBOA	370	410	440	450	450
	CABRILLO	310	310	310	340	320
	FULTON	1,320	1,280	1,320	1,280	1,310
ARGUELLO	LAKE	170	190	170	250	200
	SACRAMENTO	100	120	140	120	120
	CALIFORNIA	960	1,010	1,090	1,100	1,050
	CORNWALL	10	10	0	0	10
	EUCLID AVE	120	100	130	190	150
	CLEMENT	120	120	130	160	140
	ANZA	450	530	450	480	600
	EDWARD	10	10	20	20	20
	BALBOA/TURK	500	590	670	670	660
	GOLDEN GATE AVE	0	0	0	0	0
	CABRILLO	20	20	30	50	40
	MCALLISTER	60	70	60	70	50
	FULTON	1,300	1,250	1,320	1,290	1,290
MASONIC	PINE	1,220	1,440	1,420	1,260	1,410
	EUCLID AVE	140	210	150	190	150
	ANZA	250	250	360	350	230
	TURK	990	990	1,060	1,120	1,110
	GOLDEN GATE AVE	140	140	170	160	160
	MCALLISTER	40	30	50	30	20
	FULTON	670	680	730	660	700
DIVISADERO	PACIFIC AVE	190	240	150	280	210
	JACKSON	240	220	230	300	270
	WASHINGTON	70	70	40	70	70
	CLAY	220	240	160	260	270
	SACRAMENTO	130	180	220	110	140
	CALIFORNIA	990	860	850	1,010	970
	PINE	1,540	1,610	1,590	1,550	1,640
	SUTTER	50	110	60	100	80
	POST	90	100	120	110	110
	GARDEN	0	0	0	0	0
	O'FARRELL	40	50	50	80	40
	ELLIS	30	30	40	40	40
	EDDY	40	60	40	30	50
	TURK	1,210	1,200	1,410	1,370	1,330
	GOLDEN GATE AVE	20	30	30	10	20
	MCALLISTER	60	50	80	60	70
	FULTON	250	250	290	240	250
WEBSTER	PACIFIC AVE	170	230	160	250	190
	JACKSON	200	210	210	290	250
	WASHINGTON	0	20	0	10	20
	CLAY	30	60	30	30	30
	SACRAMENTO	140	180	270	150	190
	CALIFORNIA	1,020	840	860	990	1,050
	PINE	1,620	1,700	1,620	1,790	1,680
	SUTTER	70	180	120	140	140
	POST	160	210	170	200	210
	O'FARRELL	40	50	40	40	50
	ELLIS	0	0	0	0	0
	EDDY	80	120	110	90	100

	TURK	1,280	1,440	1,530	1,610	1,500
	MCALLISTER	150	100	120	140	130
	FULTON	250	360	350	290	340

Note: Traffic volumes are direct model output, rounded to the nearest 10 vehicles, and are not post-processed. Reported traffic volume estimates are the average of volumes on the links directly east and directly west of the screenline street. Intersection turning movement volumes used for Level of Service analysis at select intersections are carefully post-processed and may not match the figures reported in this appendix.

Source: San Francisco Northwest Quadrant Dynamic Traffic Assignment Model

Table D7-2: Westbound Volumes on Parallel Roadways at Select Screenlines, 2035 PM Peak Hour

SCREENLINE	PARALLEL STREET	BASELINE	ALT. 2	ALT. 3	ALT. 3-C	HYBRID ALT.
30TH AVE	EL CAMINO DEL MAR	70	110	110	100	80
	LAKE	10	10	10	10	10
	SEA VIEW TERRACE	0	0	0	0	0
	CALIFORNIA	70	110	140	130	110
	CLEMENT	300	220	250	280	230
	ANZA	150	80	80	100	90
	BALBOA	90	170	170	160	190
	CABRILLO	170	110	120	110	80
	FULTON	1,370	1,460	1,410	1,480	1,420
PARK PRESIDIO	LAKE	300	290	420	380	300
	CALIFORNIA	500	600	610	620	640
	CLEMENT	300	320	380	460	340
	ANZA	400	380	350	390	400
	BALBOA	400	410	430	460	420
	CABRILLO	310	330	340	370	350
	FULTON	1,310	1,310	1,300	1,300	1,320
ARGUELLO	LAKE	180	170	260	240	170
	SACRAMENTO	100	110	140	120	120
	CALIFORNIA	960	1,120	1,210	1,250	1,190
	CORNWALL	10	10	20	10	10
	EUCLID AVE	180	130	200	220	80
	CLEMENT	120	110	160	150	110
	ANZA	510	530	510	500	580
	EDWARD	10	10	20	20	10
	BALBOA/TURK	580	620	690	690	620
	GOLDEN GATE AVE	0	0	0	0	0
	CABRILLO	50	50	60	50	30
	MCALLISTER	50	70	70	70	50
	FULTON	1,250	1,340	1,380	1,360	1,370
MASONIC	PINE	1,440	1,360	1,270	1,270	1,300
	EUCLID AVE	230	150	210	210	110
	ANZA	290	270	310	300	230
	TURK	1,040	1,050	1,150	1,090	1,070
	GOLDEN GATE AVE	190	240	260	320	200
	MCALLISTER	30	70	80	100	80
	FULTON	690	760	730	740	720
DIVISADERO	PACIFIC AVE	220	210	290	290	200
	JACKSON	160	360	360	330	290
	WASHINGTON	80	60	60	60	60
	CLAY	240	220	270	260	230
	SACRAMENTO	160	220	170	140	210
	CALIFORNIA	870	1,140	1,280	1,280	1,300
	PINE	1,670	1,550	1,500	1,490	1,440
	SUTTER	60	120	150	120	80
	POST	110	120	100	100	130
	GARDEN	0	0	0	0	0
	O'FARRELL	110	40	90	80	50
	ELLIS	50	40	60	60	30
	EDDY	50	90	60	50	60

	TURK	1,330	1,250	1,440	1,380	1,370
	GOLDEN GATE AVE	20	30	30	30	20
	MCALLISTER	40	160	130	140	140
	FULTON	270	360	300	290	260
WEBSTER	PACIFIC AVE	220	180	260	240	150
	JACKSON	180	310	360	290	230
	WASHINGTON	10	10	10	10	10
	CLAY	60	40	60	60	60
	SACRAMENTO	120	260	160	170	250
	CALIFORNIA	900	1,230	1,450	1,460	1,460
	PINE	1,830	1,880	1,620	1,640	1,470
	SUTTER	120	180	220	190	150
	POST	180	290	260	260	200
	O'FARRELL	50	30	30	40	50
	ELLIS	0	0	0	0	0
	EDDY	90	170	280	160	160
	TURK	1,470	1,390	1,530	1,520	1,490
	MCALLISTER	110	260	240	260	220
	FULTON	340	510	380	320	390

Note: Traffic volumes are direct model output, rounded to the nearest 10 vehicles, and are not post-processed. Reported traffic volume estimates are the average of volumes on the links directly east and directly west of the screenline street. Intersection turning movement volumes used for Level of Service analysis at select intersections are carefully post-processed and may not match the figures reported in this appendix.

Source: San Francisco Northwest Quadrant Dynamic Traffic Assignment Model

Eastbound Volumes on Parallel Roadways

Table D7-3: Eastbound Volumes on Parallel Roadways at Select Screenlines, 2020 PM Peak Hour

SCREENLINE	PARALLEL STREET	BASELINE	ALT. 2	ALT. 3	ALT. 3-C	HYBRID ALT.
30TH AVE	EL CAMINO DEL MAR	40	40	30	30	30
	LAKE	10	10	10	10	20
	SEA VIEW TERRACE	0	0	0	0	0
	CALIFORNIA	80	70	120	140	120
	CLEMENT	160	210	260	240	230
	ANZA	10	20	20	30	10
	BALBOA	110	90	110	130	110
	CABRILLO	20	30	20	30	20
	FULTON	1,040	1,030	1,160	1,060	1,160
PARK PRESIDIO	LAKE	170	210	210	220	240
	CALIFORNIA	610	580	630	650	660
	CLEMENT	290	280	400	350	350
	ANZA	240	310	270	330	280
	BALBOA	200	140	220	230	210
	CABRILLO	150	220	210	180	220
	FULTON	1,160	1,180	1,220	1,220	1,200
ARGUELLO	LAKE	150	160	140	190	210
	SACRAMENTO	100	140	110	110	140
	CALIFORNIA	850	860	920	860	930
	CORNWALL	20	40	40	40	20
	EUCLID AVE	180	170	250	260	230
	CLEMENT	120	130	190	180	170
	ANZA	300	440	380	390	420
	EDWARD	0	0	0	0	0
	BALBOA/TURK	240	230	250	270	270
	GOLDEN GATE AVE	50	50	40	50	50
	CABRILLO	20	40	40	20	60
	MCALLISTER	0	0	0	0	0

	FULTON	1,280	1,310	1,350	1,370	1,380
MASONIC	PINE	920	940	870	940	950
	EUCLID AVE	210	300	430	380	280
	ANZA	160	130	160	190	190
	TURK	190	220	200	200	220
	GOLDEN GATE AVE	100	80	130	170	120
	MCALLISTER	400	510	500	480	490
	FULTON	90	110	50	120	90
DIVISADERO	PACIFIC AVE	250	210	230	250	270
	JACKSON	20	40	40	30	40
	WASHINGTON	280	250	200	270	260
	CLAY	80	100	100	90	120
	SACRAMENTO	260	290	480	300	330
	CALIFORNIA	1,410	1,290	1,330	1,420	1,330
	PINE	40	80	100	40	50
	SUTTER	150	210	90	240	120
	POST	90	50	50	80	110
	GARDEN	190	210	230	240	230
	O'FARRELL	70	60	90	80	60
	ELLIS	80	60	70	80	80
	EDDY	110	80	120	90	90
	TURK	510	460	420	530	490
	GOLDEN GATE AVE	100	60	110	100	100
	MCALLISTER	130	230	210	180	190
	FULTON	110	100	60	100	90
WEBSTER	PACIFIC AVE	190	140	170	170	180
	JACKSON	40	40	40	40	40
	WASHINGTON	70	140	110	120	160
	CLAY	100	90	130	100	130
	SACRAMENTO	350	390	520	350	410
	CALIFORNIA	0	0	0	0	0
	PINE	1,580	1,390	1,330	1,510	1,460
	SUTTER	50	80	90	50	70
	POST	240	420	220	450	300
	O'FARRELL	60	60	50	70	60
	ELLIS	0	0	0	0	0
	EDDY	90	130	120	120	100
	TURK	1,050	960	900	1,190	1,240
	MCALLISTER	80	80	140	110	110
	FULTON	160	280	190	200	200

Note: Traffic volumes are direct model output, rounded to the nearest 10 vehicles, and are not post-processed. Reported traffic volume estimates are the average of volumes on the links directly east and directly west of the screenline street. Intersection turning movement volumes used for Level of Service analysis at select intersections are carefully post-processed and may not match the figures reported in this appendix.

Source: San Francisco Northwest Quadrant Dynamic Traffic Assignment Model

Table D7-4: Eastbound Volumes on Parallel Roadways at Select Screenlines, 2035 PM Peak Hour

SCREENLINE	PARALLEL STREET	BASELINE	ALT. 2	ALT. 3	ALT. 3-C	HYBRID ALT.
30TH AVE	EL CAMINO DEL MAR	40	30	30	40	40
	LAKE	10	20	20	10	10
	SEA VIEW TERRACE	0	0	0	0	0
	CALIFORNIA	80	120	150	170	130
	CLEMENT	190	180	240	220	240
	ANZA	20	20	30	20	10
	BALBOA	90	130	140	150	150
	CABRILLO	60	30	50	20	30
	FULTON	1,140	1,260	1,280	1,320	1,280
PARK PRESIDIO	LAKE	210	210	220	210	240
	CALIFORNIA	570	610	680	690	650
	CLEMENT	290	290	350	390	360

	ANZA	300	270	330	350	300
	BALBOA	130	230	270	280	260
	CABRILLO	230	200	190	180	220
	FULTON	1,150	1,210	1,210	1,200	1,200
ARGUELLO	LAKE	160	160	210	220	200
	SACRAMENTO	130	140	130	100	160
	CALIFORNIA	840	900	1,000	970	930
	CORNWALL	40	50	20	20	20
	EUCLID AVE	150	130	230	250	220
	CLEMENT	110	100	160	160	160
	ANZA	460	440	460	490	450
	EDWARD	0	0	0	0	0
	BALBOA/TURK	190	330	380	350	320
	GOLDEN GATE AVE	50	50	40	40	50
	CABRILLO	40	30	60	50	40
	MCALLISTER	0	0	0	0	0
	FULTON	1,320	1,350	1,390	1,330	1,390
MASONIC	PINE	870	810	890	920	900
	EUCLID AVE	280	340	490	500	340
	ANZA	120	290	340	340	260
	TURK	190	200	210	190	190
	GOLDEN GATE AVE	90	150	220	190	150
	MCALLISTER	510	560	610	590	610
	FULTON	120	100	120	100	90
DIVISADERO	PACIFIC AVE	200	270	310	290	240
	JACKSON	40	20	30	30	20
	WASHINGTON	250	230	260	260	200
	CLAY	100	150	100	90	110
	SACRAMENTO	280	320	320	290	310
	CALIFORNIA	1,350	1,060	1,250	1,350	1,280
	PINE	50	100	60	40	80
	SUTTER	190	230	310	310	230
	POST	140	110	210	180	90
	GARDEN	390	230	320	300	270
	O'FARRELL	70	60	90	80	110
	ELLIS	80	110	180	160	90
	EDDY	180	180	170	170	170
	TURK	430	680	720	710	670
	GOLDEN GATE AVE	60	220	240	240	140
	MCALLISTER	190	370	260	220	290
	FULTON	120	90	100	90	100
WEBSTER	PACIFIC AVE	150	190	220	220	140
	JACKSON	40	40	50	50	50
	WASHINGTON	80	110	130	100	150
	CLAY	90	140	90	80	120
	SACRAMENTO	410	390	390	340	380
	CALIFORNIA	0	0	0	0	0
	PINE	1,510	1,130	1,380	1,390	1,360
	SUTTER	70	120	80	70	110
	POST	330	500	510	520	520
	O'FARRELL	60	60	60	60	60
	ELLIS	0	0	0	0	0
	EDDY	120	150	180	170	140
	TURK	1,030	1,390	1,720	1,680	1,480
	MCALLISTER	60	250	190	180	180
	FULTON	300	420	330	310	360

Note: Traffic volumes are direct model output, rounded to the nearest 10 vehicles, and are not post-processed. Reported traffic volume estimates are the average of volumes on the links directly east and directly west of the screenline street. Intersection turning movement volumes used for Level of Service analysis at select intersections are carefully post-processed and may not match the figures reported in this appendix.

Source: San Francisco Northwest Quadrant Dynamic Traffic Assignment Model

San Francisco County Transportation Authority
1455 Market Street, 22nd Floor
San Francisco, California 94103
415.522.4800 FAX 415.522.4829
info@sfcta.org www.sfcta.org

Appendix D8:

Pedestrian Safety Analysis and Recommendations

Geary Boulevard Bus Rapid Transit

This appendix provides additional detail to supplement the discussion of pedestrian safety included in the transportation chapter of the Geary Boulevard Environmental Impact Study / Report (EIS/EIR). It provides the following:

- A more detailed description of the pedestrian collision history and contributing crash factors along the Geary BRT corridor
- A table summary listing a complete toolbox of pedestrian safety improvements and how they are incorporated in to the design of the BRT (focusing on the staff-recommended "hybrid" alternative).
- Detail regarding how additional bulbouts were prioritized for inclusion in the BRT design.

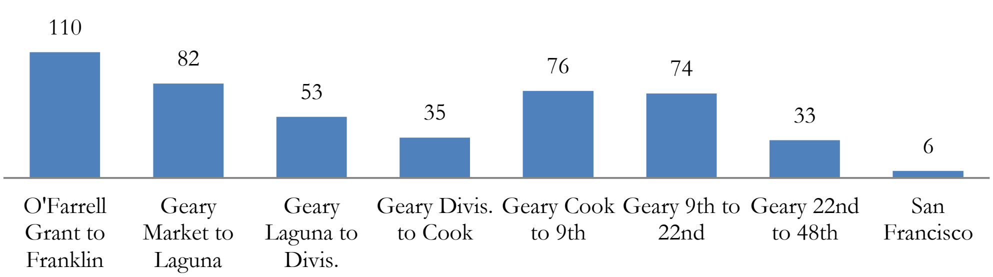
PEDESTRIAN COLLISION HISTORY

The following presents a summary of the pedestrian collision history along the Geary corridor based on data compiled by the Department of Public Health (DPH) and analyzed by the San Francisco County Transportation Authority (SFCTA). It then presents collision data analyzed as part of the 2013 WalkFirst Investment Study.

SFCTA/ DPH Analysis

All roadway segments along the Geary corridor exhibit worse pedestrian safety performance than the citywide average. Figure 1 compares severity-weighted injuries on a per mile basis for seven corridor segments to the city-wide average. Inner Geary (O'Farrell from Grant to Franklin and Geary from Market to Laguna) have the highest numbers of severe injuries and fatalities per mile. The sections of Geary from Cook to 22nd Ave also stand out as having higher than typical numbers of severe and fatal injuries per mile.

Figure 1. Severity-Weighted Pedestrian Injuries per Mile, 2005-2011



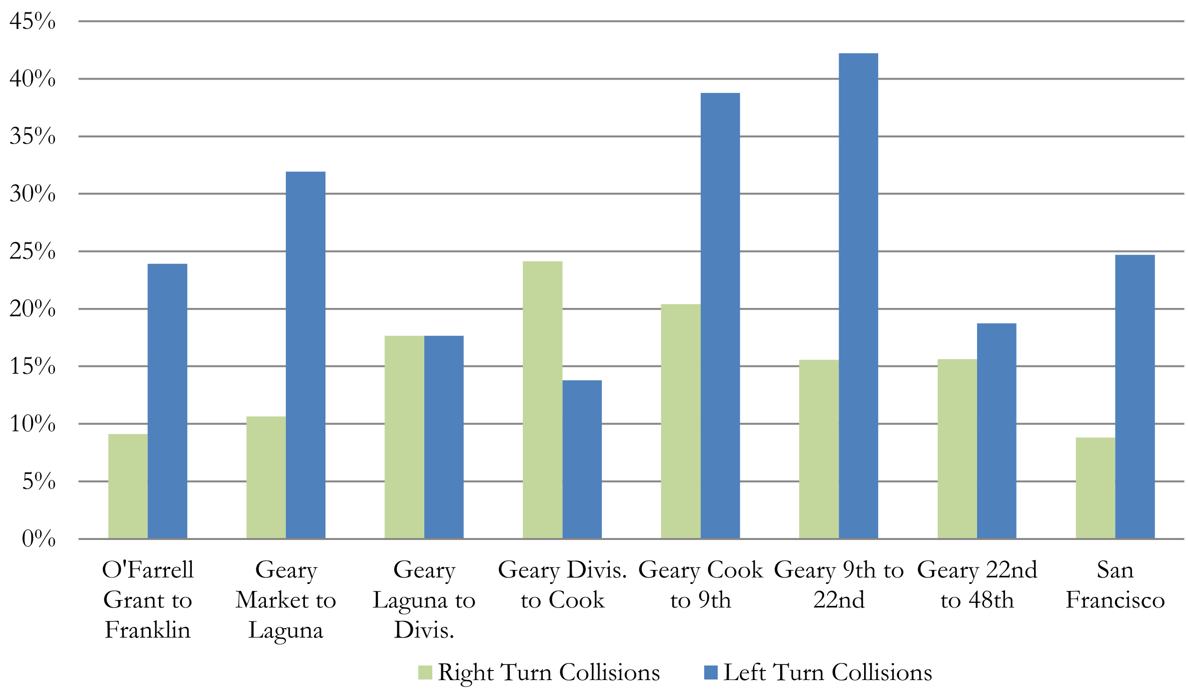
Source: Department of Public Health Pedestrian Collision Scorecard. Severe and fatal injuries are multiplied by three for a higher severity weight.

The Department of Public Health analyzed pedestrian crash types along seven segments of the Geary corridor, revealing several major factors contributing to collisions, described below.

THROUGH COLLISIONS: On most segments, the most common collision type (representing about a third of collisions), involve a vehicle proceeding straight through (as opposed to turning). Through collisions along the Geary corridor occur in about the same proportion as they do city-wide. The exceptions are the segments from Cook to 22nd, where most collisions involve a left-turning vehicle.

LEFT AND RIGHT TURN COLLISIONS: Collisions involving turning vehicles, and particularly left-turning vehicles, are disproportionately represented along the Geary corridor compared with the rest of San Francisco (Figure 2). Right-turn collisions are particularly prevalent from Divisadero to Cook, and left-turn collisions from Cook to 22nd.

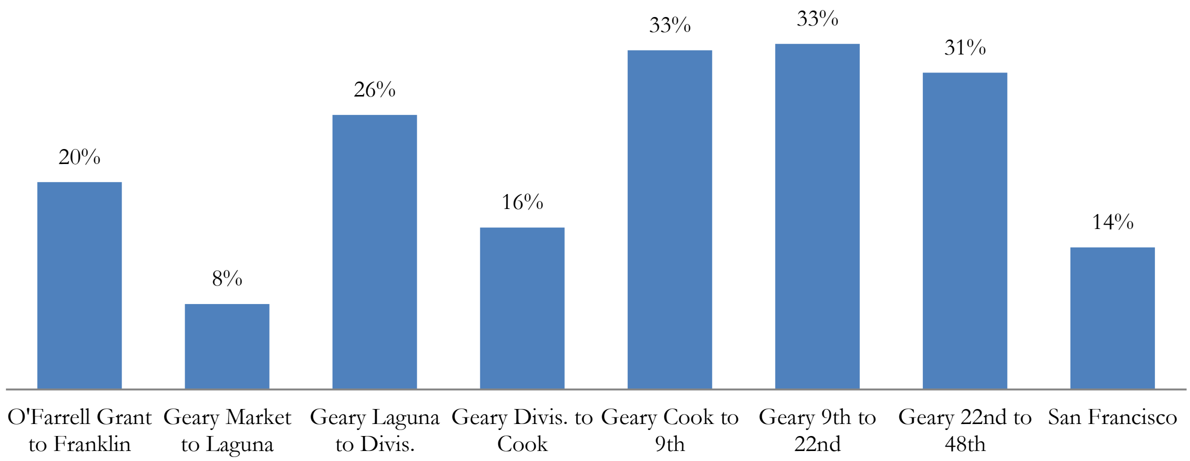
Fig. 2. Share of Pedestrian Injury Collisions Involving Turning Vehicles



Source: Department of Public Health Pedestrian Collision Scorecard, from SWITRS 2005-2011.

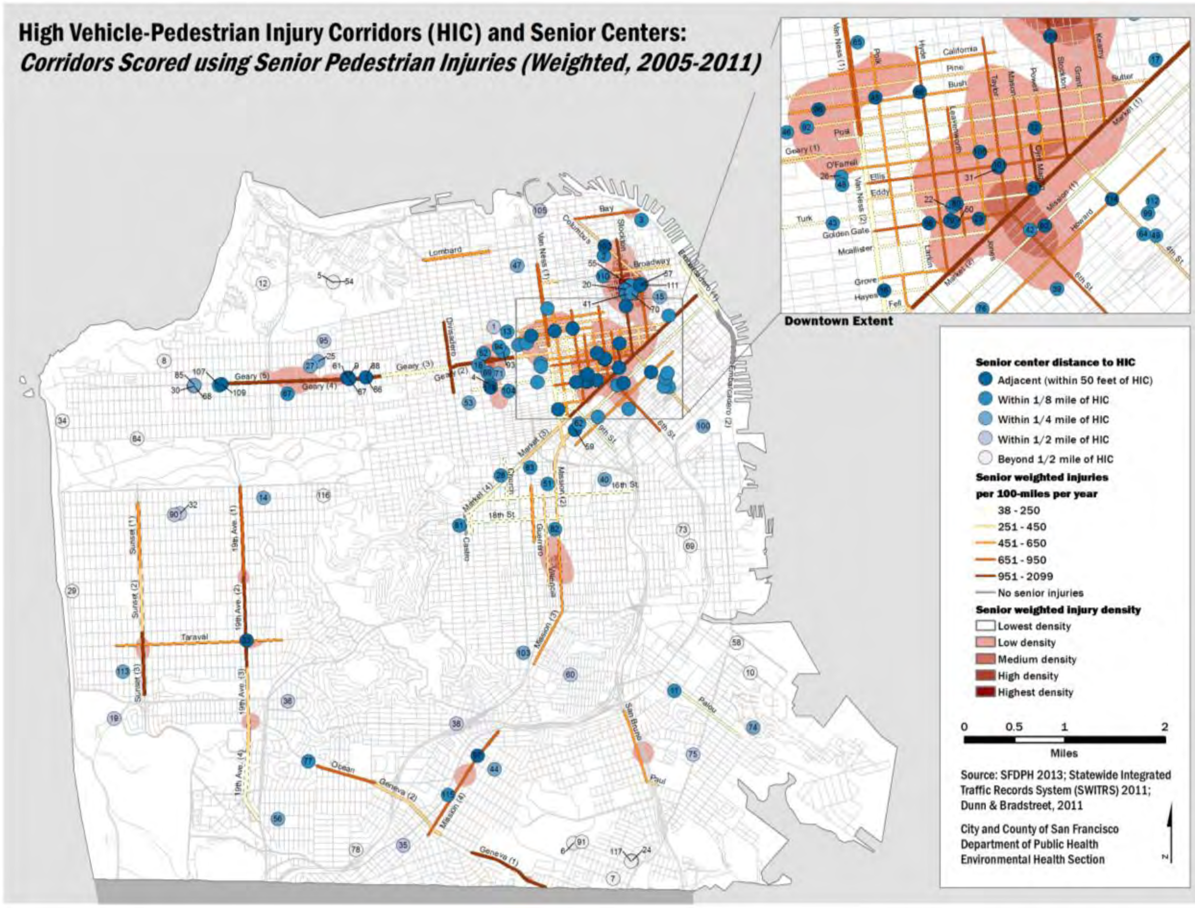
COLLISIONS INVOLVING OLDER PEDESTRIANS: Nearly forty senior centers are found within a quarter mile of the proposed BRT Route. As a result of this concentration, and because seniors are more vulnerable to being injured in a collision, pedestrian injuries to seniors are very prevalent along the corridor, and make up over a third of pedestrian injuries in on some sections (Figure 3). Analysis from the Department of Public Health indicates that the portions of Geary from approximately Laguna to Divisadero and Cook to 22nd[rd] have among the highest concentrations of senior pedestrian injuries in the city (Figure 4).

Fig. 3. Share of Pedestrian Injuries Involving an Older Pedestrian (65+)



Source: Department of Public Health Pedestrian Collision Scorecard, from SWITRS 2005-2011.

Fig. 4. Corridors Scored for Prevalence of Senior Pedestrian Injuries



Source: SF Department of Public Health, 2013; from SWITRS 2011 and Dunn and Bradstreet, 2011.

WalkFirst Investment Strategy Analysis

After the completion of the analysis presented above, a team of San Francisco city agencies released the WalkFirst Investment Strategy,[1] which analyzed the occurrence of twelve pedestrian collision profiles along San Francisco's pedestrian high injury corridors (including Geary and O'Farrell), and provided recommendations for improvement. Table 1 below highlights the analysis of collision profiles with respect to the segments of Geary and O'Farrell analyzed previously by SFCTA/DPH. The results are generally consistent and indicate that collisions involving turning vehicles – particularly left-turning vehicles, are disproportionately represented along Geary particularly inner Geary and Geary from Cook to 22nd; and high speed/high volumes collisions are prevalent as well along much of the corridor. Mid-block collisions, pedestrians crossing outside the crosswalk, and high risk factors are overrepresented in inner Geary. Collisions involving seniors were not among the 12 collision profiles studied, though WalkFirst prioritized improvements at locations with senior pedestrian injuries, with additional prioritization criteria including youth pedestrian injuries and locations in MTC Communities of Concern (areas with higher concentrations of low-income, non-white, and other vulnerable populations).

---

[1] See WalkFirst.sfplanning.org for more detail.

Table 1. WalkFirst Collision Profiles

Source: SF Planning Department, 2014

COLLISION PROFILE	O'Farrell (Market to Franklin)	Geary (Market to Lagnuna)	Geary (Laguna to Cook)	Geary (Cook to 22nd)	Geary (22nd to 48th)
Night-time crashes		□			
Left turns at signalized intersections	■■	■■	■	■■	□
Right turns at signalized intersections		■	□	■	□
Complex collisions		□			
Mid-block collisions	■■	■	■	□	□
High speed, low volume					□
High speed, high volume	■	■	■	■	
Pedestrian crossing against signal	■	■	□		□
Pedestrian crossing outside the crosswalk	■■	■■	■	□	□
Unpredictable pedestrian behavior	□	□			□
High risk factors (including crime)	■■	■			
Alcohol use	□	■	□	□	□

*Where ■■ = high concentration of collision type; ■= medium concentration; □ = low concentration; and blank = very low

PROJECT PEDESTRIAN SAFETY INVESTMENTS - OVERVIEW

The Geary BRT project includes numerous features that would address the major crash factors identified along the Geary corridor. These features are described by project alternative in the project description and the transportation chapter of the EIR/EIS, and are listed in Tables 2 and 3 below along with a description of how they are incorporated into the hybrid/staff-recommended alternative.

Table 2. Summary of Pedestrian Safety Features Included in Hybrid/Staff Recommended Alternative

Multiple Collision Types		Hybrid/Staff-Recommend Alternative
Bulbouts	Reduce crossing distance; improve visibility	Hybrid alternative includes 81 bulbouts, including 55 provided at transit stops (bus and corner bulbs) and 26 additional corner bulbs provided at pedestrian safety priority locations (location detail provided below).
Pedestrian Countdown Signals	Reduce likelihood of pedestrians still in roadway after walk clearance phase	Only seven signalized intersections along the Geary corridor currently lack pedestrian countdown signals (O'Farrell at Leavenworth and Franklin and Geary at Laguna, Fillmore, Scott, Divisadero, and Baker/St. Josephs). If not already updated prior to construction, all these intersections will receive new signal equipment under all build scenarios, and thus will receive upgrades including pedestrian countdown signals. Additionally, all new pedestrian signals installed as part

		of the project will have pedestrian countdown capabilities.
Recessed stop lines and high visibility crosswalk striping	Increase visibility of crossing pedestrians	All alternatives would provide new high visibility continental crosswalk striping and recessed stop lines at all intersections.
Pedestrian refuge islands	Provide improved refuge to crossing pedestrians	A median refuge island already runs along Geary from 44th St to Gough. This would be retained in all build alternatives, except the center-running portion (between Palm and 27th Avenue in the hybrid alternative), which would provide two median refuge islands instead of one.
New signalized crossings		All build alternatives provide new signalized crossings for pedestrians at Buchanan and Broderick.
Road diet/ reduced crossing distances		All build alternatives would all remove the pedestrian overcrossings at Steiner and Webster Street to decrease the out-of-direction walking required to cross Geary. In addition, Geary from Gough Street to Scott Street would be reduced by one travel lane in each direction, resulting in reduced crossing distance for pedestrians and in two mixed-traffic lanes and one bus-only lane in each direction. Crossing distances at locations with bulbouts will be narrowed.

Table 2 (Cont).

COUNTERMEASURE	PURPOSE	HYBRID ALTERNATIVE CHARACTERISTICS
Turning collisions		
Restrict left turns	Reduces or eliminates pedestrian right-of-way violation from left-turning vehicles.	Hybrid alternative would eliminate 16 left turn opportunities and introduce one new opportunity. Eight of the 16 would be eliminated in the section of Geary (from Cook to 22nd St) with the highest share of collisions involving left-turning vehicles.
Provide protected signal phasing	Reduces or eliminates pedestrian right-of-way violation from turning vehicles.	Hybrid alternative would result in protected signal phasing along most of the corridor. Between Cook and 22nd, the segment with the highest share of collisions involving left-turning vehicles, 22 out of 28 signalized intersections would have protected signal phasing. The six unprotected intersections experienced the following numbers of pedestrian injuries 2005-2011: Cook (6), Spruce (1), Parker (2), Beaumont (1), and Commonwealth (0); none of these collisions involved left-turning vehicles. Turns in inner Geary and O'Farrell are unprotected due to the one-way nature of the streets.
Remove parking at intersection	Improves visibility of crossing pedestrians.	Hybrid alternative includes removal of 328 parking spaces, or about 20 percent of the supply along the corridor, to provide space for the dedicated BRT lane, bus bulb-outs, transit access bulb-outs, and pedestrian safety bulb-outs.
Reduce curb radii	Slows right-turning vehicles.	Curb or bus bulb-outs at 81 corners will reduce turning radii.
Provide leading pedestrian intervals	Reduces conflicts between pedestrians and turning vehicles.	Not included in the project definition, but are recommended by the SFCTA for implementation on a case-by-case basis, especially at intersections in inner Geary and O'Farrell which experience high shares of collisions involving turning vehicles and will have unprotected signal phasing due to the one-way nature of the streets.
Senior Collisions		
Provide additional crossing time	Allow slow-moving seniors additional time to clear the crosswalk.	All pedestrian signal timings on the Geary corridor would meet both 3.5 FPS and 2.5 FPS standards for crossing speeds.
Targeted senior education	Educate seniors on safe crossing behavior.	Not included in project definition but recommended by SFCTA and WalkFirst for implementation along the corridor.
High speed/high volume collisions		

Targeted enforcement/speed campaign	Reduce corridor speeds to reduce severity of pedestrian injuries.	Not included in project definition but recommended by SFCTA and WalkFirst for implementation along the corridor.
Automated enforcement	Reduce corridor speeds to reduce severity of pedestrian injuries.	Not included in project definition but recommended for implementation along the corridor by SFCTA and WalkFirst; would require a state law change.
More visible mastarms/back plates	Reduce red-light running and pedestrian right-of-way violations from through vehicles.	Included in project - new mastarms and upgraded signal equipment will be provided at most corridor intersections (approx. 60 out of 88 intersections).

BULB-OUT PRIORITIZATION - DETAIL

This section provides additional detail about how locations for pedestrian bulb-outs were prioritized for inclusion in the project. Because pedestrian activity is expected to be concentrated around BRT stop locations after project construction, each BRT stop location includes provision for corner and bus bulb-outs. A total of 55 bulb-outs will be provided at BRT stop locations in the hybrid alternative.

SFCTA prioritized locations for <u>additional</u> bulb-outs to further address pedestrian safety. Locations were prioritized by identifying the top 10 and 30 percent of high pedestrian collision locations along the Geary corridor based on their collision history 2005 – 2011. This was combined with the DPH analysis of top locations for senior injuries (see Figure 4) to produce three tiers of priority:

- Tier 1 locations (eight intersections) were in the top 10 percent of locations by pedestrian collision frequency.
- Tier 2 locations (nine intersections) were in the top 11-30 percent of locations by collision frequency and are adjacent to a segment with the highest concentrations of senior injuries.[2]
- Tier 3 locations (fourteen intersections) included all remaining in the top 11-30 percent.

In late February, 2014, SFMTA and the controller's office released the recommendations of the WalkFirst Investment study, which included a list of locations and a menu of recommended improvements by location. The SFCTA's intersection prioritization was updated to take into account WalkFirst recommendations.

The resulting list of priority intersections was then reviewed for implementation feasibility, including considerations such as whether a bulbout is already planned for the intersection, or whether it would conflict with utilities, loading zones, and sensitive uses. The following is the resulting list of locations recommended for inclusion in the project definition (number of corners listed in parentheses).

At intersections with Geary Boulevard:

- 9th Street (2)
- 3rd Street (4)
- Cook St. (1)

[2] See Fig. 5. Segments with 951 or greater senior weighted injuries per 100-miles per year were given a score of 1; all others 0.

- Baker Street (1)
- Broderick Street (2)
- Scott St. (1)
- Steiner St. (2)
- Webster St. (4)
- Buchanan St. (1)
- Laguna St (2)
- Hyde St. (1), and
- Mason St (2)

And with O'Farrell St.:

- Larkin (1)
- Jones (1)

This page intentionally left blank.

Appendix E

Cultural Items: Architectural APE, Archaeological APE, SHPO Correspondence, Tribal Consultation, Letters to Interested Parties

Note: Additional cultural reports were completed for this project, including: an Archaeological and Native American Cultural Resources Sensitivity Assessment, a Historic Resources Inventory and Evaluation Report, and a Finding of Effect.

Due to the sensitive nature of archaeological and certain historic resources, these reports are not included in this appendix, and are instead on file with SFCTA.

Architectural APE

This page intentionally left blank.

Architectural APE
Excluded from APE
Parcel Boundaries
Map Reference Number
Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Architectural APE

Page 1 of 12

Date: 2/26/2014

Data Sources: Layout: 3/27/2013; streets & APNs: sfgov.org/site/gis; aerial: 2007.

Architectural APE
Excluded from APE
Parcel Boundaries
Map Reference Number
Golden Triangle Light Standards (approximate locations)

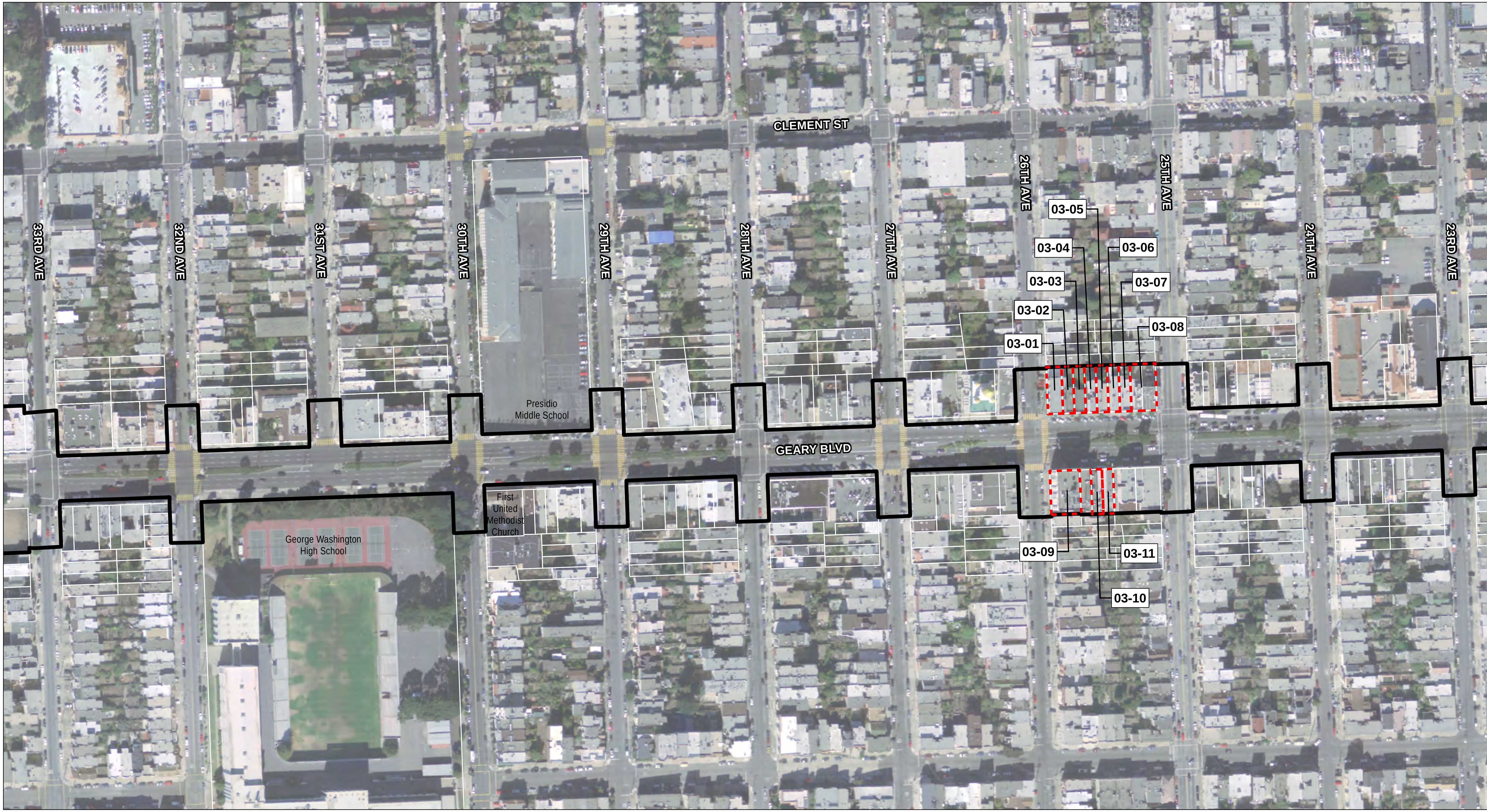
0 100 200 300 400 Feet
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/26/2014

Data Sources: Layout: 3/27/2013;
streets & APNs: sfgov.org/site/gis; aerial: 2007.



- Architectural APE
- Excluded from APE
- Parcel Boundaries
- Map Reference Number
- Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

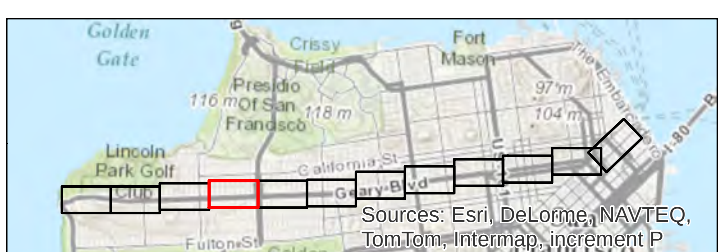
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/26/2014

Data Sources: Layout: 3/27/2013; streets & APNs: sfgov.org/site/gis; aerial: 2007.



- Architectural APE
- Excluded from APE
- Parcel Boundaries
- Map Reference Number
- Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/26/2014

Data Sources: Layout: 3/27/2013; streets & APNs: sfgov.org/site/gis; aerial: 2007.

Architectural APE
Excluded from APE
Parcel Boundaries
Map Reference Number
Golden Triangle Light Standards (approximate locations)

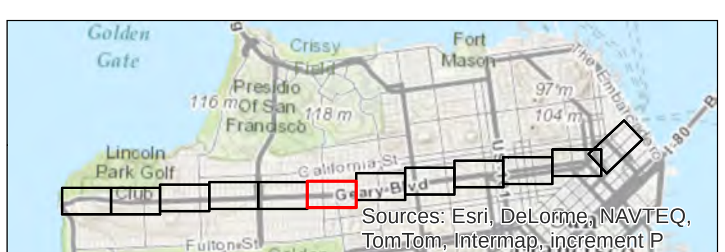
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/26/2014

Data Sources: Layout: 3/27/2013;
streets & APNs: sfgov.org/site/gis; aerial: 2007.



Architectual APE

Excluded from APE

Parcel Boundaries

Map Reference Number

Golden Triangle Light Standards (approximate locations)

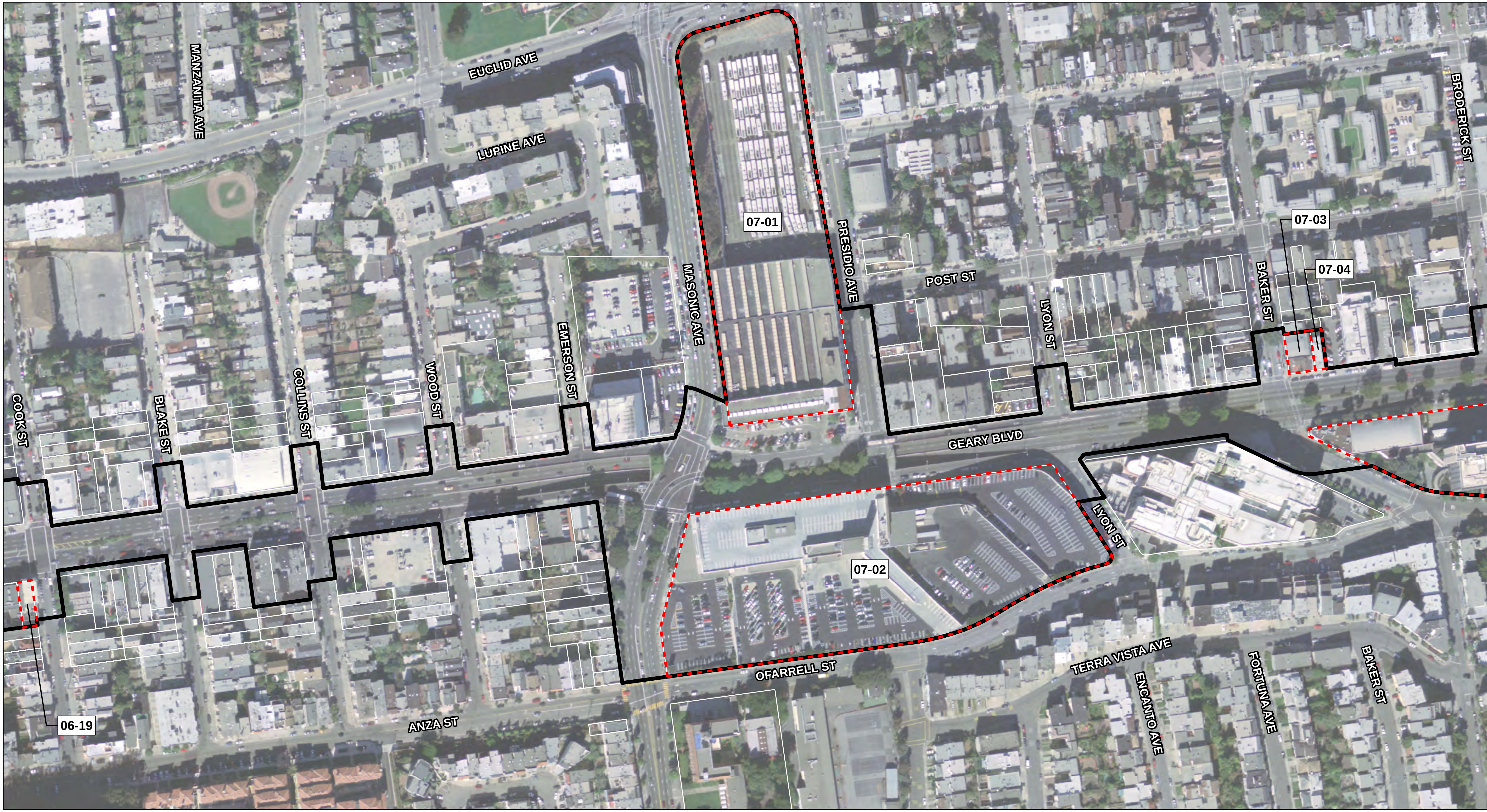
0 100 200 300 400 Feet

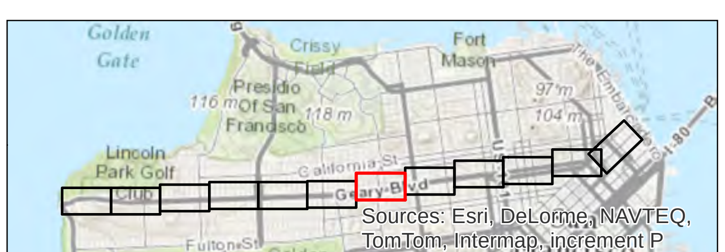
1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/26/2014

Data Sources: Layout: 3/27/2013; streets & APNs: sfgov.org/site/gis; aerial: 2007.





Architectural APE
Excluded from APE
Parcel Boundaries
Map Reference Number
Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

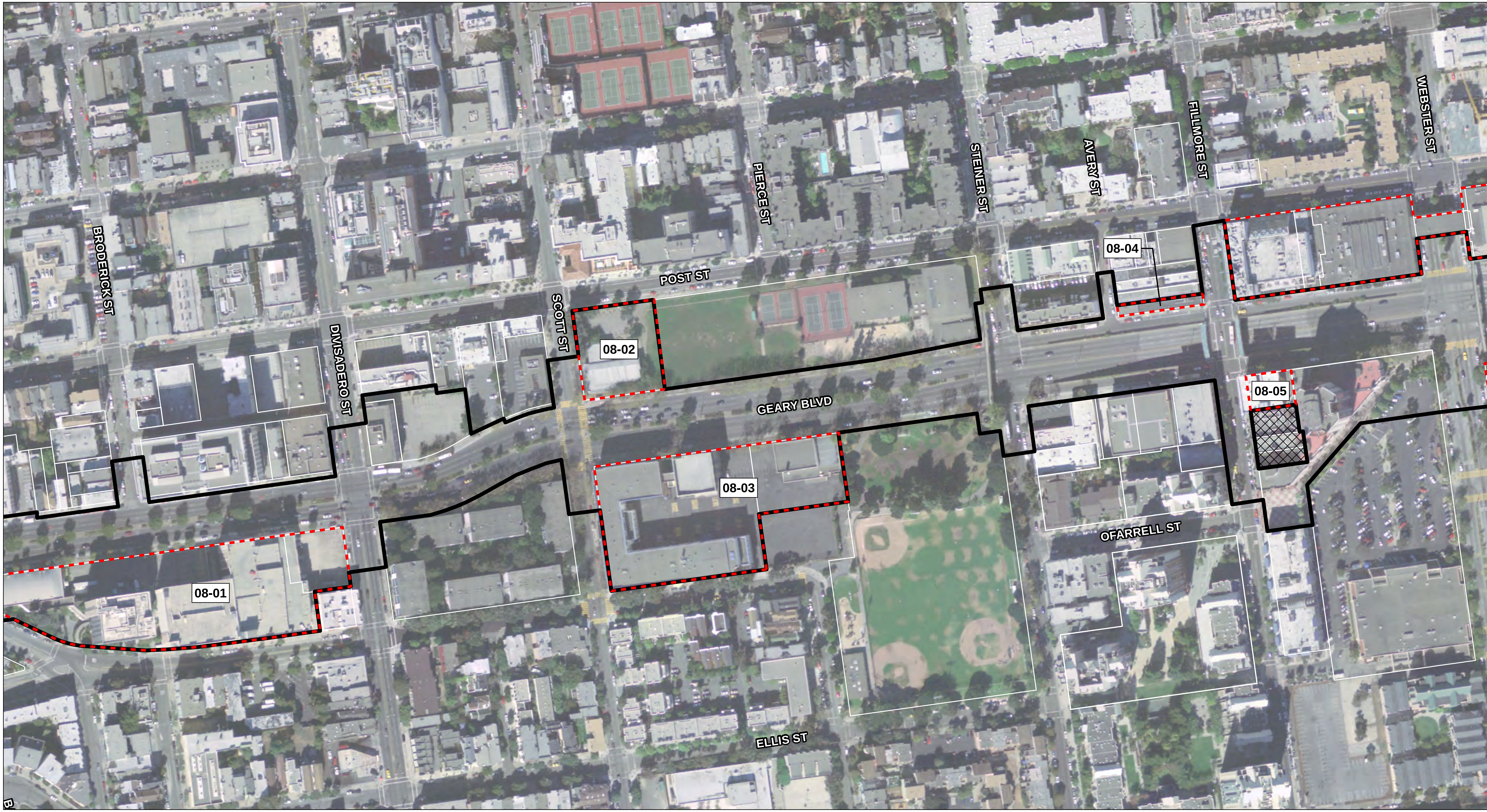
1:2,400 1 Inch = 200 Feet

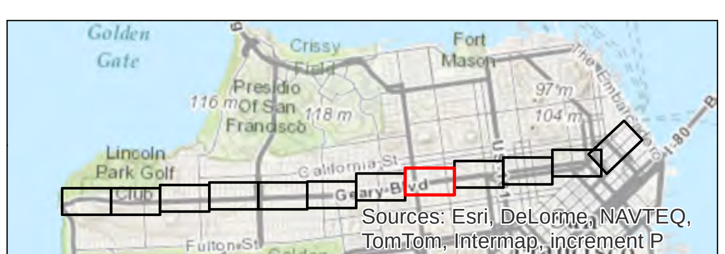
N

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/26/2014

Data Sources: Layout: 3/27/2013;
streets & APNs: sfgov.org/site/gis; aerial: 2007.





- Architectural APE
- Excluded from APE
- Parcel Boundaries
- Map Reference Number
- Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

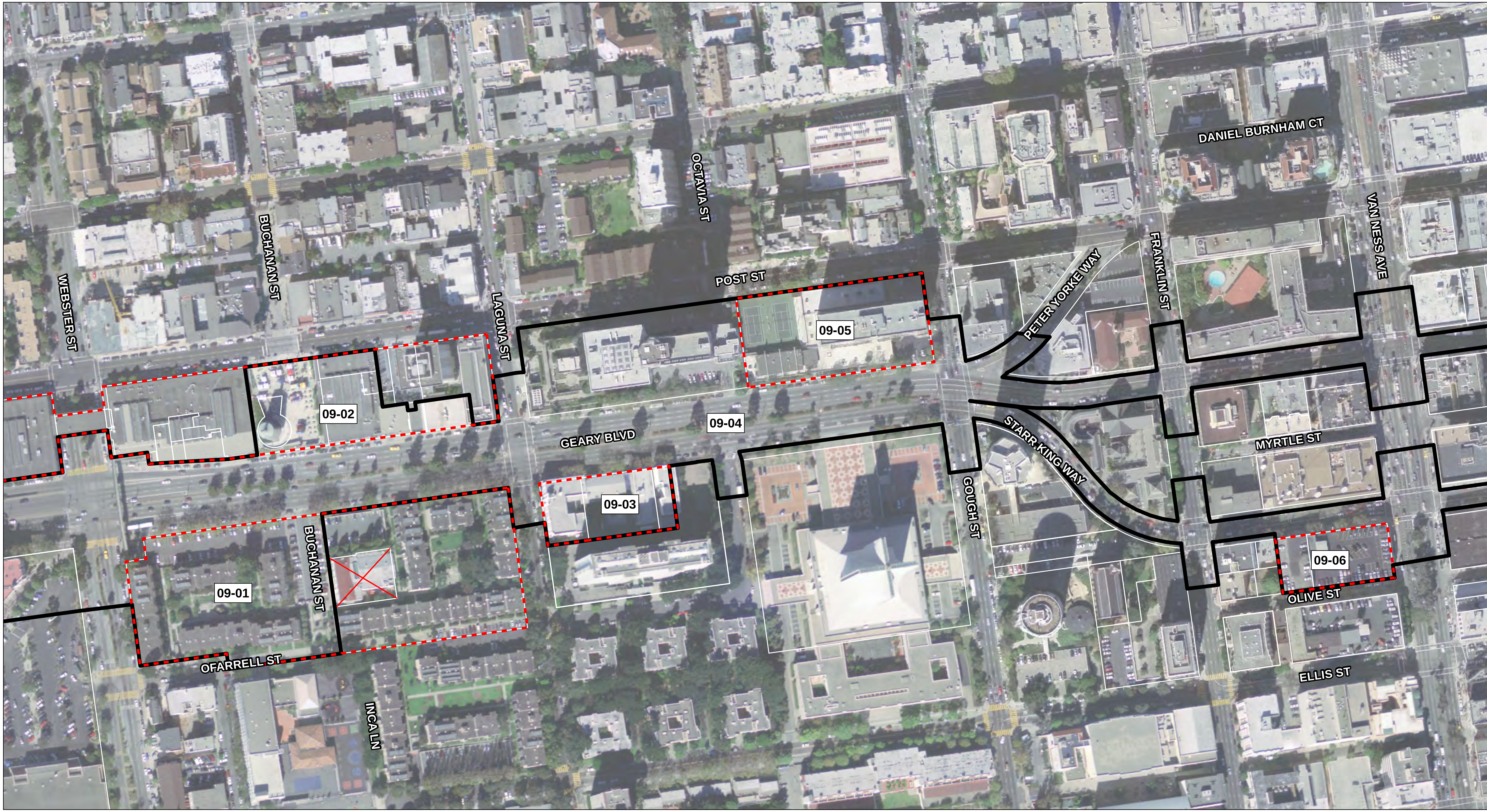
1:2,400 1 Inch = 200 Feet

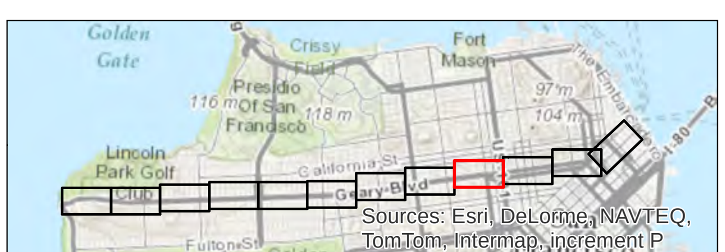
N

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/28/2014

Data Sources: Layout: 3/27/2013; streets & APNs: sfgov.org/site/gis; aerial: 2007.





- Architectural APE
- Excluded from APE
- Parcel Boundaries
- Map Reference Number
- Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

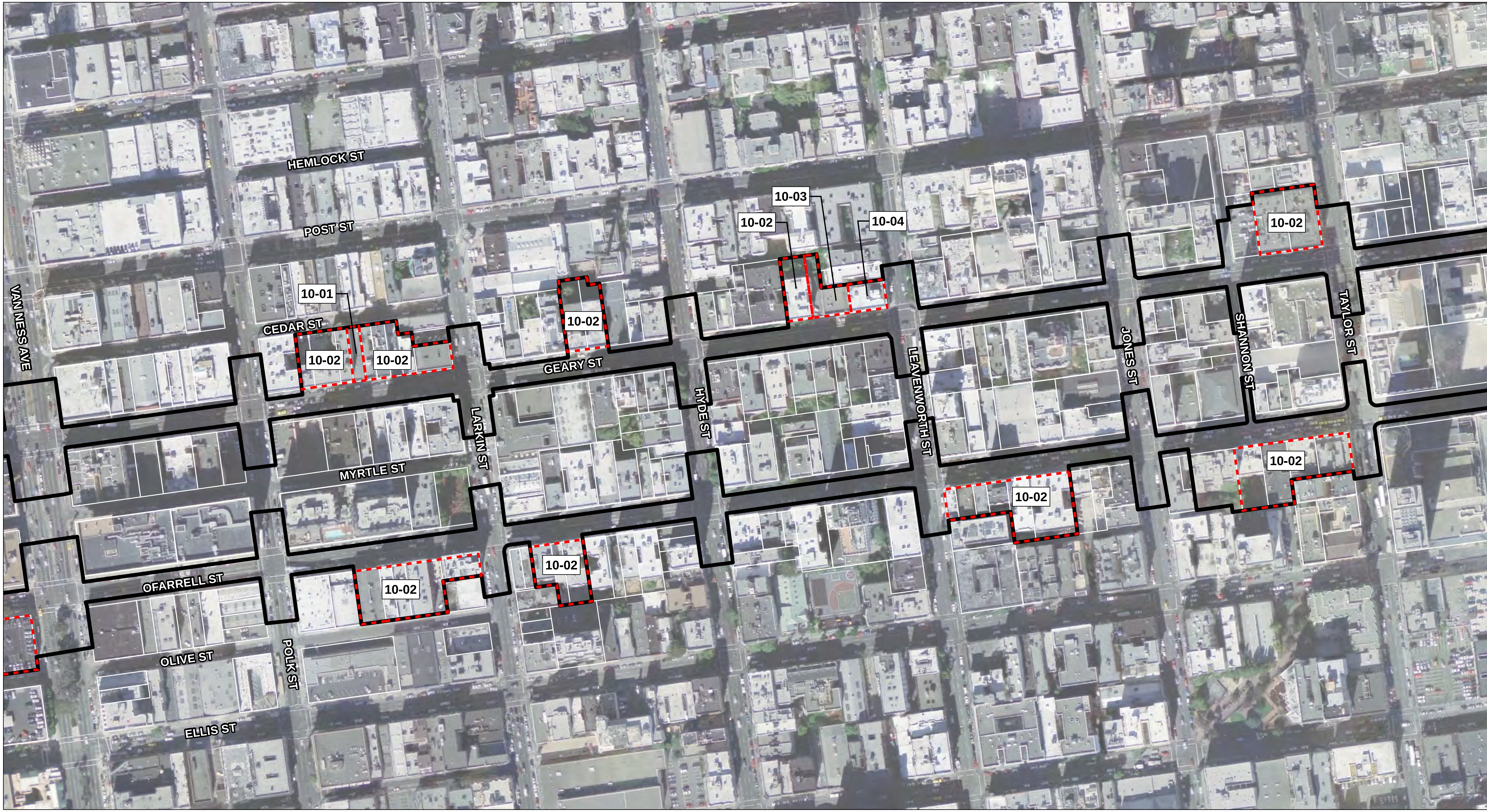
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/28/2014

Data Sources: Layout: 3/27/2013; streets & APNs: sfgov.org/site/gis; aerial: 2007.



Architectural APE
Excluded from APE
Parcel Boundaries
Map Reference Number
Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

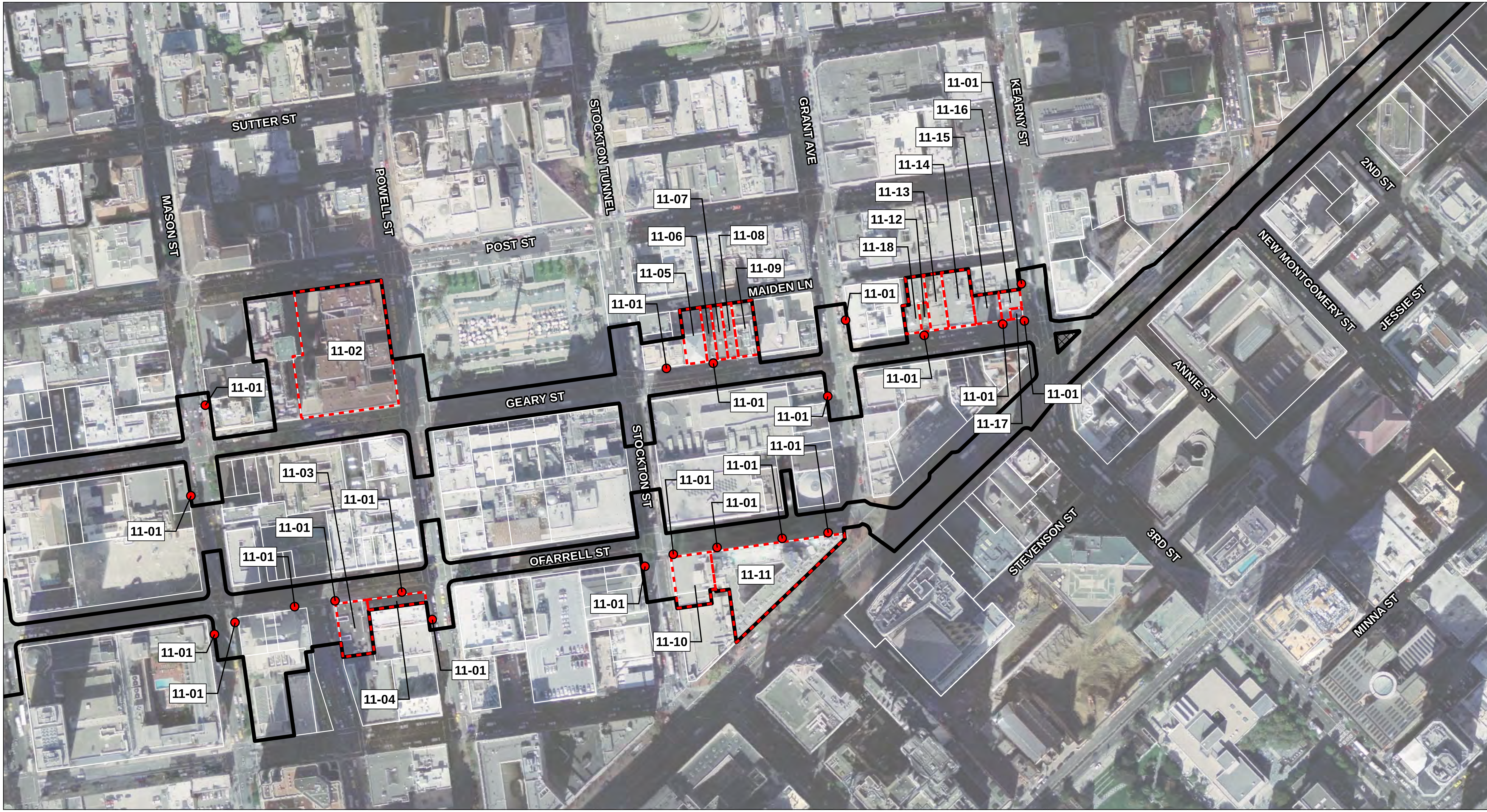
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/26/2014

Data Sources: Layout: 3/27/2013; streets & APNs: sfgov.org/site/gis; aerial: 2007.



Architectural APE
Excluded from APE
Parcel Boundaries
Map Reference Number
Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

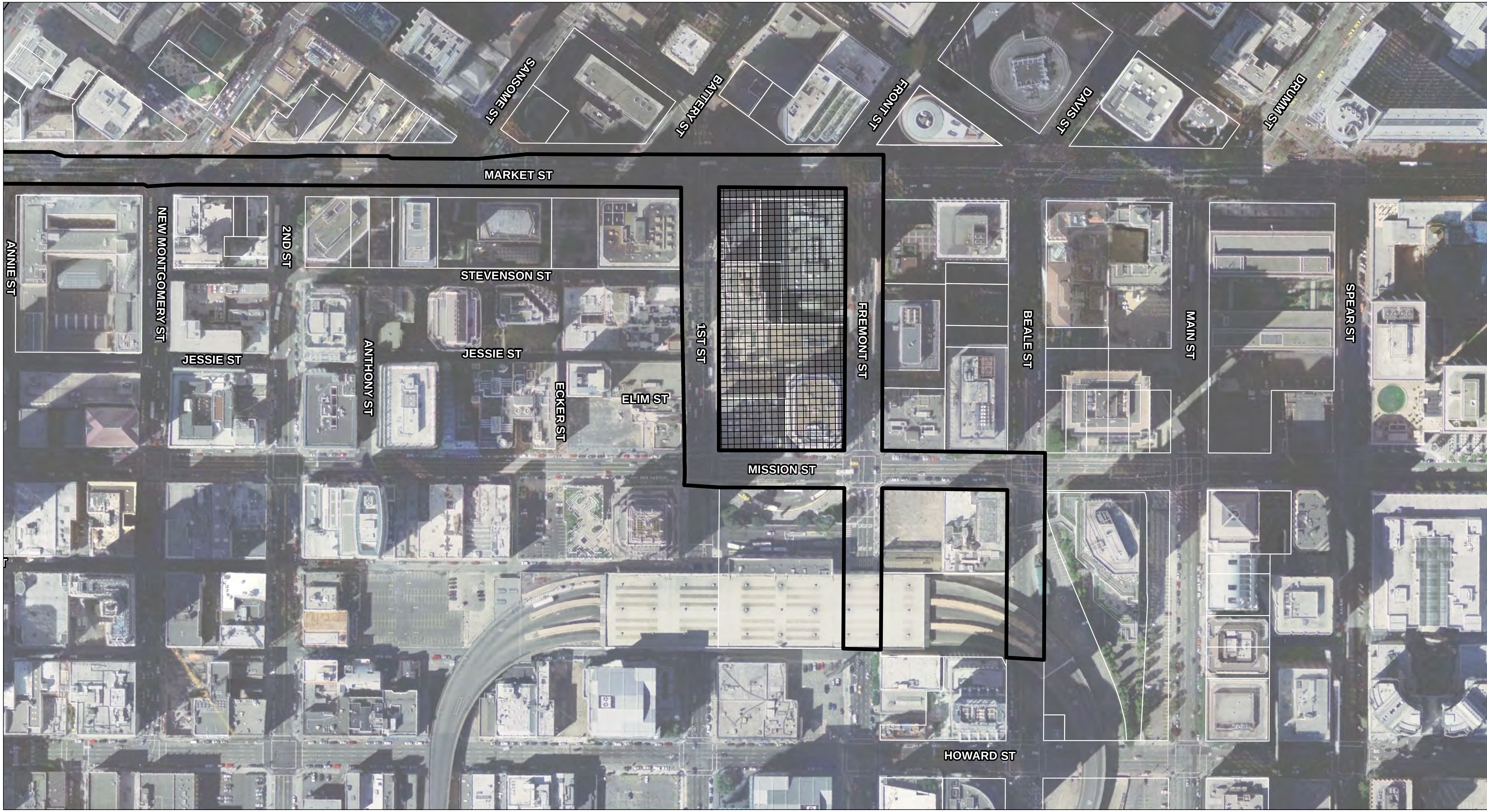
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Architectural APE

Date: 2/26/2014

Data Sources: Layout: 3/27/2013;
streets & APNs: sfgov.org/site/gis; aerial: 2007.



Architectural APE
Excluded from APE
Parcel Boundaries
Map Reference Number
Golden Triangle Light Standards (approximate locations)

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

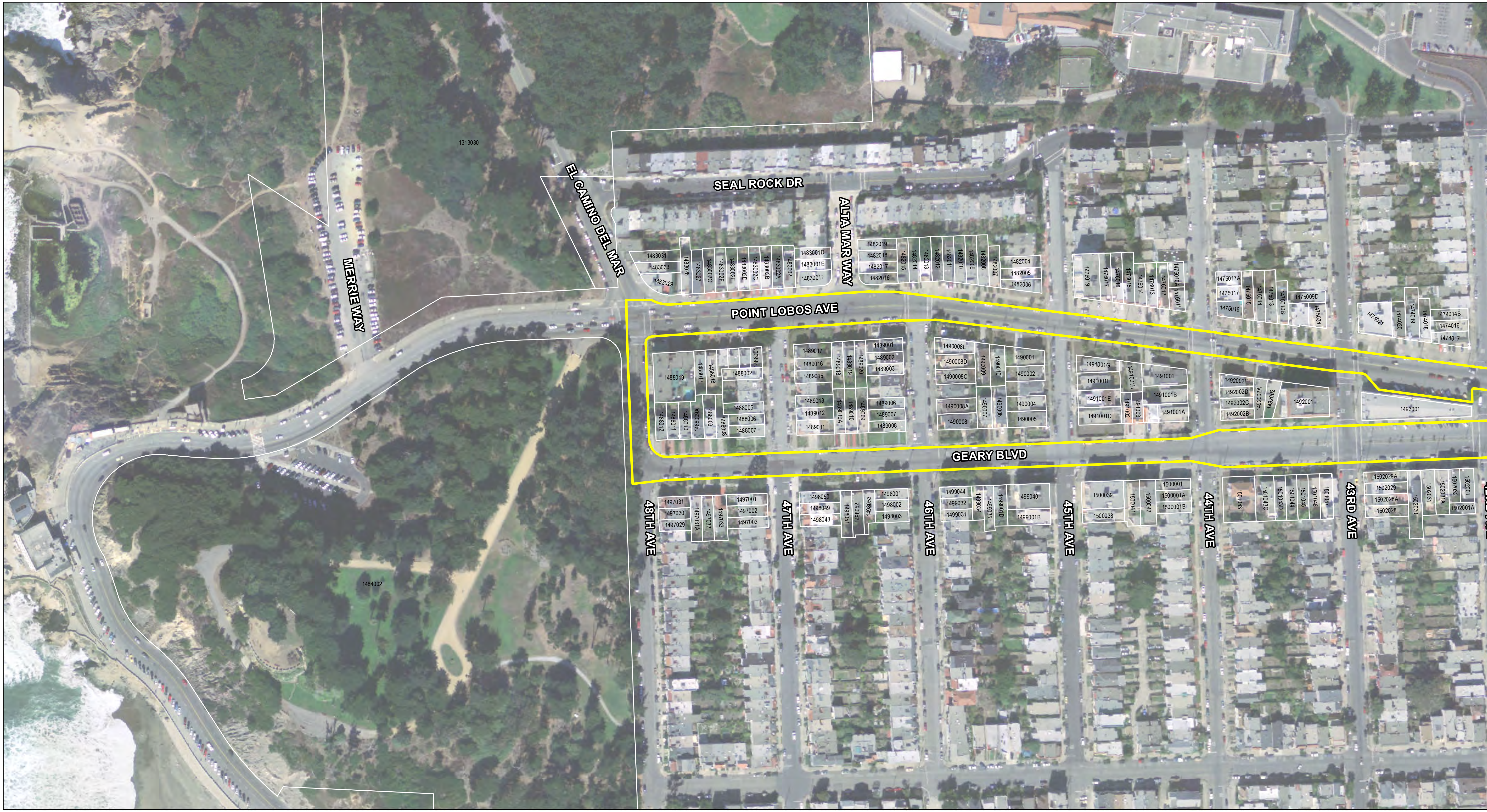
Geary Bus Rapid Transit Project
Architectural APE

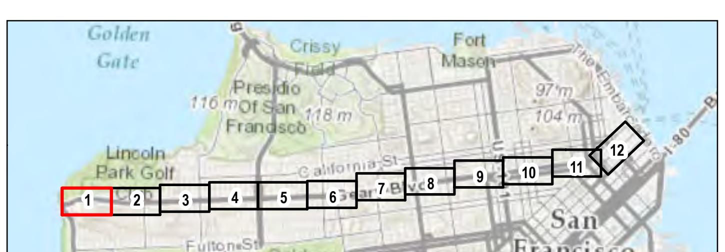
Date: 2/26/2014

Data Sources: Layout: 3/27/2013;
streets & APNs: sfgov.org/site/gis; aerial: 2007.

Archaeological APE

This page intentionally left blank.





Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed Local Stop	Preserved Local Stop
Proposed Spillover Stop	Roadway and Pavement Markings
BRT Bus Layover	
Environmental Study Limits	Parcel Boundaries

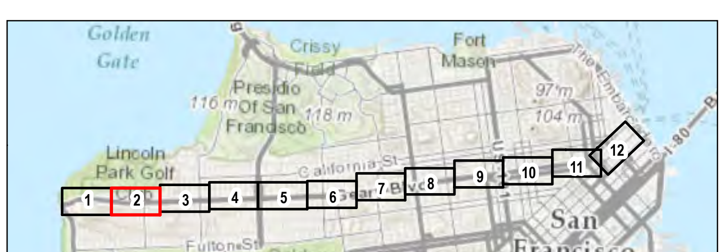
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013



Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed Local Stop	Preserved Local Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

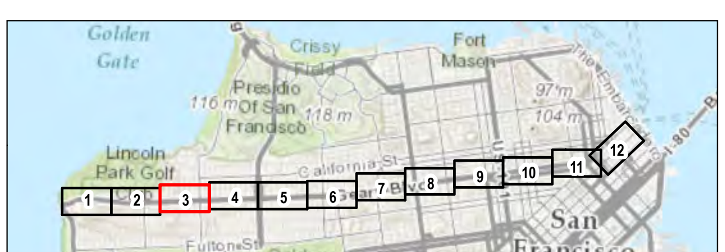
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013



Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed Local Stop	Preserved Local Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

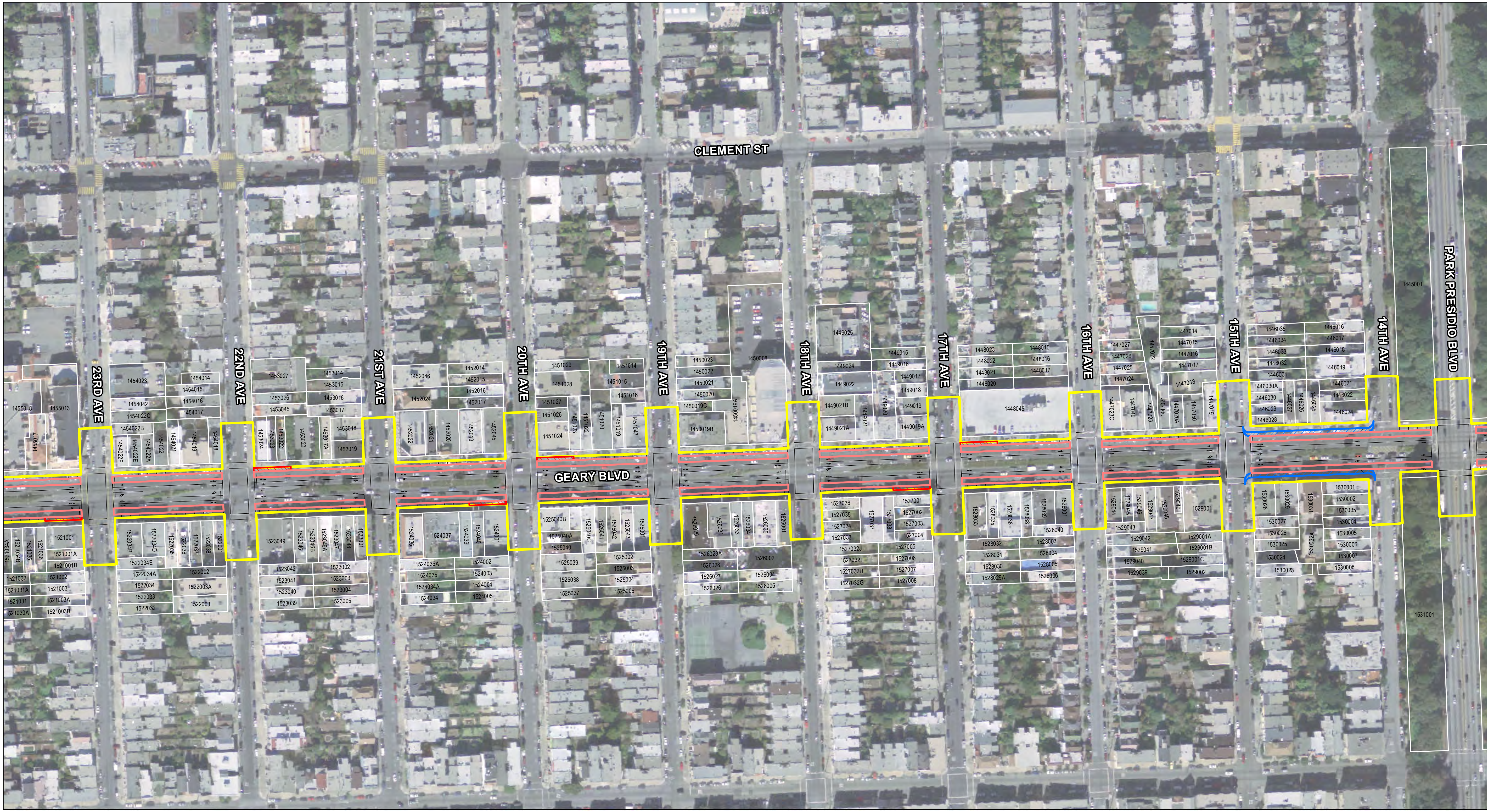
0 100 200 300 400 Feet

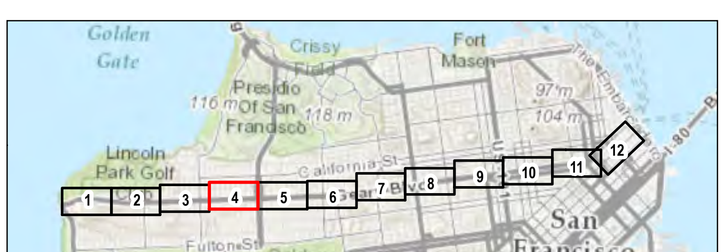
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

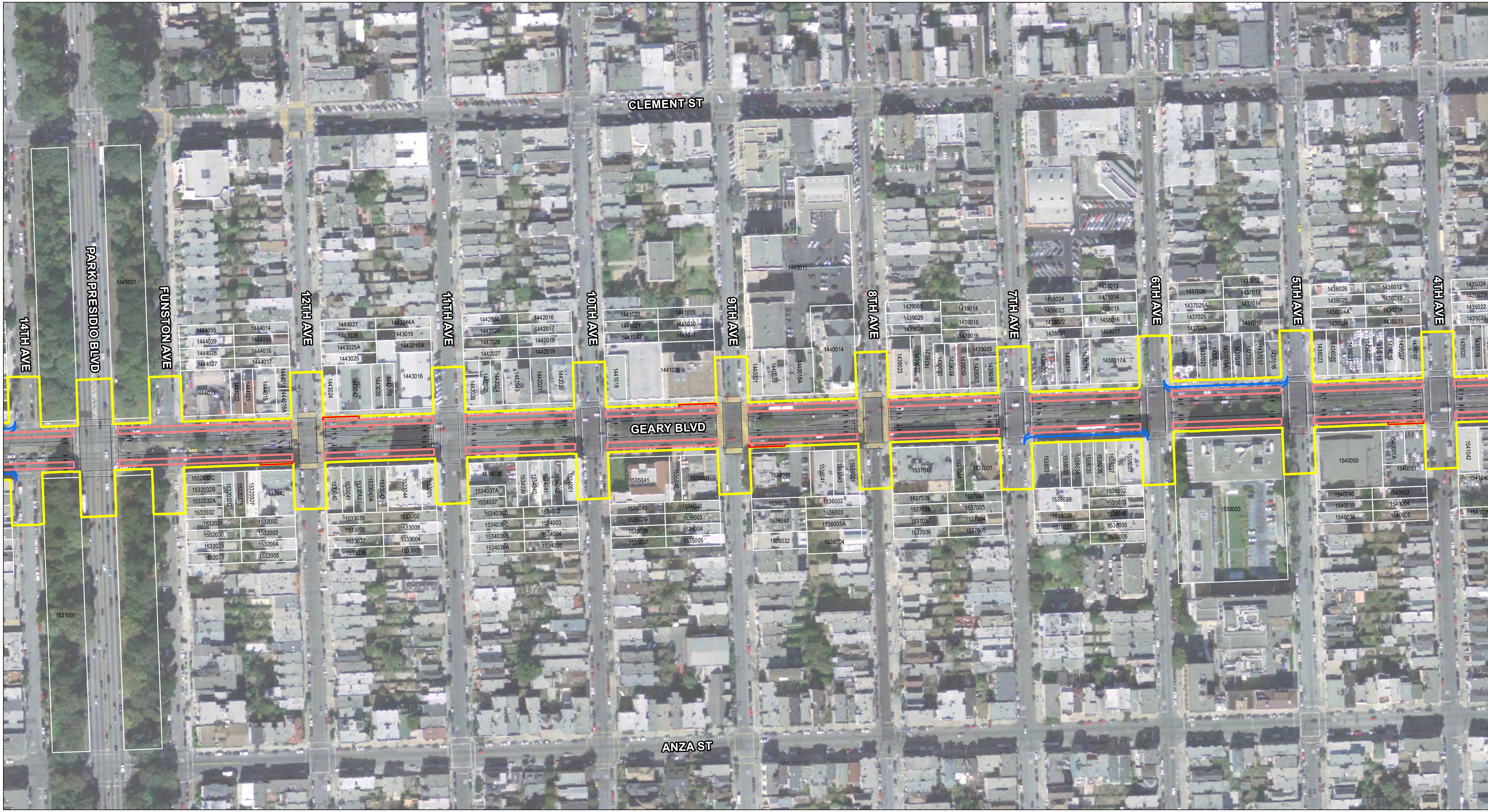
0 100 200 300 400 Feet

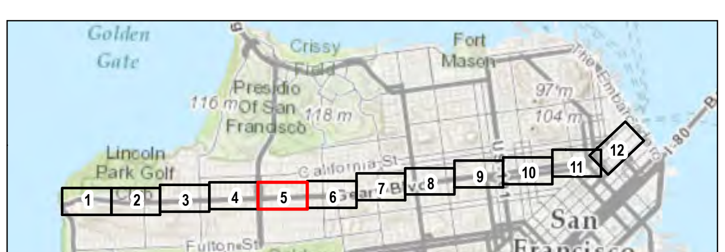
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013





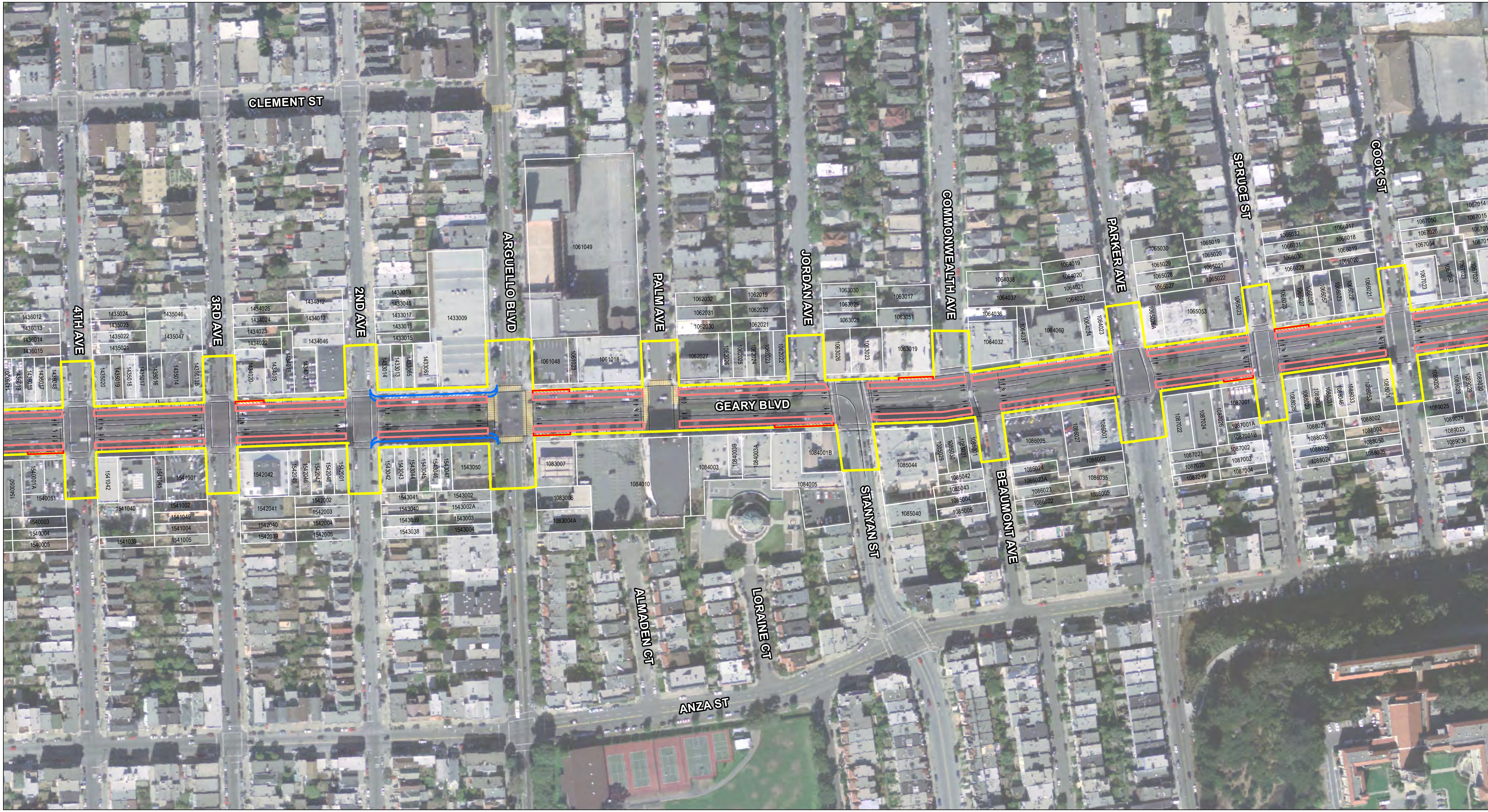
Proposed Bus-Only Lane
Proposed BRT/Local Stop
Proposed Local Stop
Proposed Spillover Stop
BRT Bus Layover
Proposed Median
Proposed Solid Median
Preserved Local Stop
Roadway and Pavement Markings
Environmental Study Limits
Parcel Boundaries

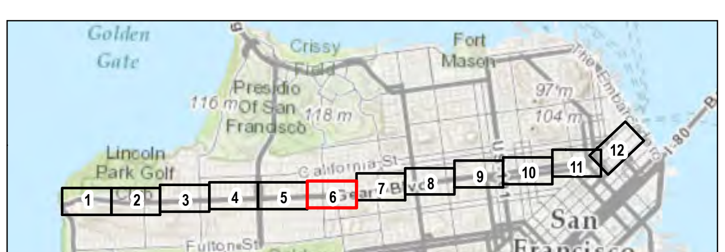
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013





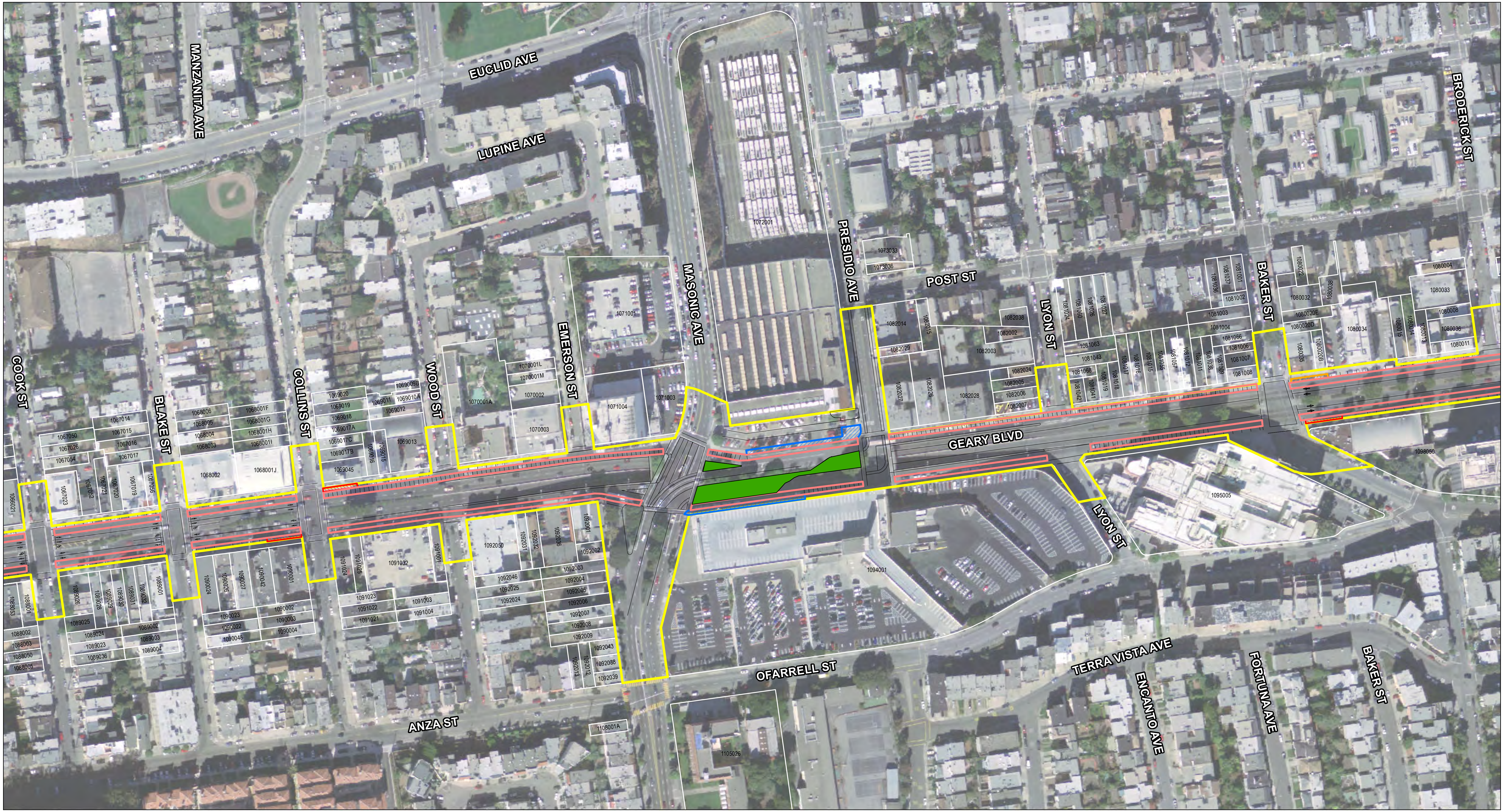
- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

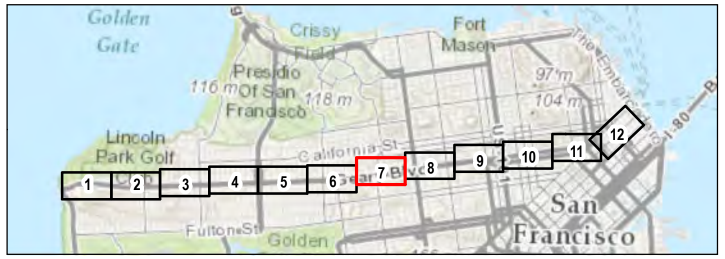
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

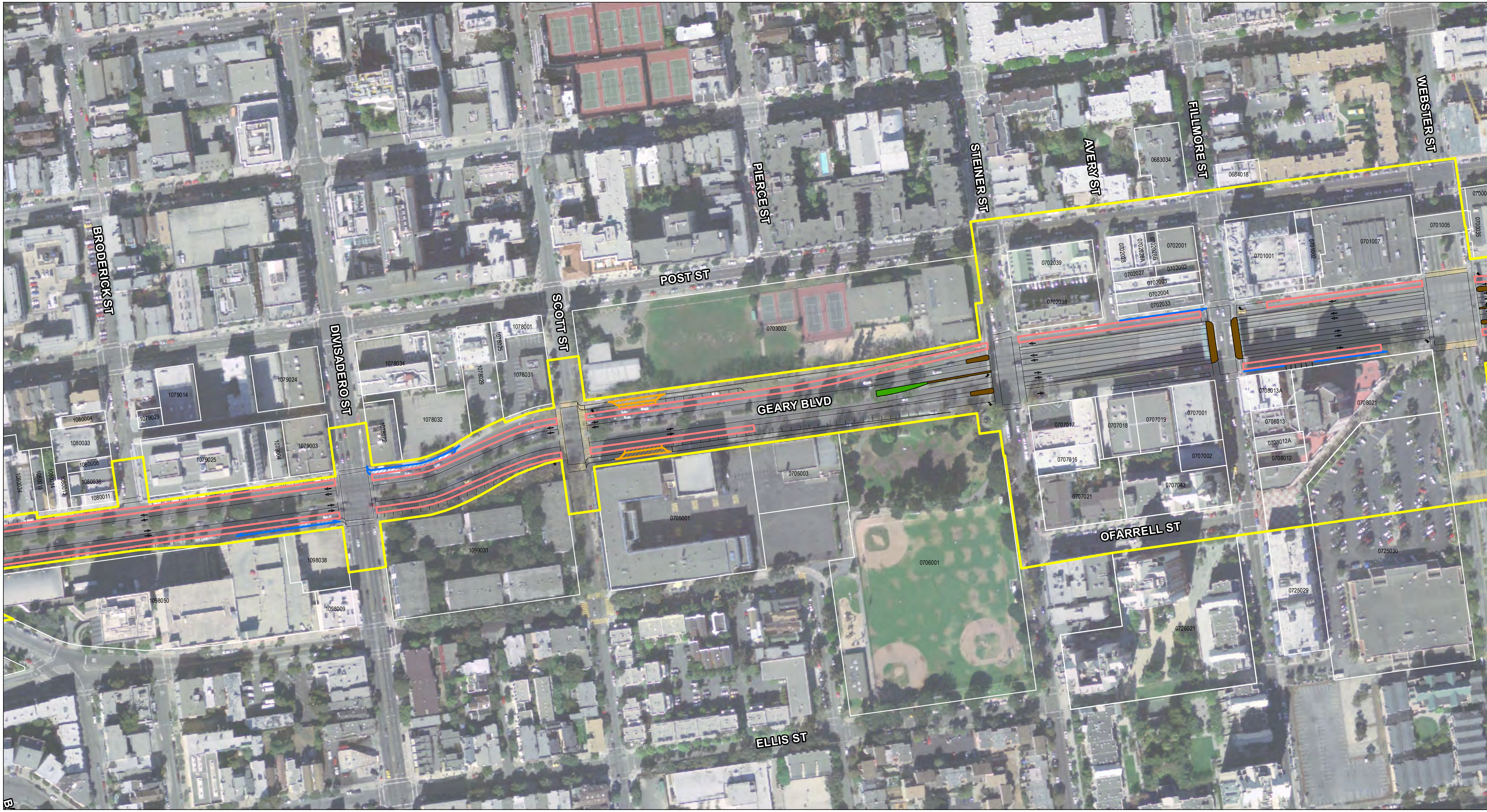
0 100 200 300 400 Feet

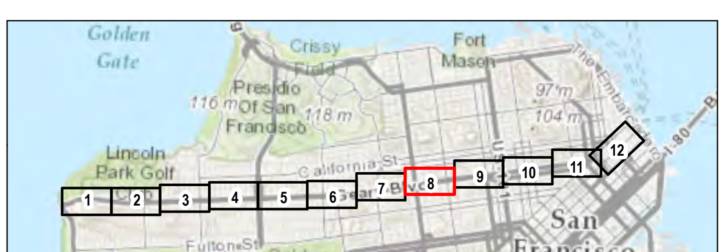
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013





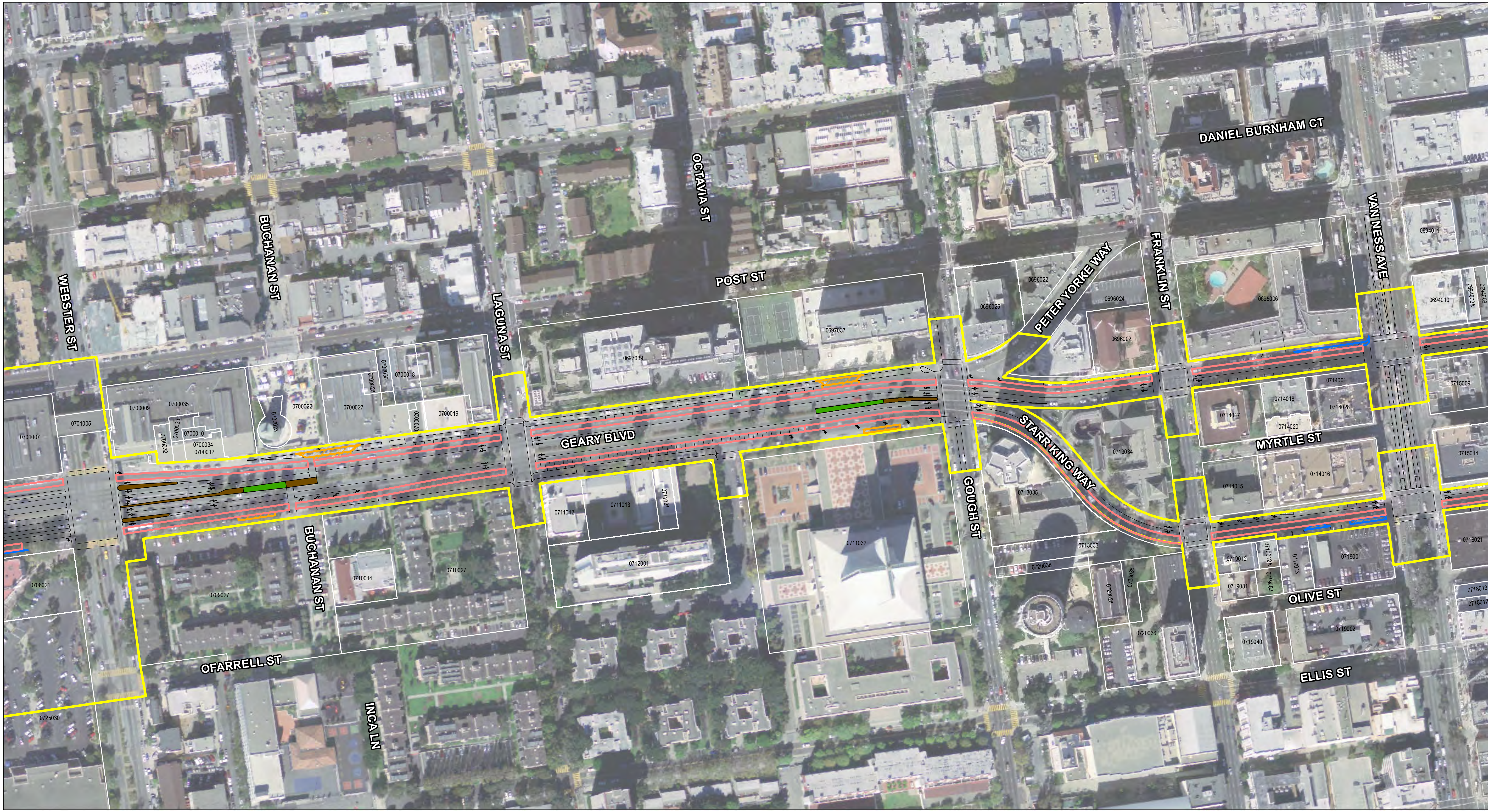
Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed Local Stop	Preserved Local Stop
Proposed Spillover Stop	Roadway and Pavement Markings
BRT Bus Layover	
Environmental Study Limits	
Parcel Boundaries	

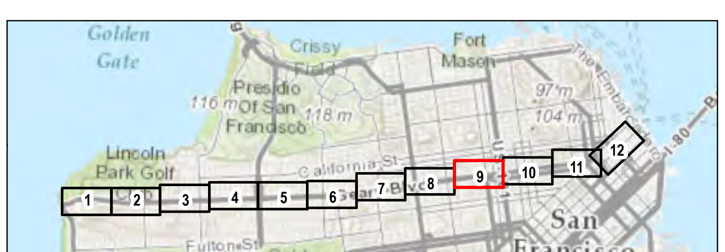
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013





Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed Local Stop	Preserved Local Stop
Proposed Spillover Stop	Roadway and Pavement Markings
BRT Bus Layover	
Environmental Study Limits	Parcel Boundaries

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013

Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed Local Stop	Preserved Local Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

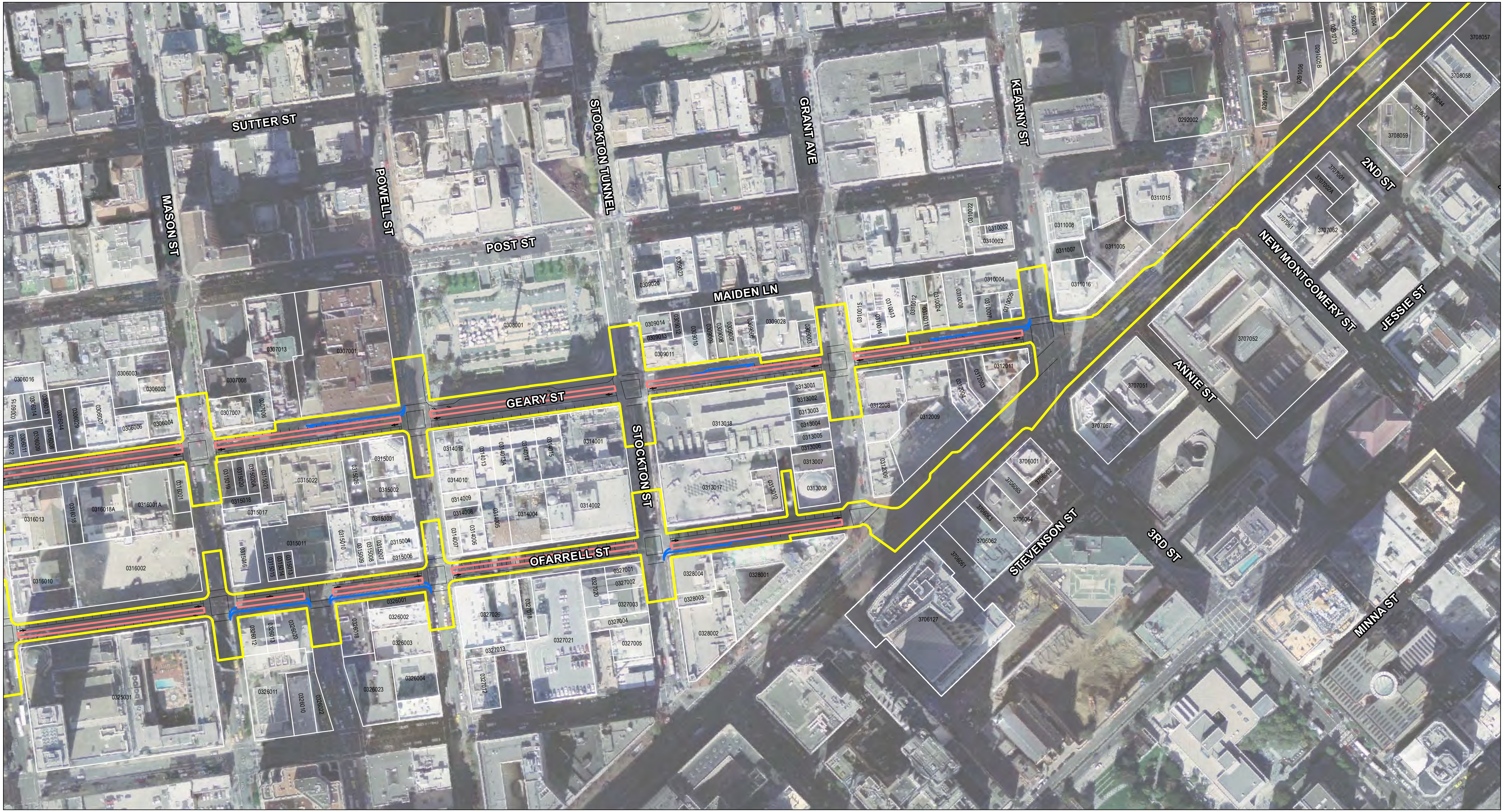
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013



Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed Local Stop	Preserved Local Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

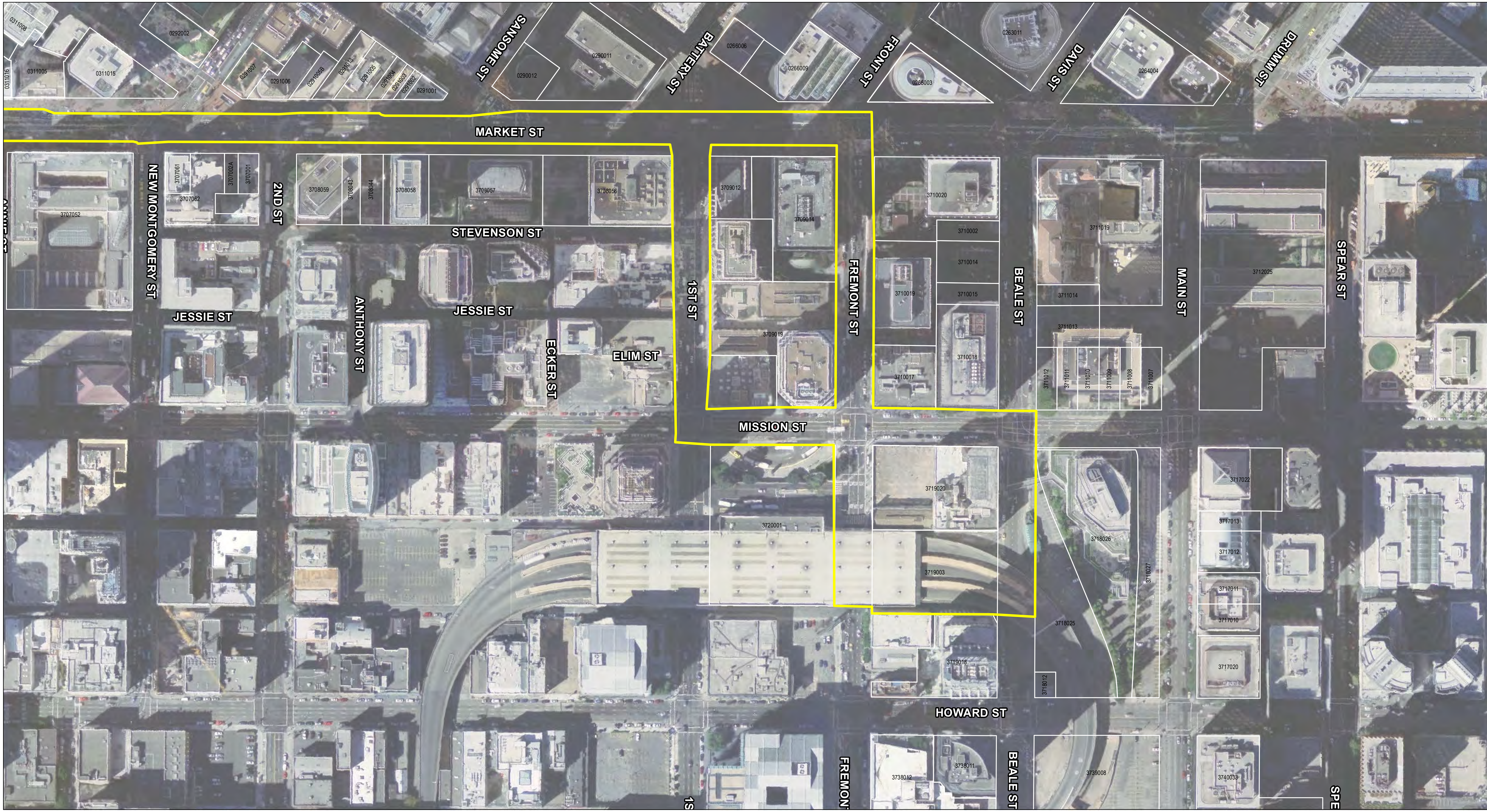
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013



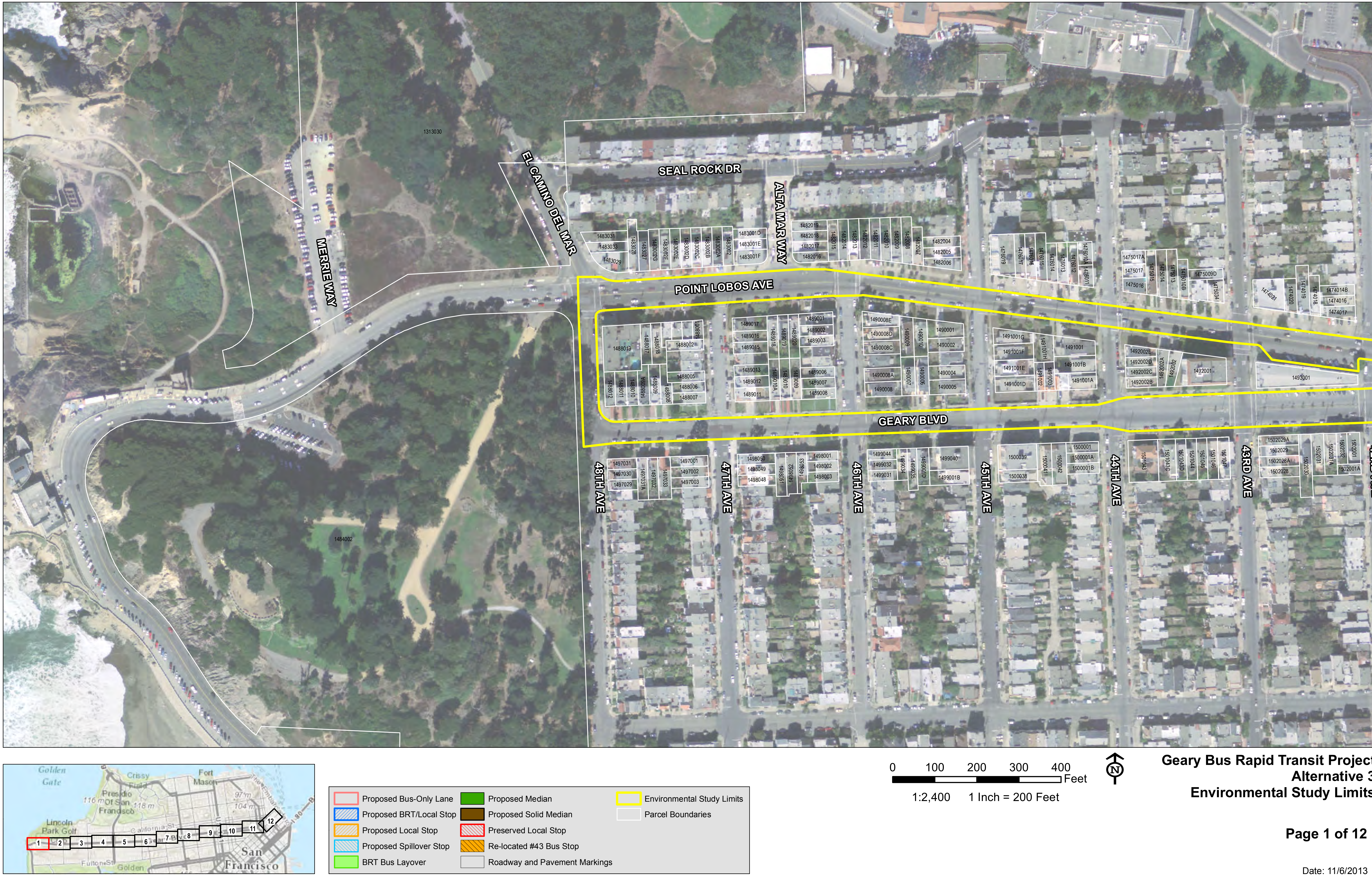
Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed Local Stop	Preserved Local Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

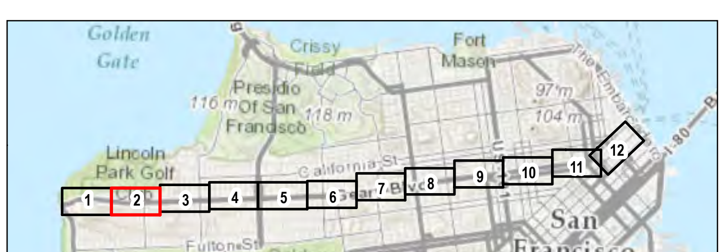
Geary Bus Rapid Transit Project
Alternative 2
Environmental Study Limits

Date: 11/6/2013



Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013



- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

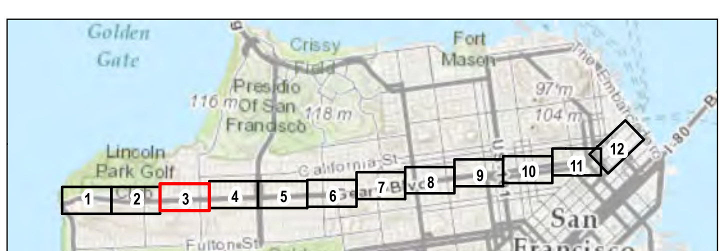
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013



- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

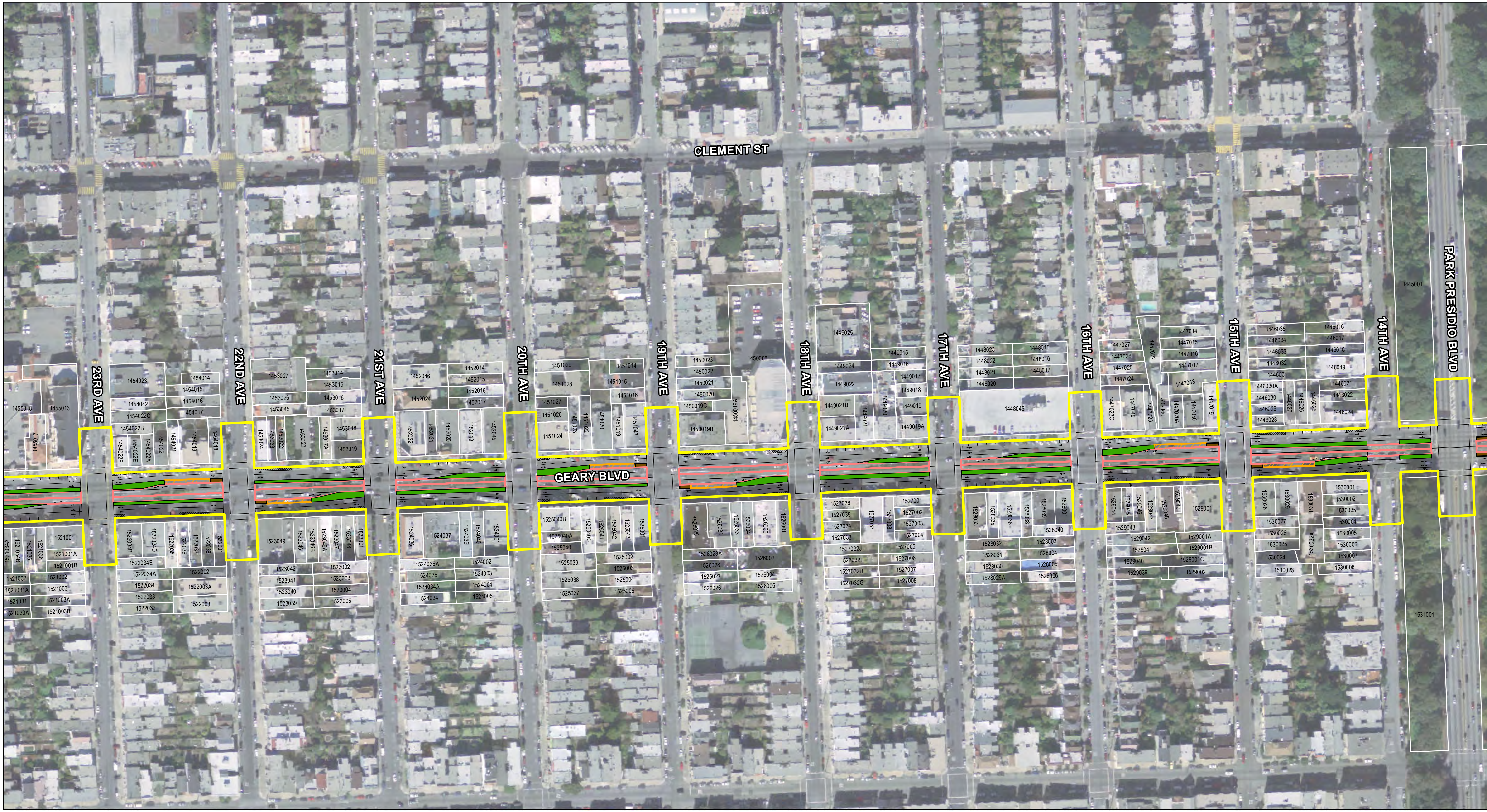
0 100 200 300 400 Feet

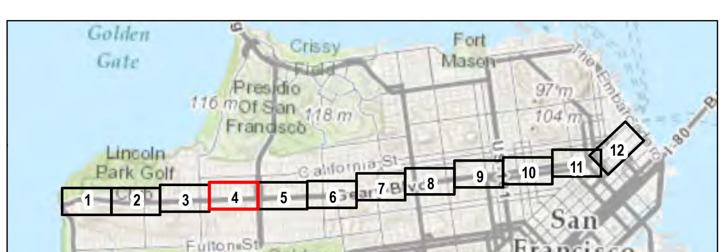
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013





Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed Local Stop	Preserved Local Stop
Proposed Spillover Stop	Re-located #43 Bus Stop
BRT Bus Layover	Roadway and Pavement Markings
Environmental Study Limits	Parcel Boundaries

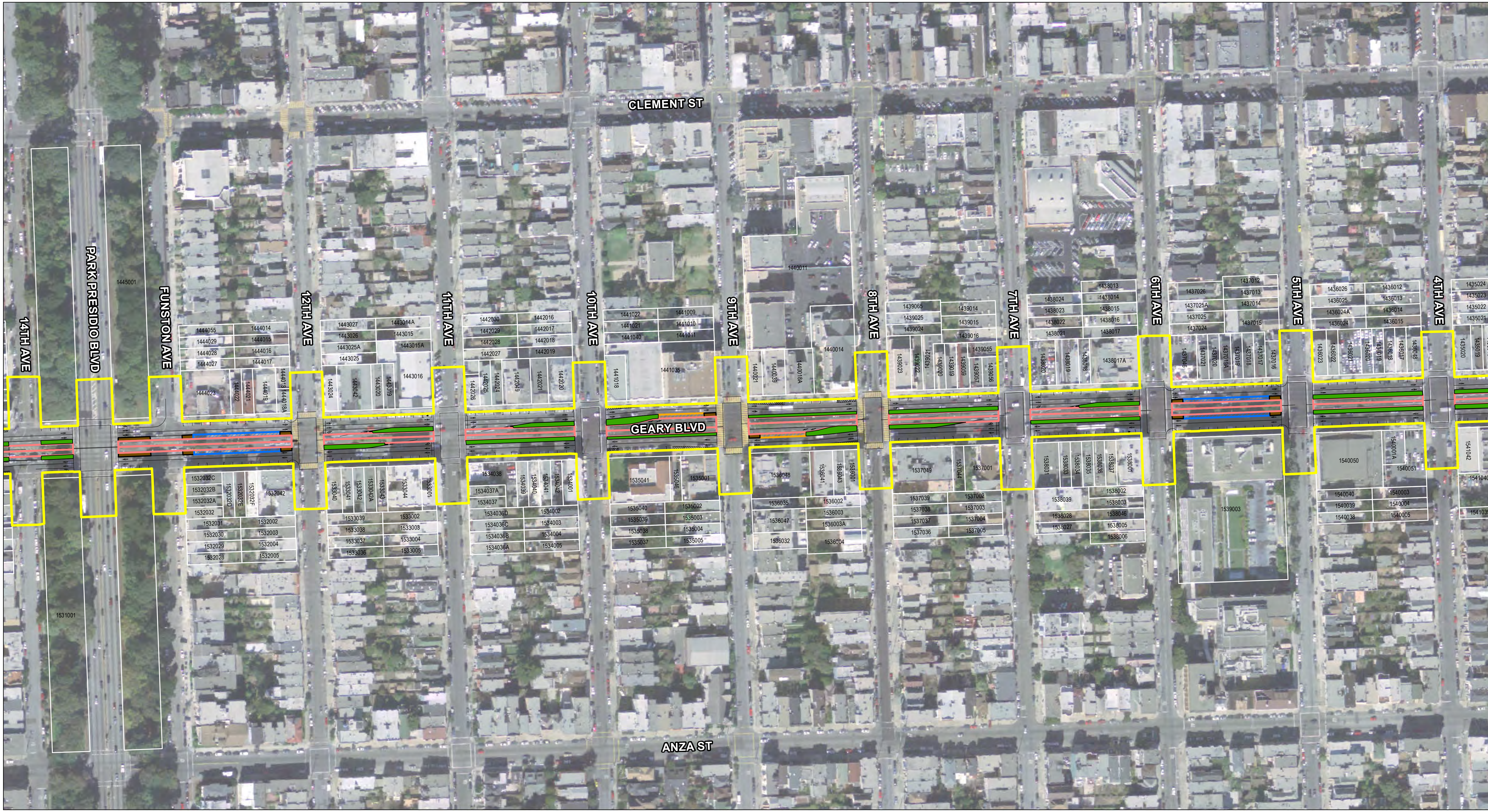
0 100 200 300 400 Feet

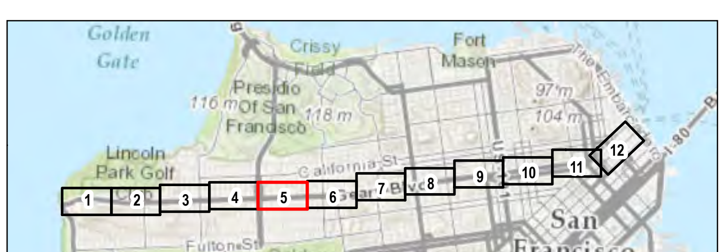
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

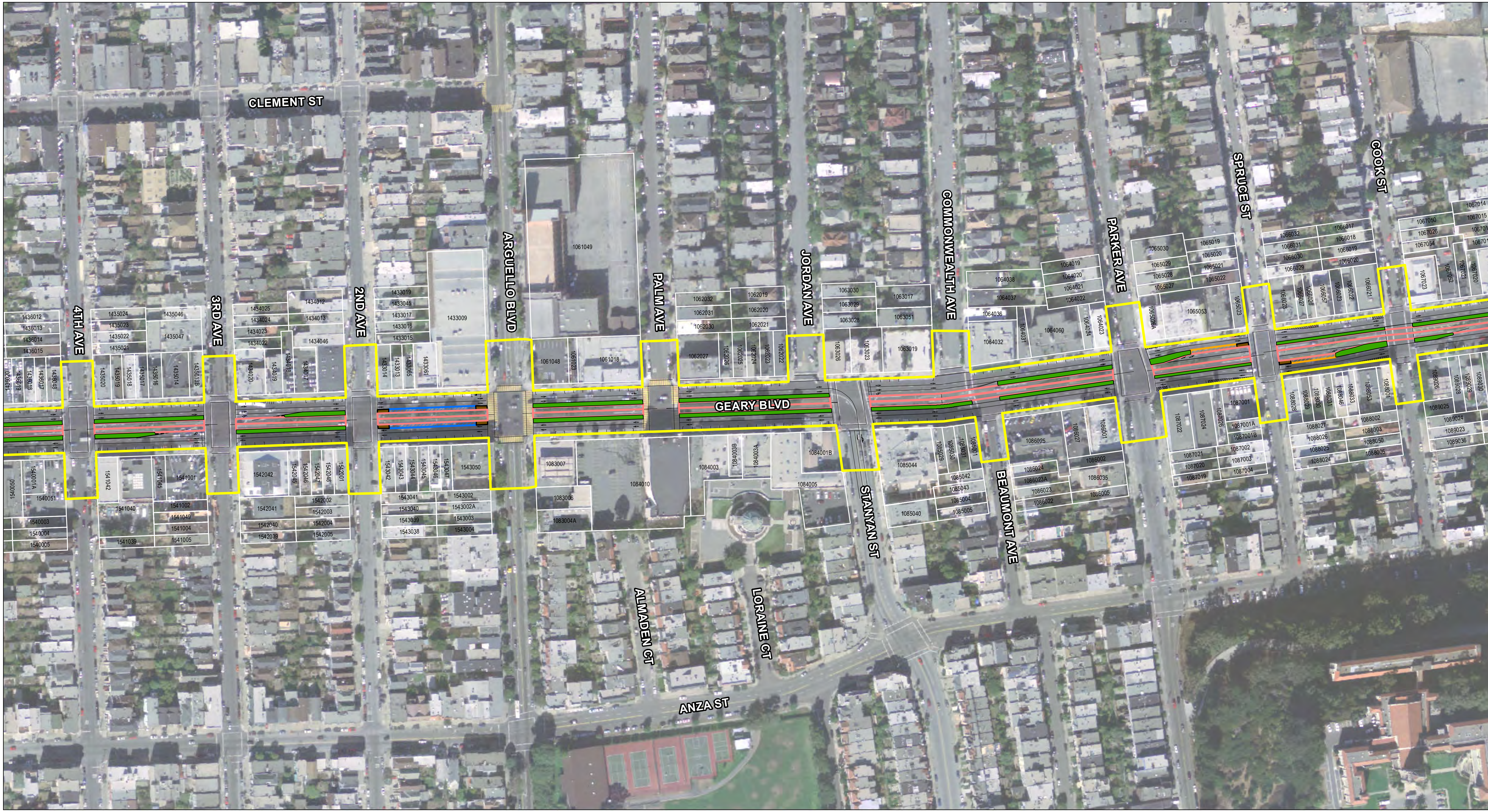
0 100 200 300 400 Feet

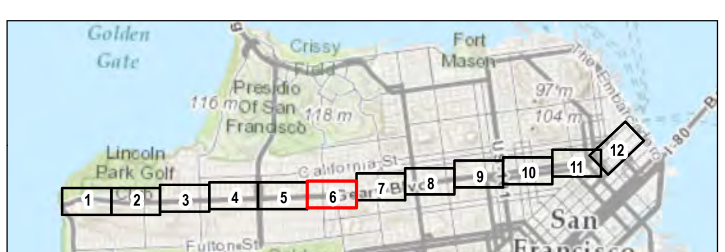
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013





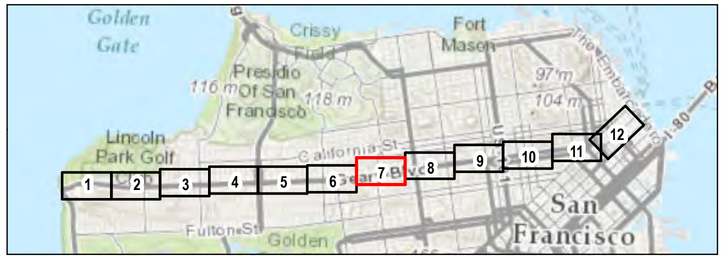
Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed Local Stop	Preserved Local Stop	
Proposed Spillover Stop	Re-located #43 Bus Stop	
BRT Bus Layover	Roadway and Pavement Markings	

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013



- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

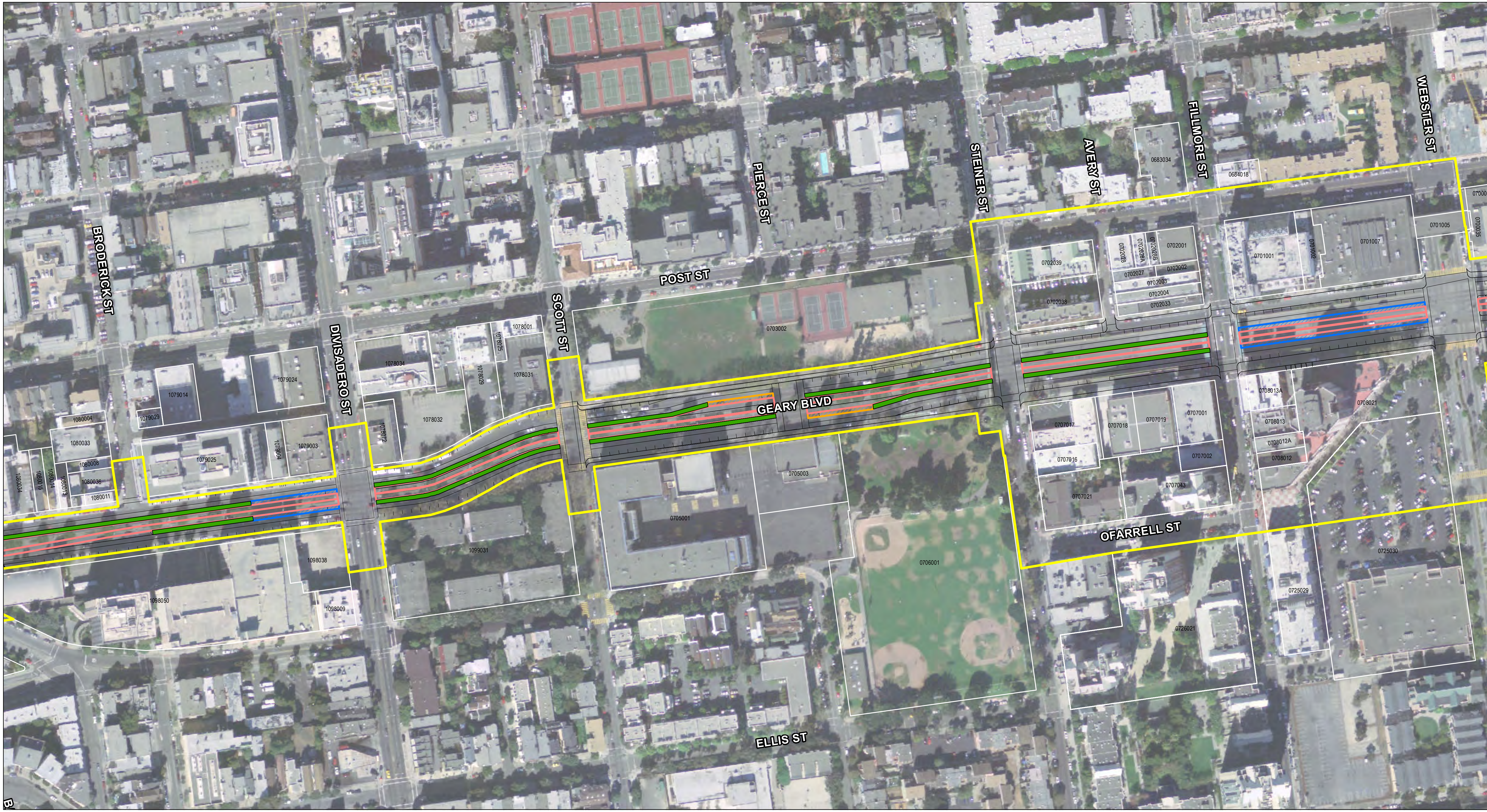
0 100 200 300 400 Feet

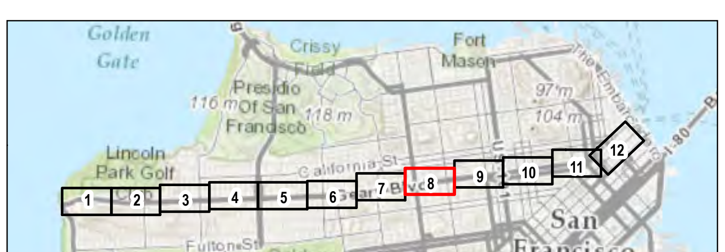
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013





Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed Local Stop	Preserved Local Stop	
Proposed Spillover Stop	Re-located #43 Bus Stop	
BRT Bus Layover	Roadway and Pavement Markings	

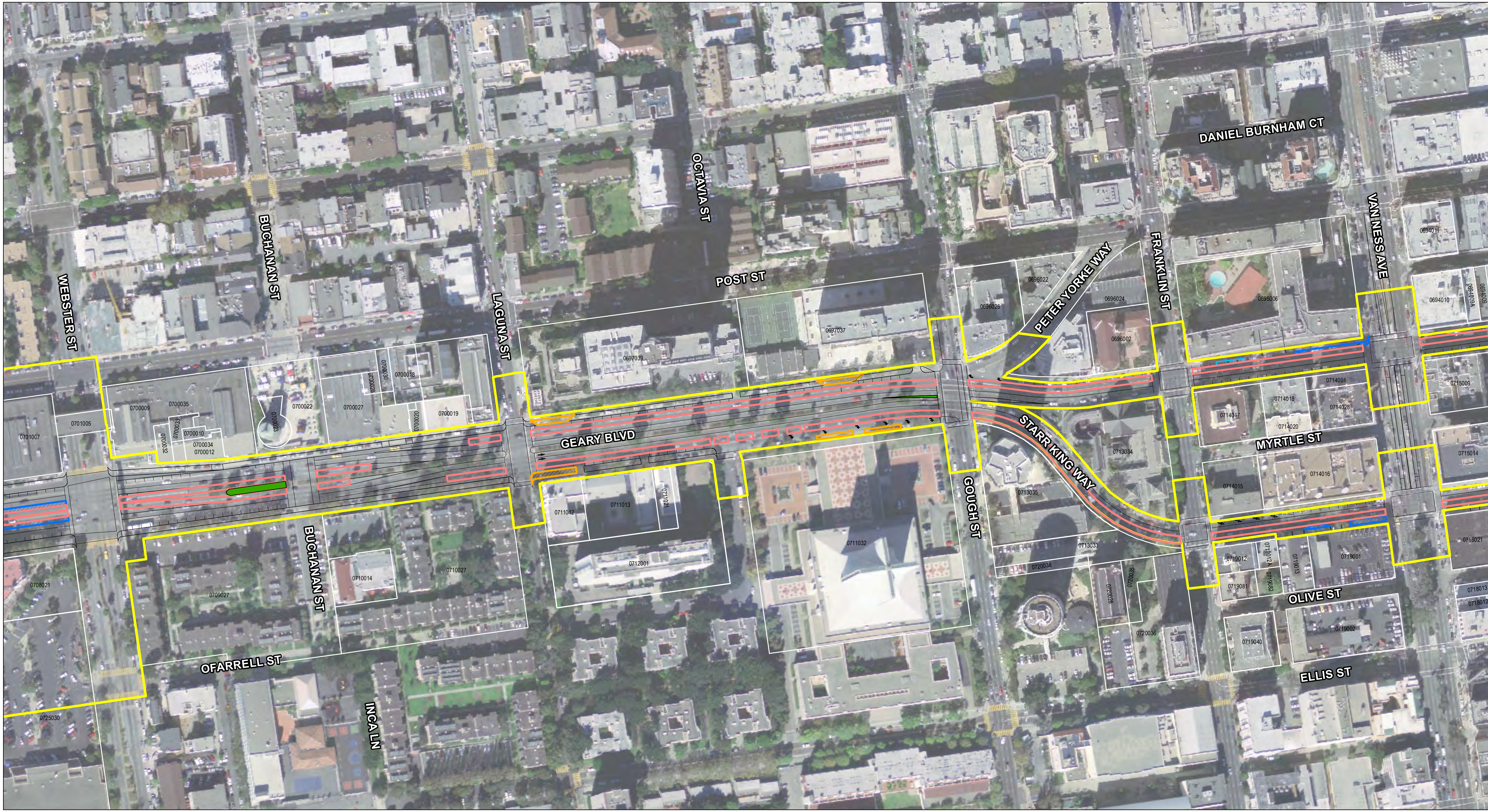
0 100 200 300 400 Feet

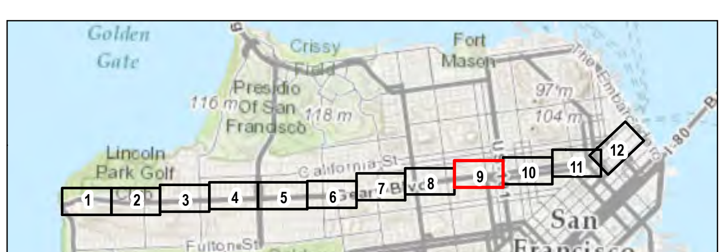
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013





Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed Local Stop	Preserved Local Stop
Proposed Spillover Stop	Re-located #43 Bus Stop
BRT Bus Layover	Roadway and Pavement Markings
Environmental Study Limits	Parcel Boundaries

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013

Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed Local Stop	Preserved Local Stop
Proposed Spillover Stop	Re-located #43 Bus Stop
BRT Bus Layover	Roadway and Pavement Markings
Environmental Study Limits	Parcel Boundaries

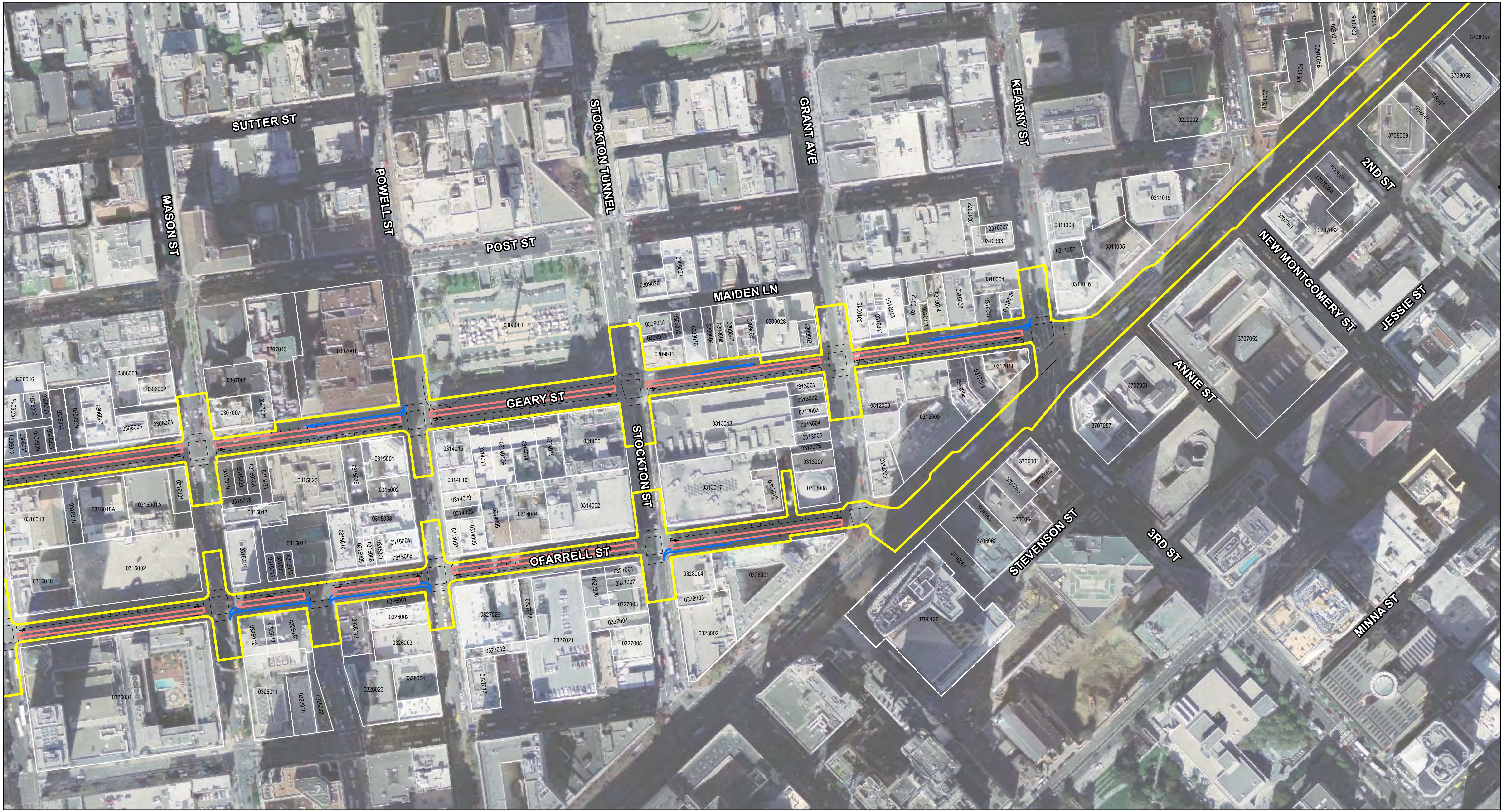
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013



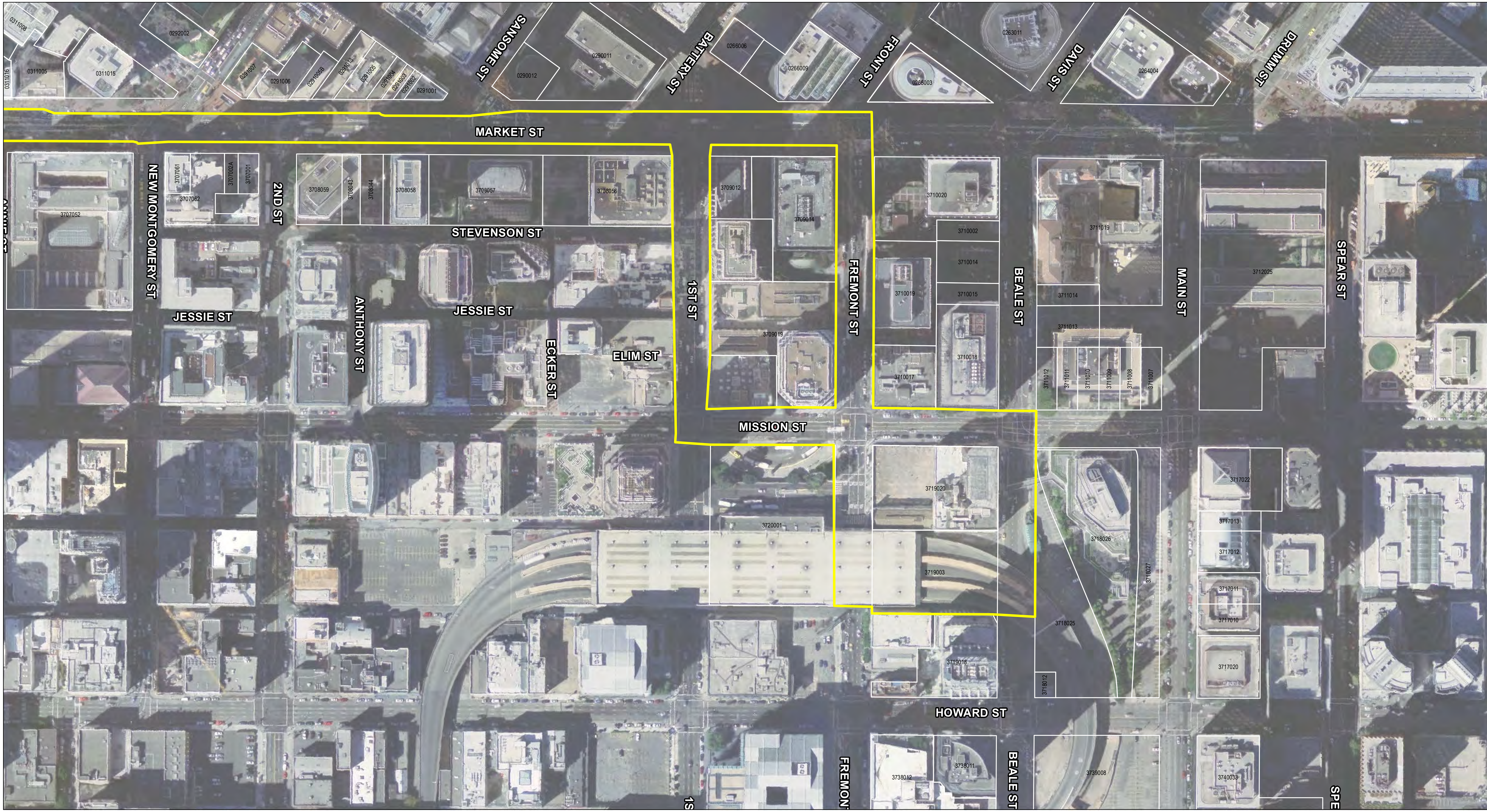
Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed Local Stop	Preserved Local Stop
Proposed Spillover Stop	Re-located #43 Bus Stop
BRT Bus Layover	Roadway and Pavement Markings
Environmental Study Limits	Parcel Boundaries

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013



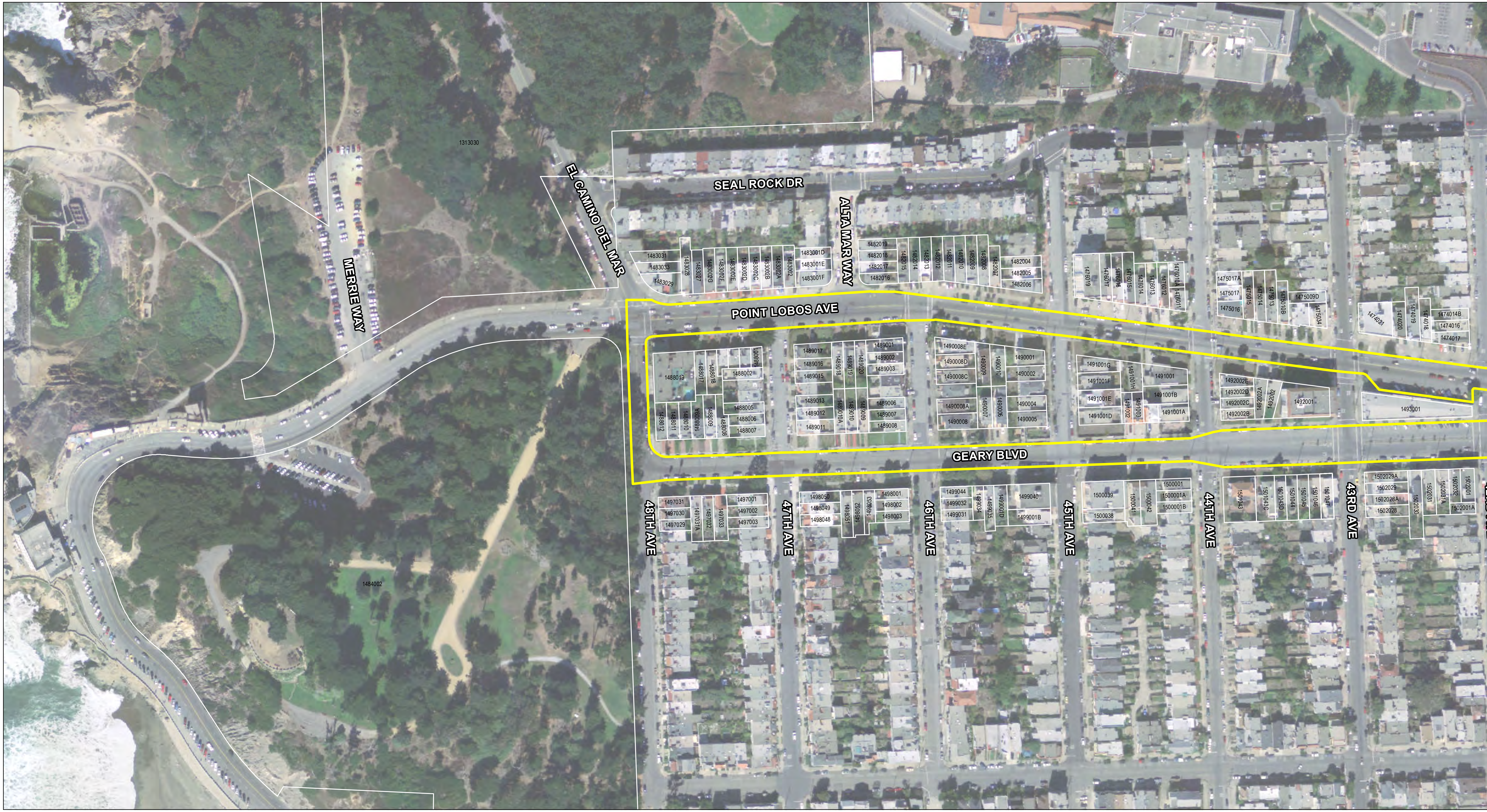
Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed Local Stop	Preserved Local Stop
Proposed Spillover Stop	Re-located #43 Bus Stop
BRT Bus Layover	Roadway and Pavement Markings
Environmental Study Limits	Parcel Boundaries

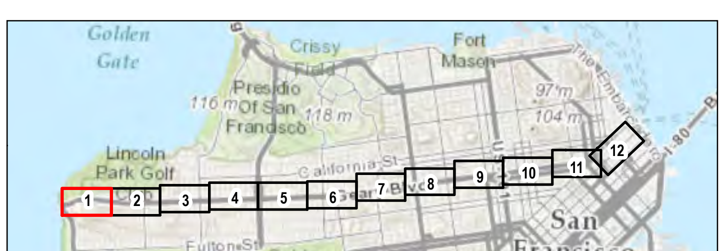
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 3
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

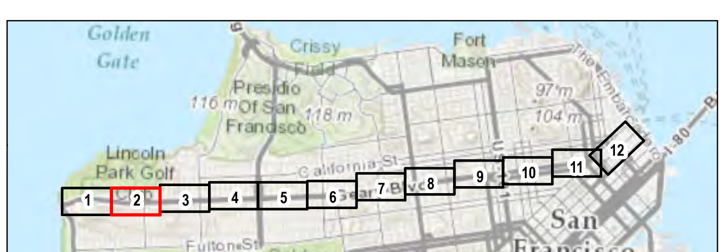
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013



Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed BRT Only Stop	Preserved Local Stop
Proposed Local Stop	Re-located #43 Bus Stop
Proposed Spillover Stop	Roadway and Pavement Markings
BRT Bus Layover	
Environmental Study Limits	
Parcel Boundaries	

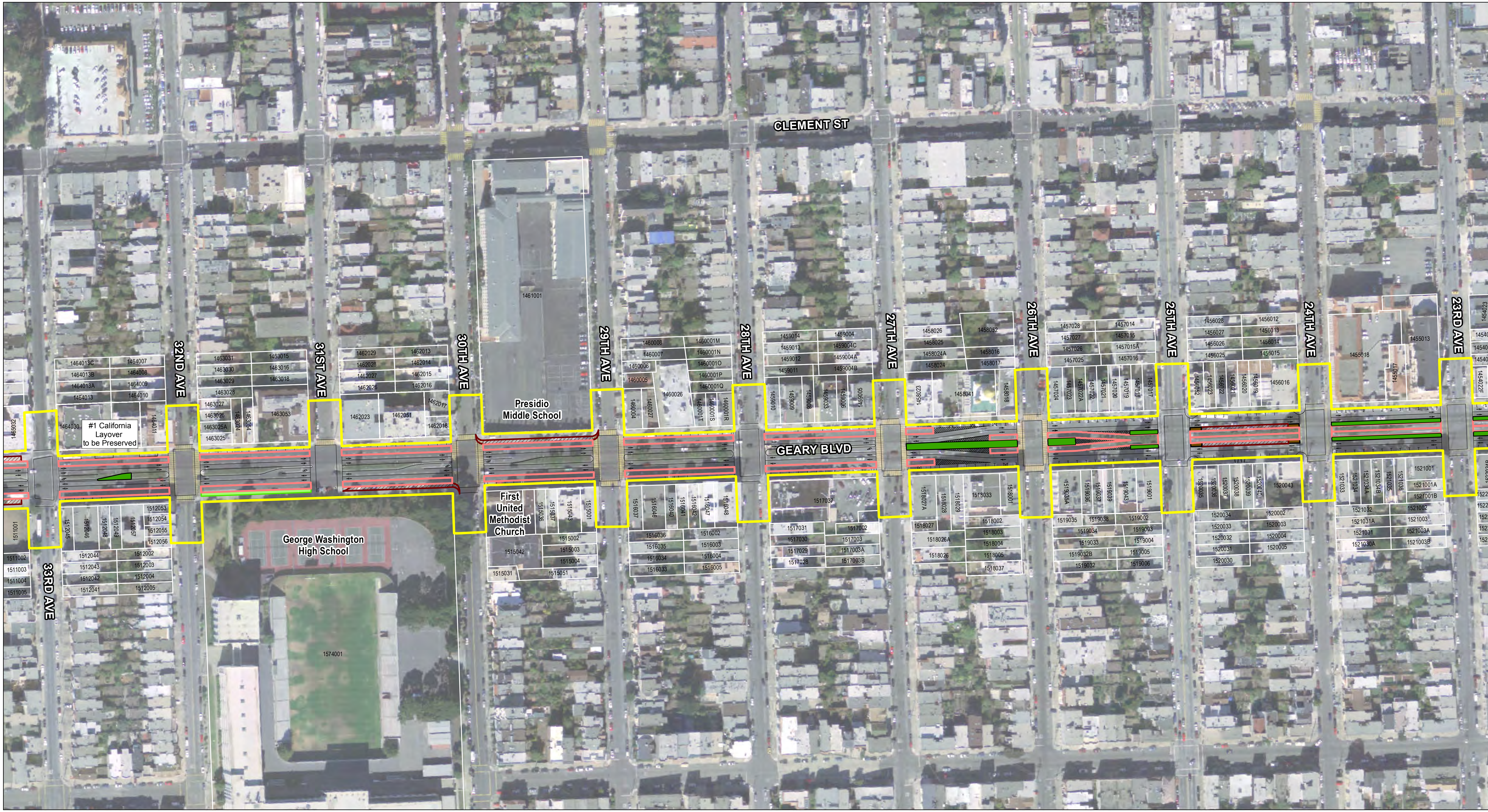
0 100 200 300 400 Feet

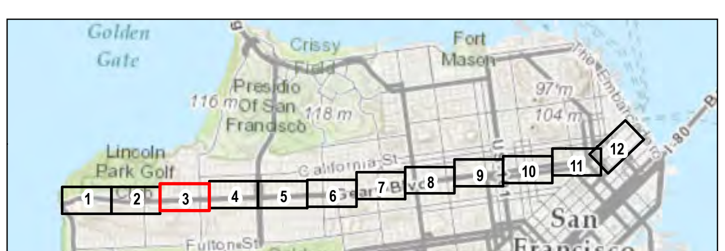
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed BRT Only Stop	Preserved Local Stop
Proposed Local Stop	Re-located #43 Bus Stop
Proposed Spillover Stop	Roadway and Pavement Markings
BRT Bus Layover	
Environmental Study Limits	
Parcel Boundaries	

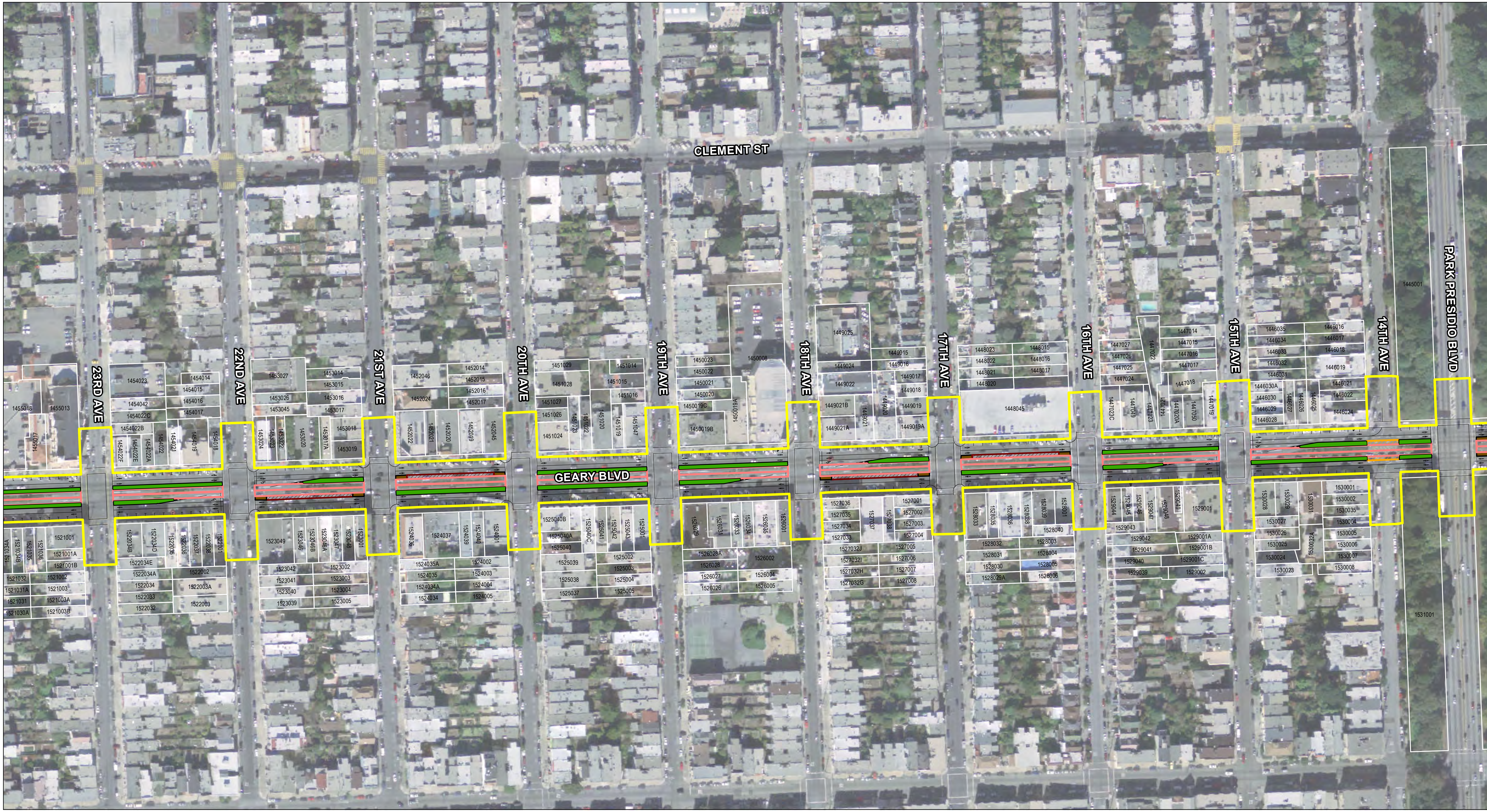
0 100 200 300 400 Feet

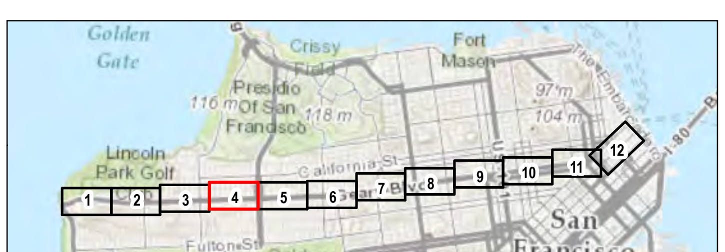
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





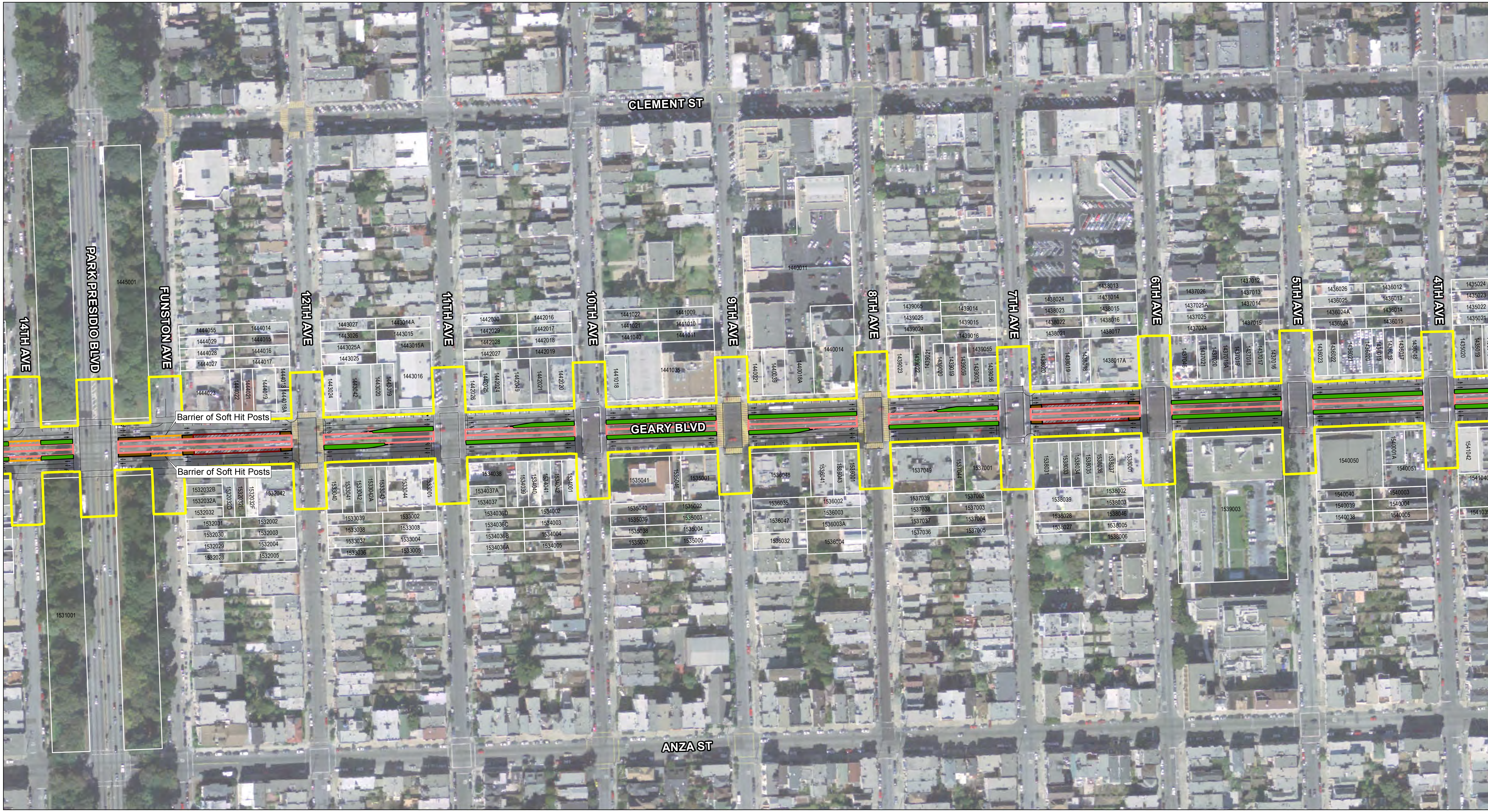
- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

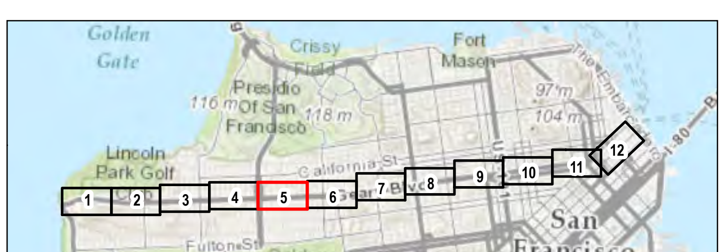
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed BRT Only Stop	Preserved Local Stop	
Proposed Local Stop	Re-located #43 Bus Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

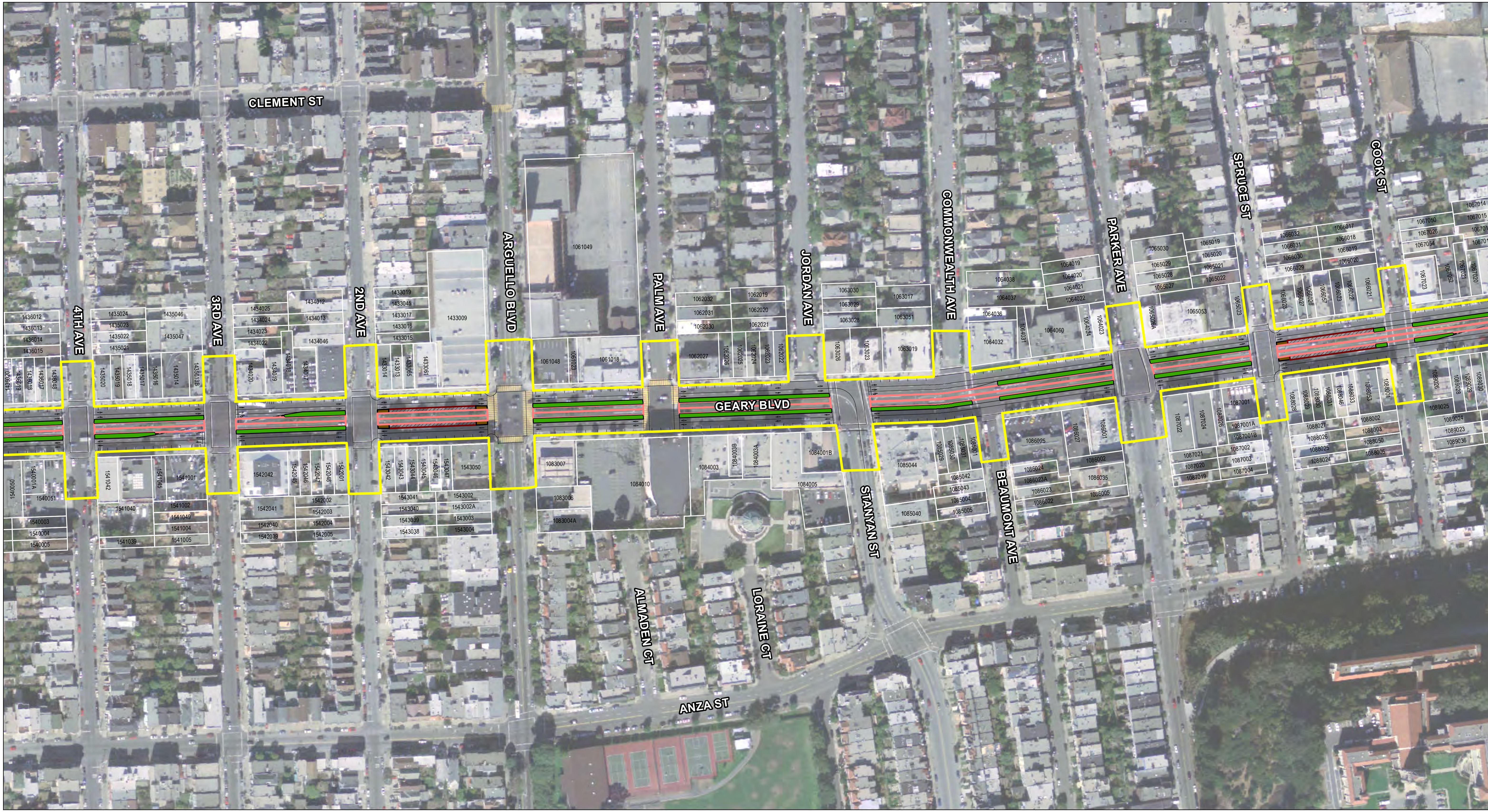
0 100 200 300 400 Feet

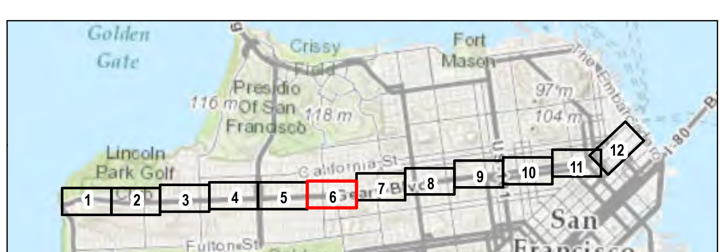
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

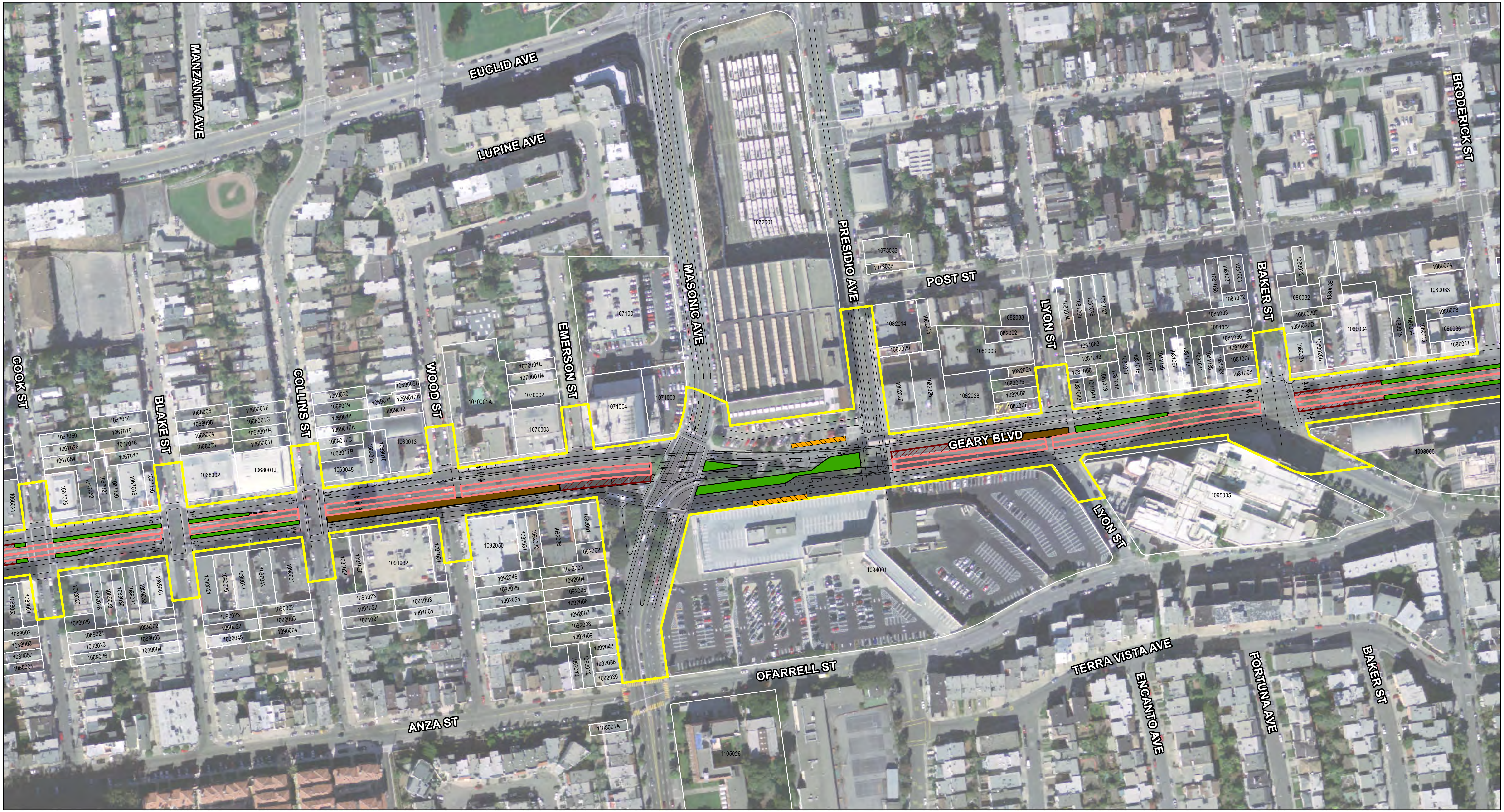
0 100 200 300 400 Feet

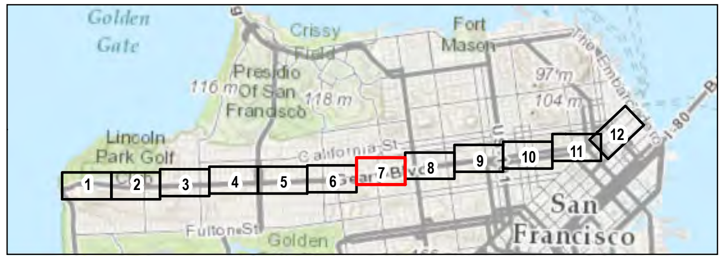
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





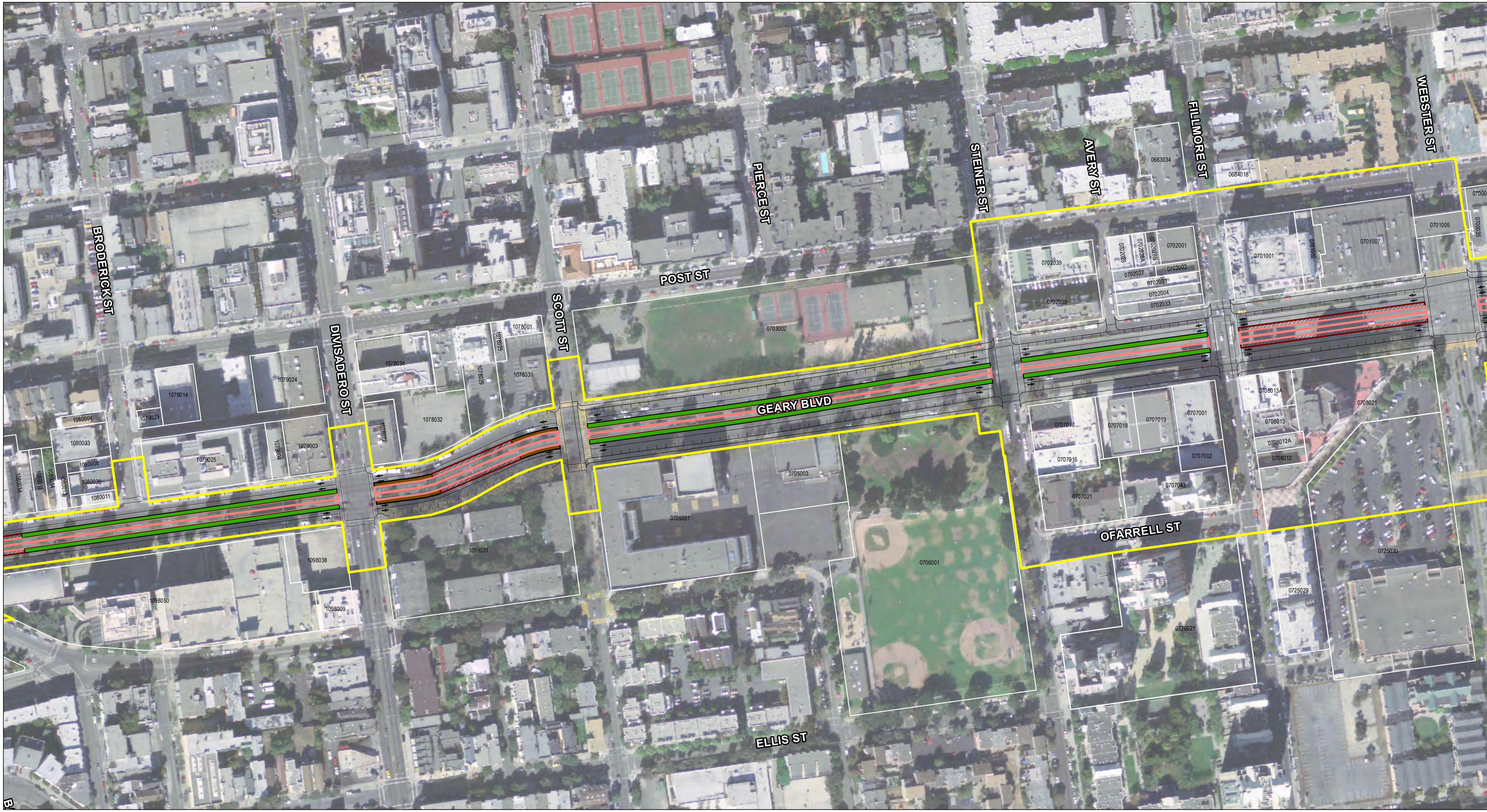
Proposed Bus-Only Lane
Proposed BRT/Local Stop
Proposed BRT Only Stop
Proposed Local Stop
Proposed Spillover Stop
BRT Bus Layover
Proposed Median
Proposed Solid Median
Preserved Local Stop
Re-located #43 Bus Stop
Roadway and Pavement Markings
Environmental Study Limits
Parcel Boundaries

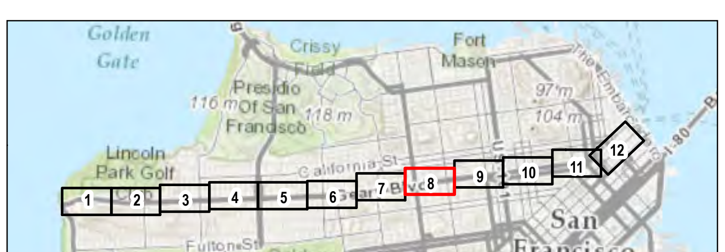
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

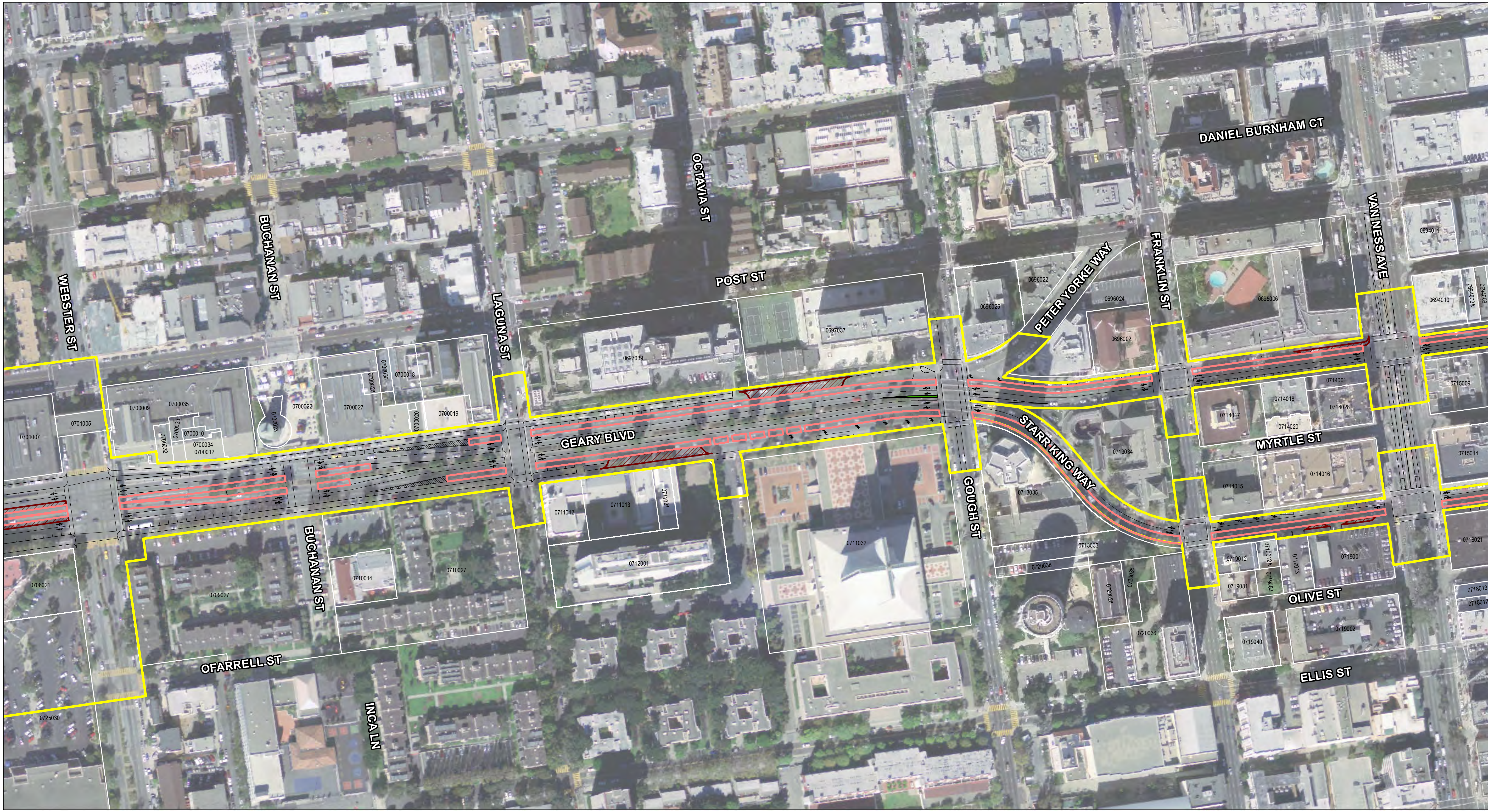
0 100 200 300 400 Feet

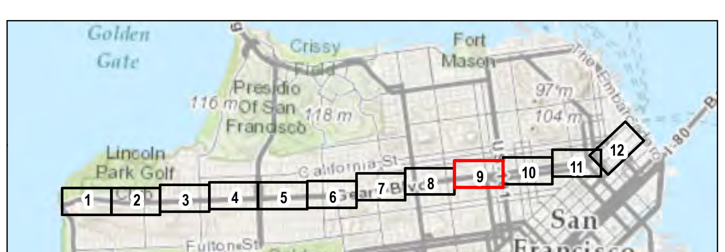
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





Proposed Bus-Only Lane	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed BRT Only Stop	Preserved Local Stop	
Proposed Local Stop	Re-located #43 Bus Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013

- Proposed Bus-Only Lane
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

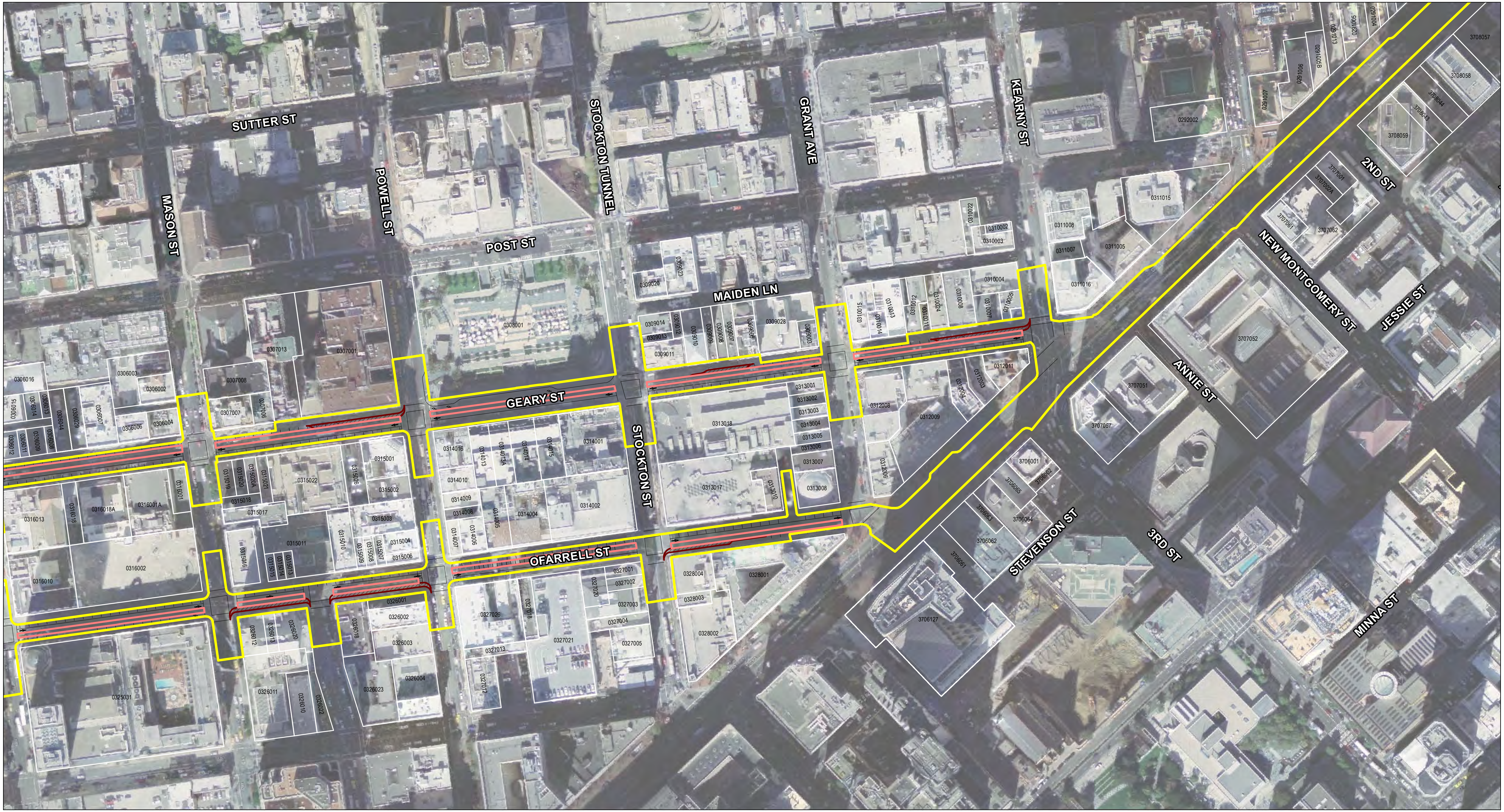
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013



Proposed Bus-Only Lane
Proposed BRT/Local Stop
Proposed BRT Only Stop
Proposed Local Stop
Proposed Spillover Stop
BRT Bus Layover
Proposed Median
Proposed Solid Median
Preserved Local Stop
Re-located #43 Bus Stop
Roadway and Pavement Markings
Environmental Study Limits
Parcel Boundaries

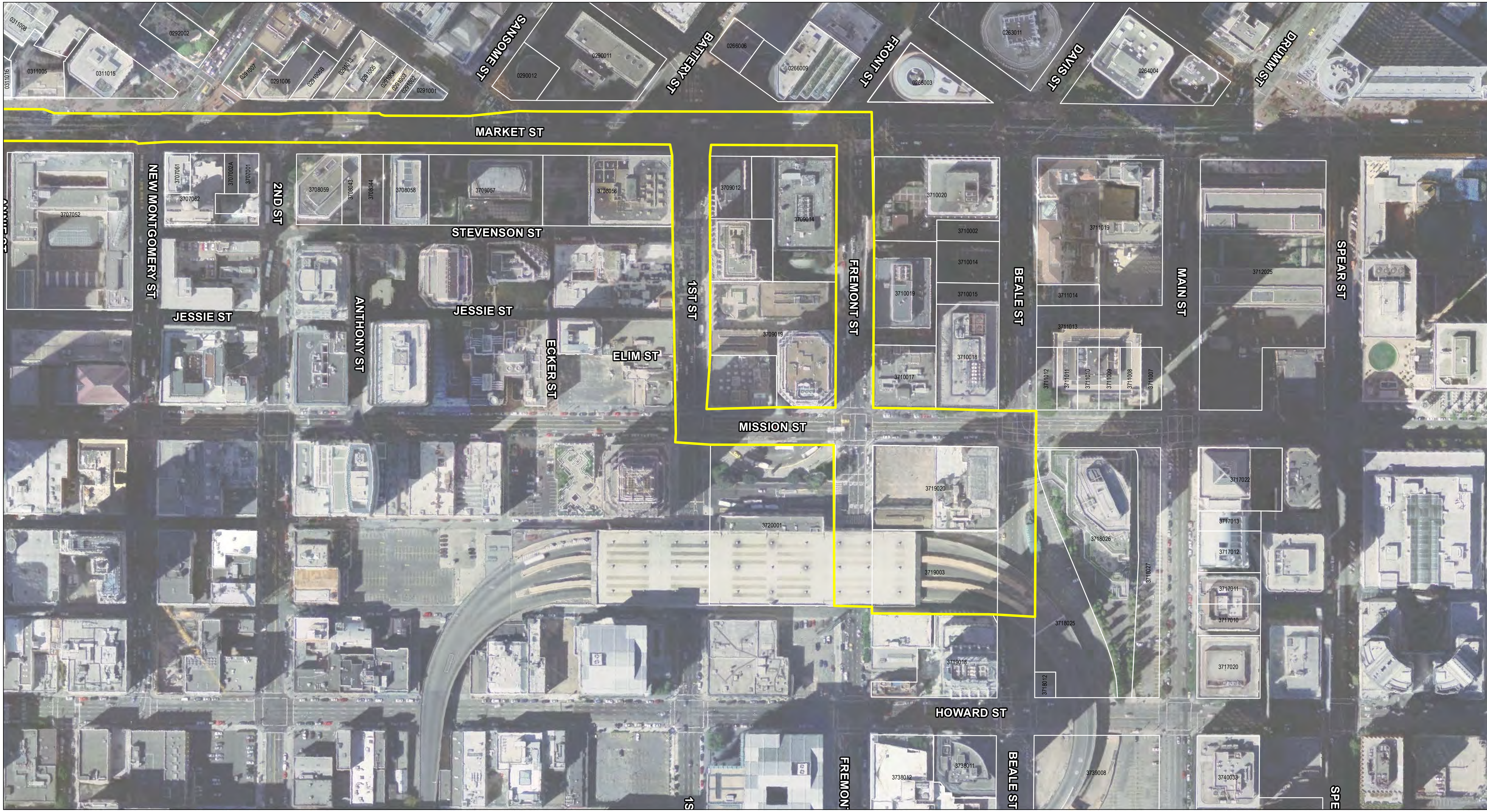
0 100 200 300 400 Feet

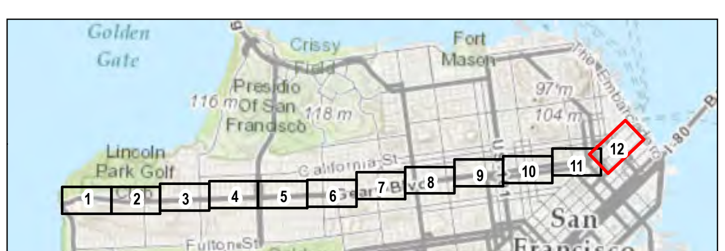
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





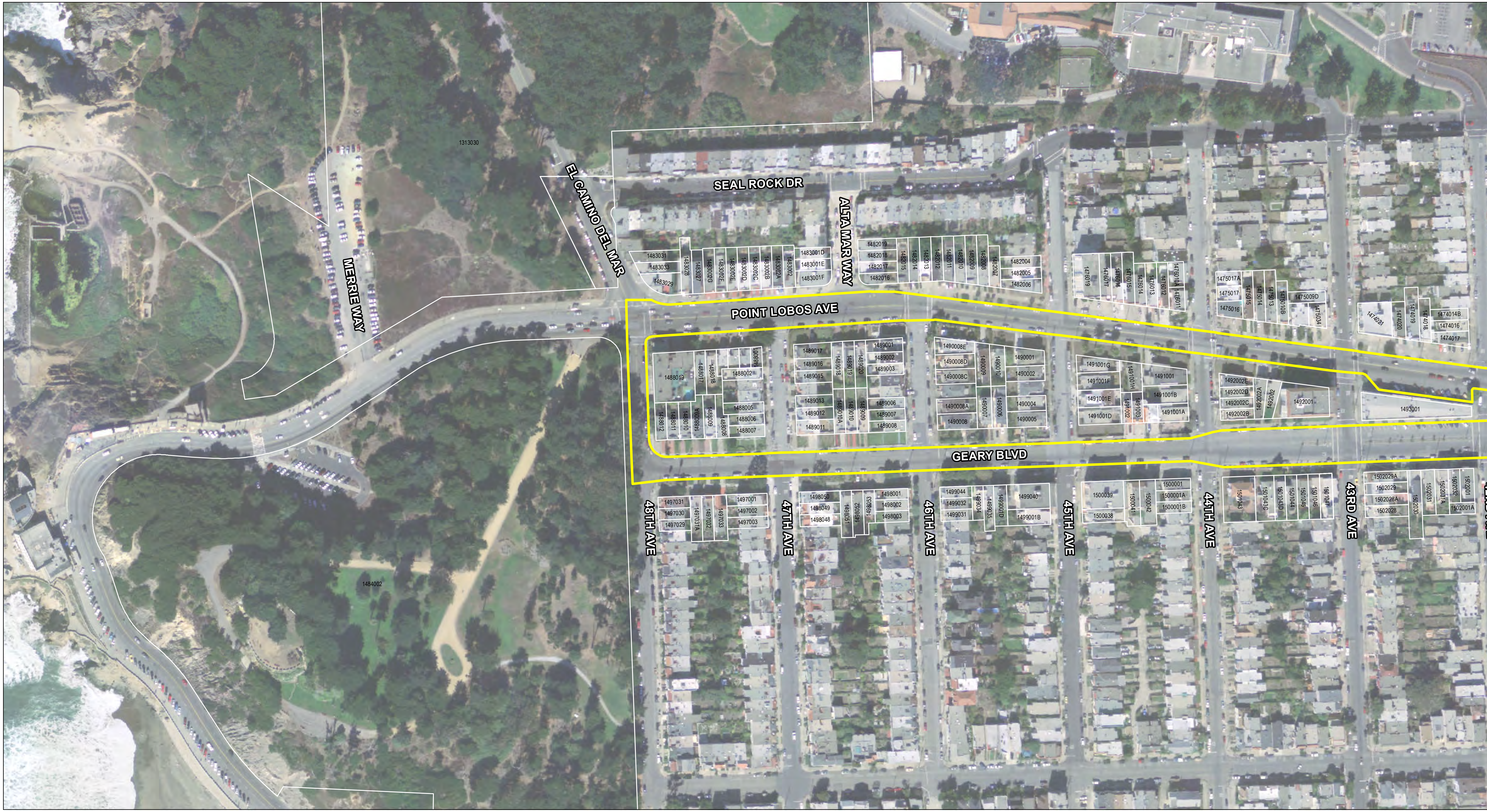
Proposed Bus-Only Lane	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed BRT Only Stop	Preserved Local Stop
Proposed Local Stop	Re-located #43 Bus Stop
Proposed Spillover Stop	Roadway and Pavement Markings
BRT Bus Layover	
Environmental Study Limits	
Parcel Boundaries	

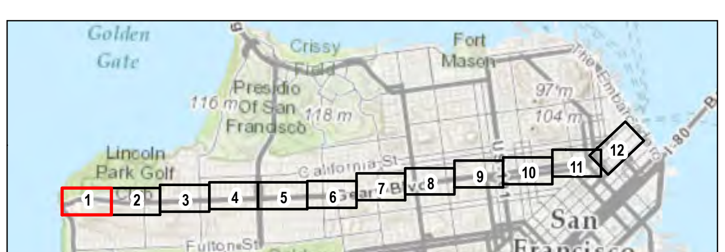
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Alternative 3C
Environmental Study Limits

Date: 11/6/2013





Proposed Bus Lane Only	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed BRT Only Stop	Preserved Local Stop	
Proposed Local Stop	Re-located #43 Bus Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

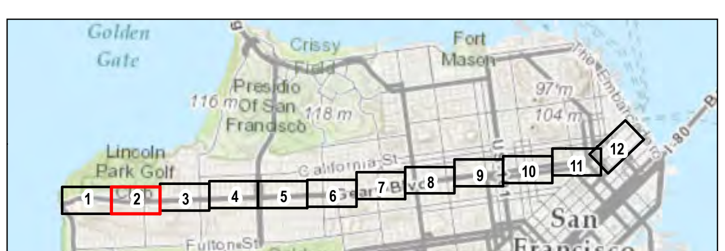
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013



Proposed Bus Lane Only
Proposed BRT/Local Stop
Proposed BRT Only Stop
Proposed Local Stop
Proposed Spillover Stop
BRT Bus Layover
Proposed Median
Proposed Solid Median
Preserved Local Stop
Re-located #43 Bus Stop
Roadway and Pavement Markings
Environmental Study Limits
Parcel Boundaries

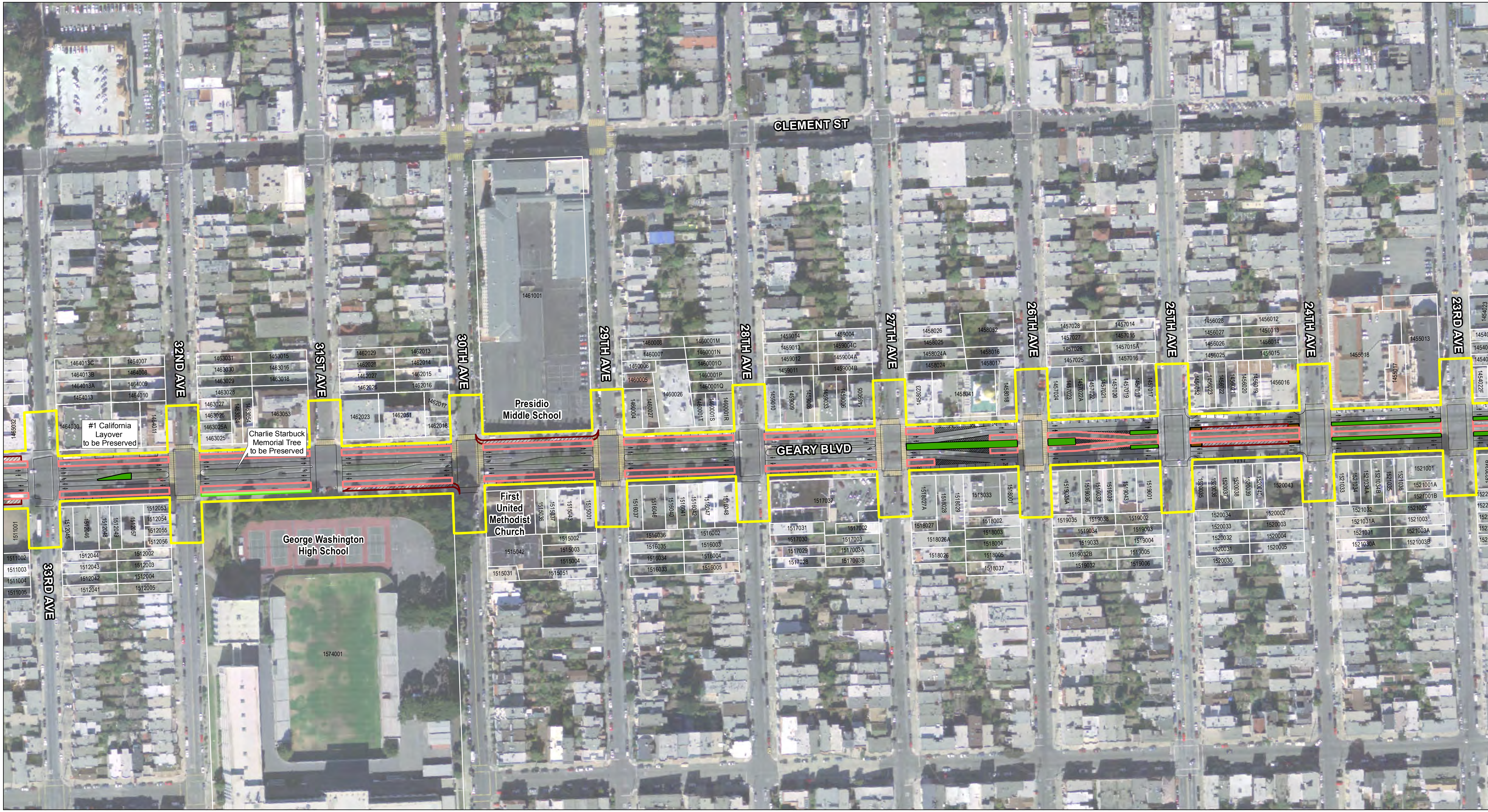
0 100 200 300 400 Feet

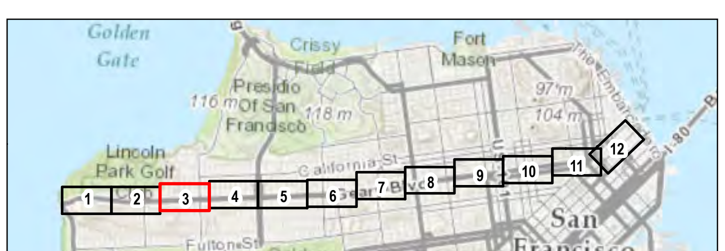
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013





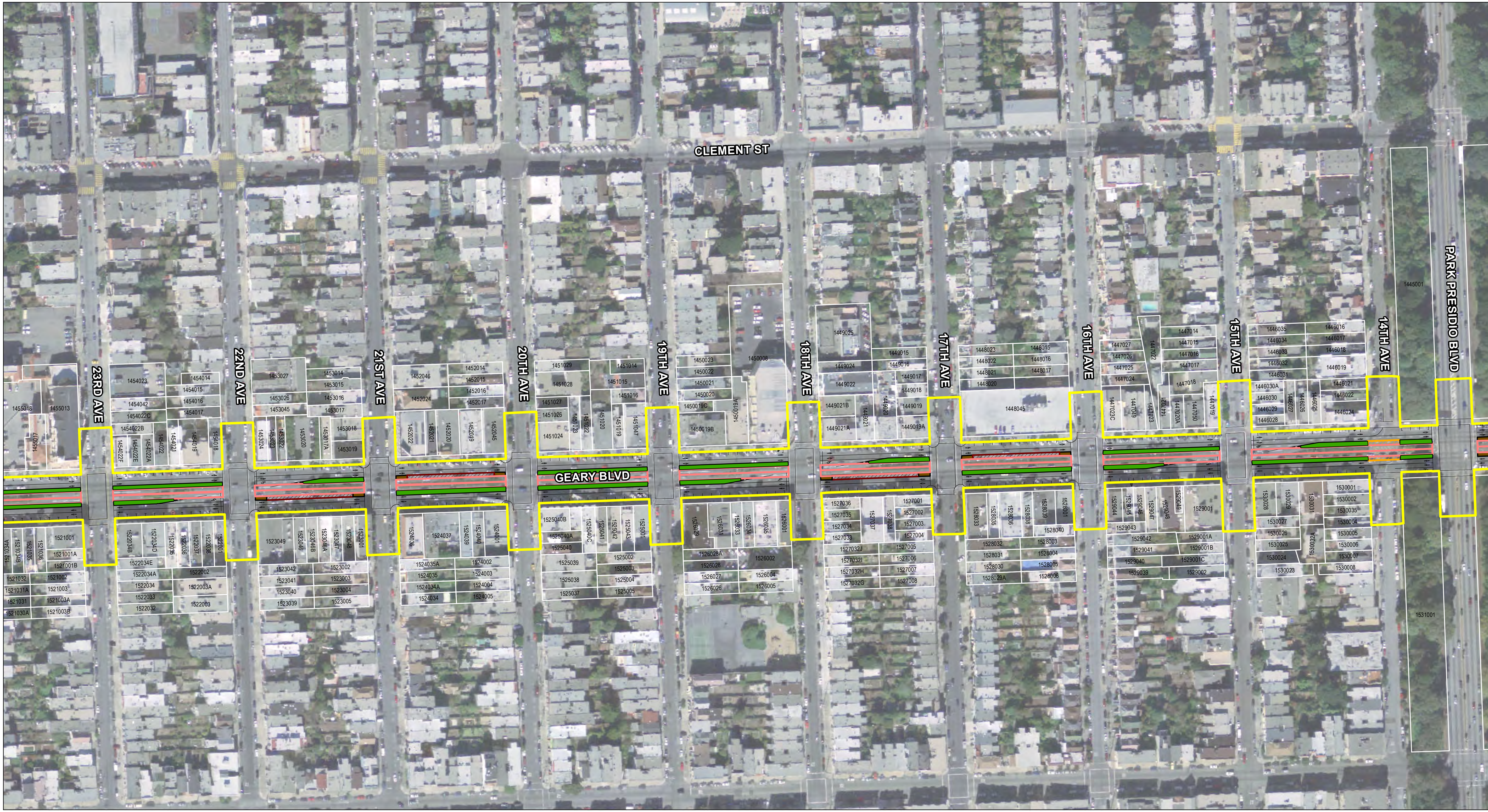
Proposed Bus Lane Only	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed BRT Only Stop	Preserved Local Stop	
Proposed Local Stop	Re-located #43 Bus Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

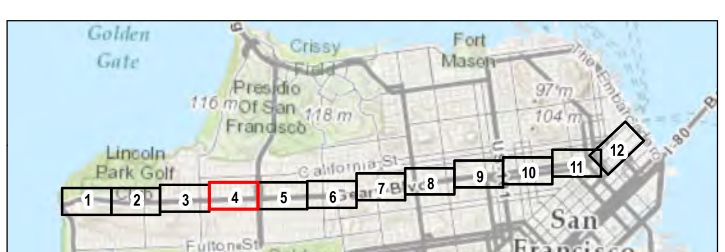
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus Lane Only
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

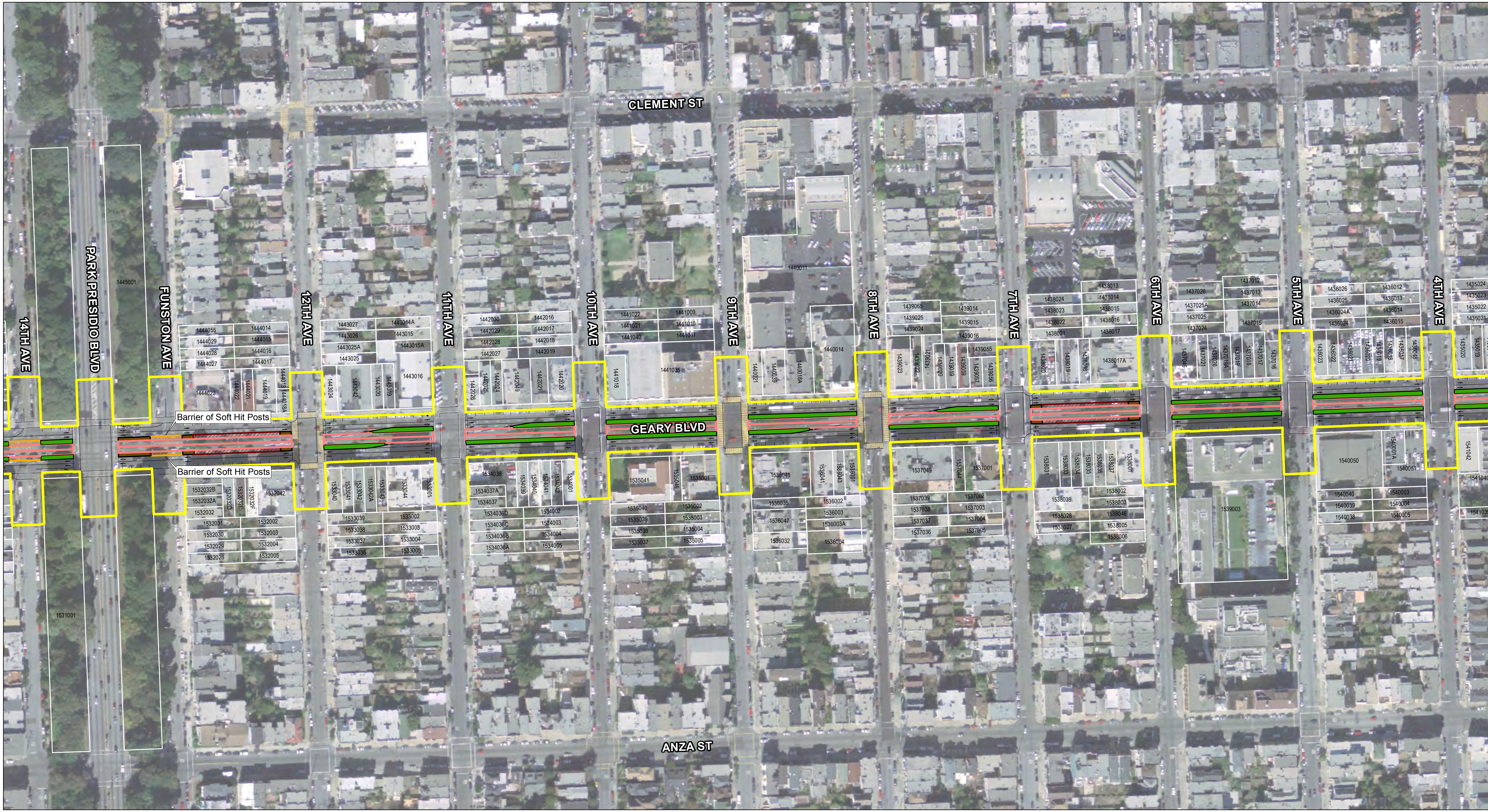
0 100 200 300 400 Feet

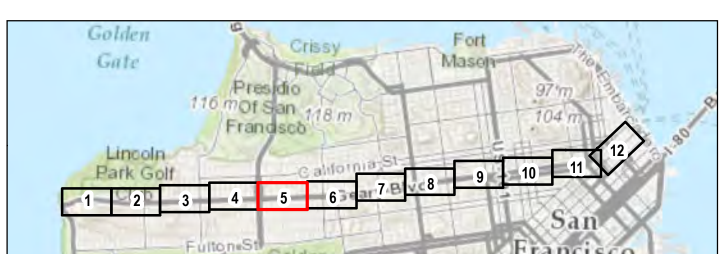
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013





Proposed Bus Lane Only	Proposed Median	Environmental Study Limits
Proposed BRT/Local Stop	Proposed Solid Median	Parcel Boundaries
Proposed BRT Only Stop	Preserved Local Stop	
Proposed Local Stop	Re-located #43 Bus Stop	
Proposed Spillover Stop	Roadway and Pavement Markings	
BRT Bus Layover		

0 100 200 300 400 Feet

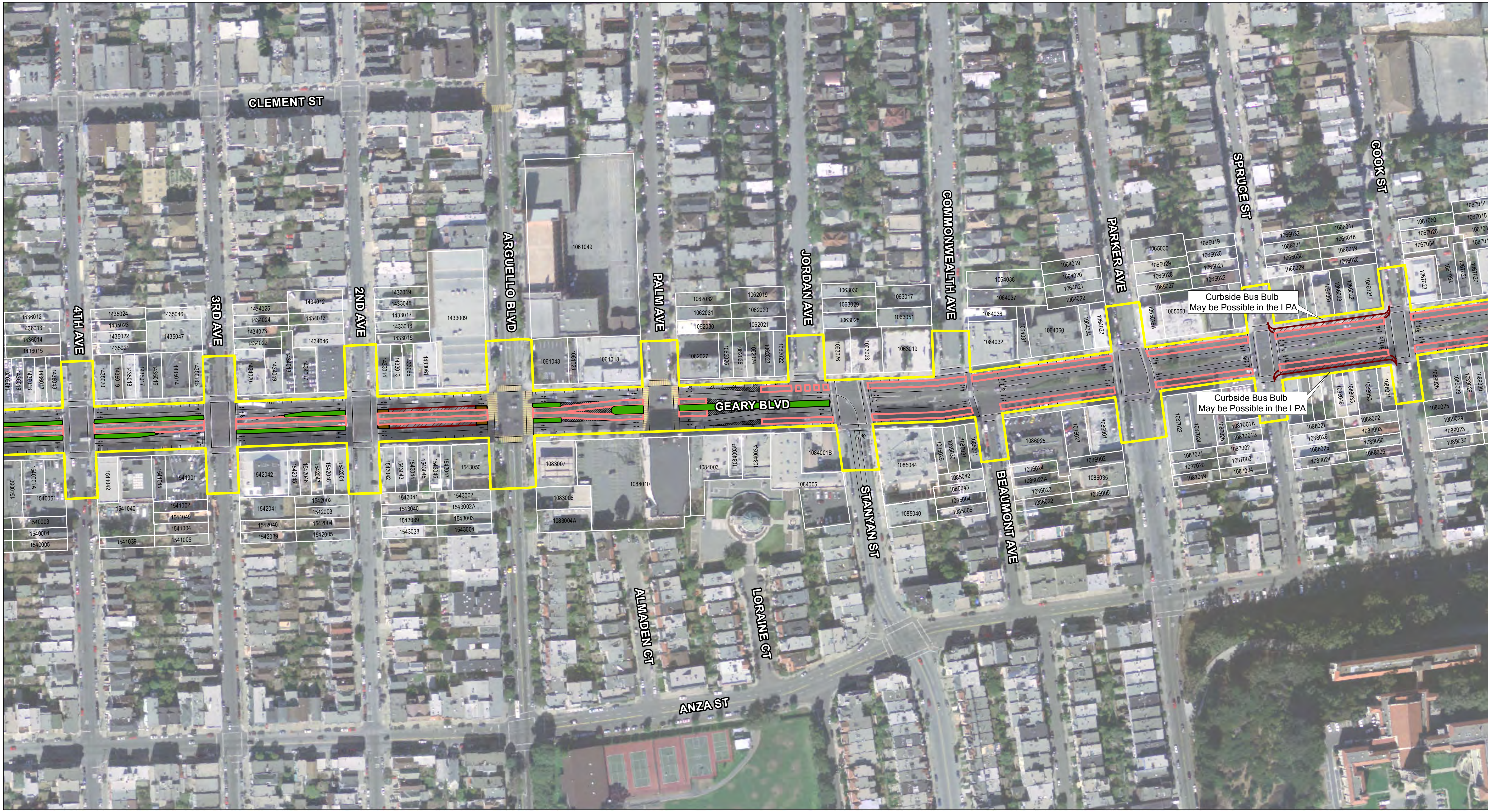
1:2,400 1 Inch = 200 Feet

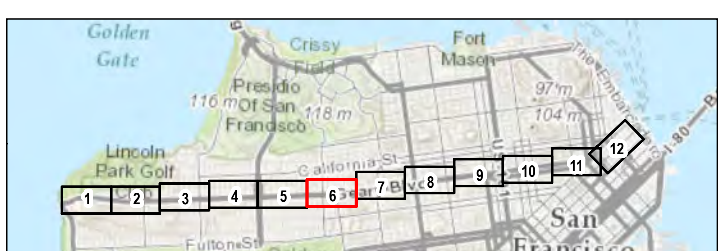
N

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Page 5 of 12

Date: 11/6/2013





- Proposed Bus Lane Only
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

0 100 200 300 400 Feet

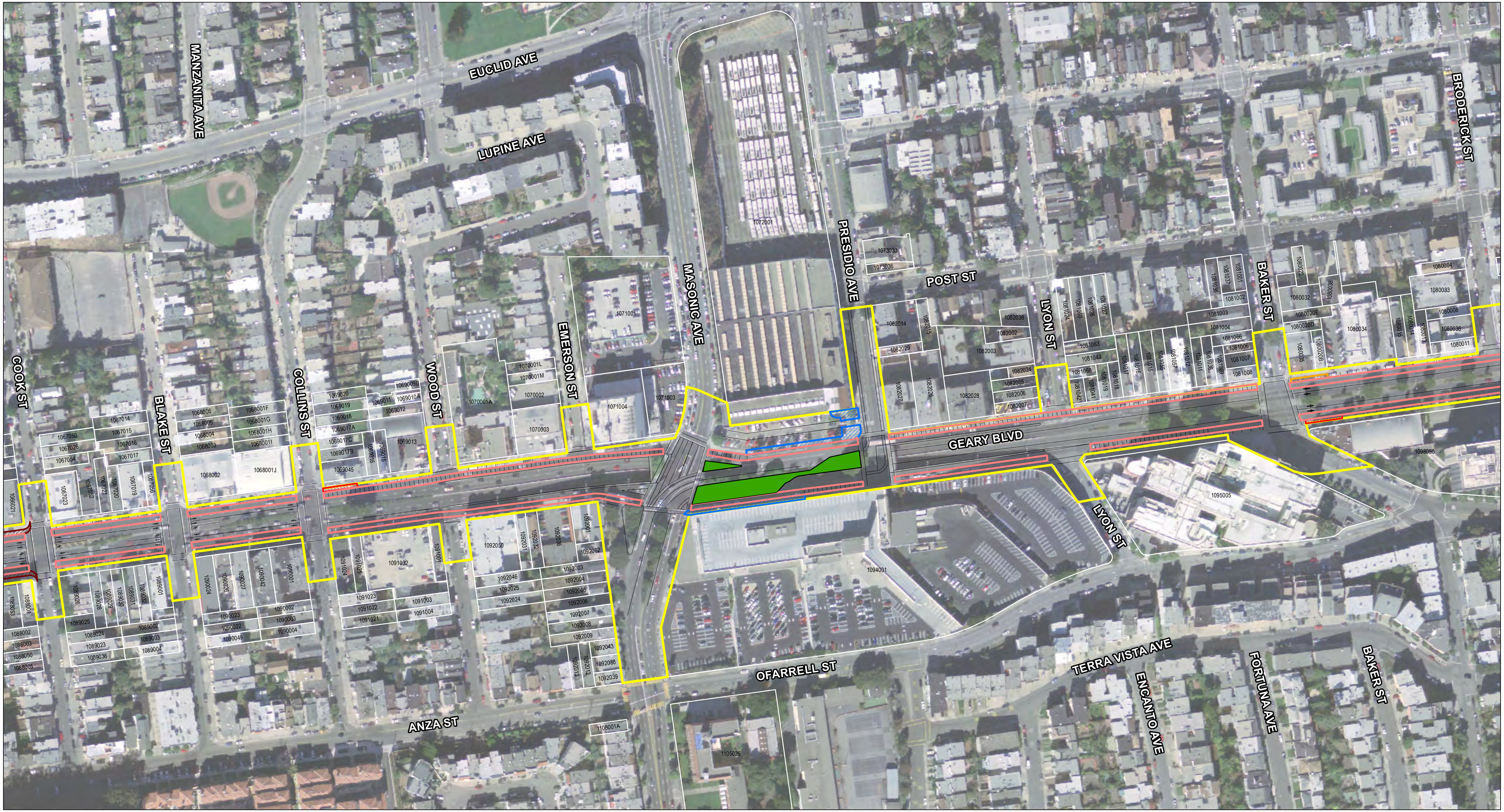
1:2,400 1 Inch = 200 Feet

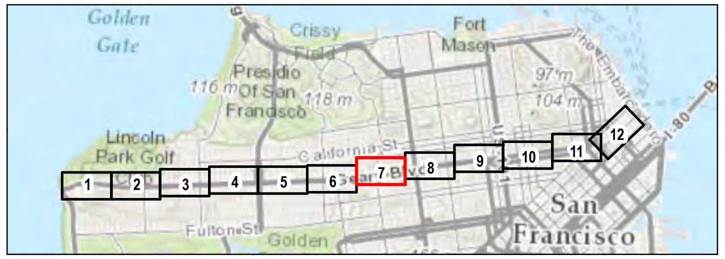
N

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Page 6 of 12

Date: 11/6/2013





Proposed Bus Lane Only	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed BRT Only Stop	Preserved Local Stop
Proposed Local Stop	Re-located #43 Bus Stop
Proposed Spillover Stop	Roadway and Pavement Markings
BRT Bus Layover	
Environmental Study Limits	
Parcel Boundaries	

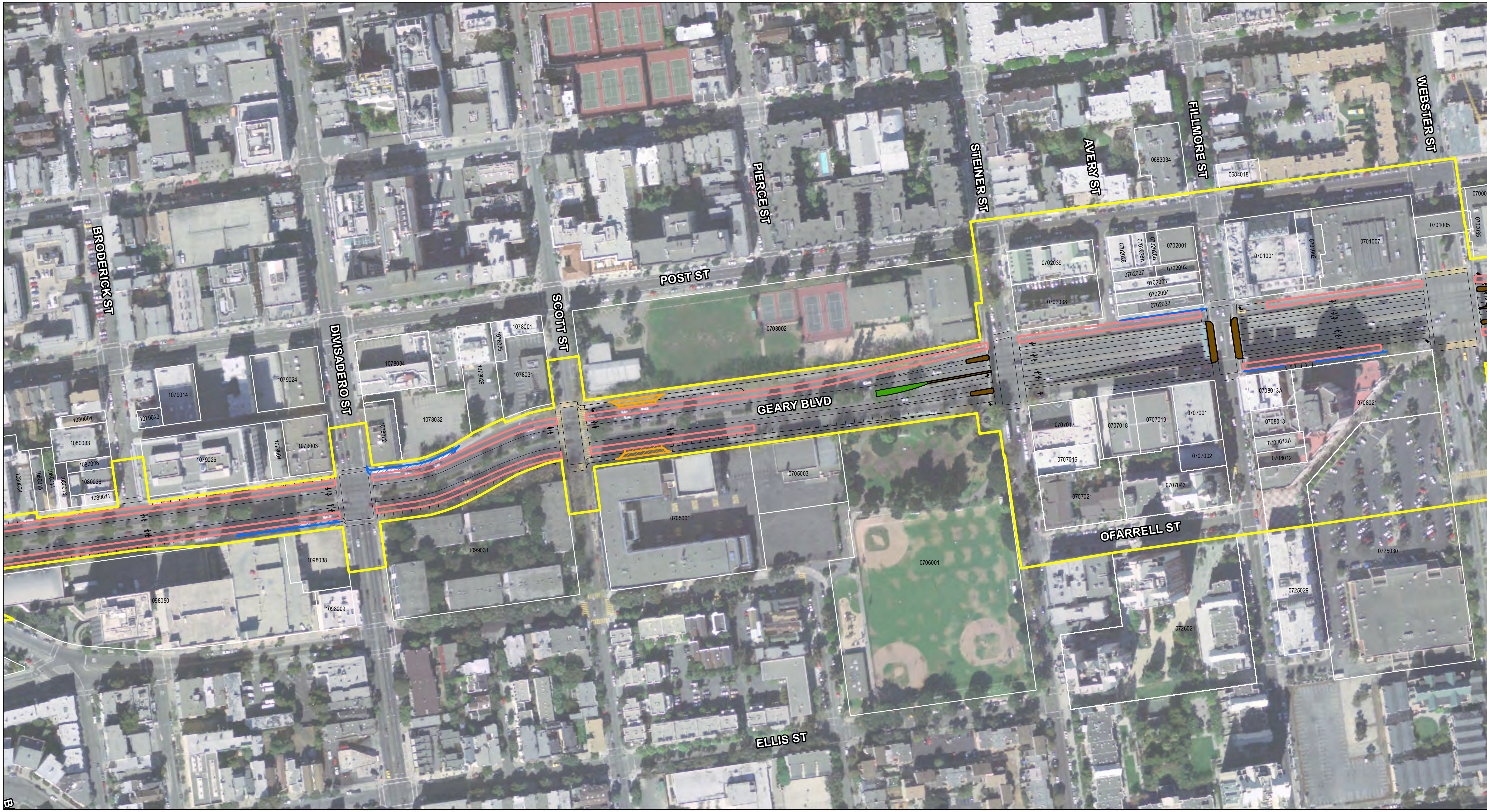
0 100 200 300 400 Feet

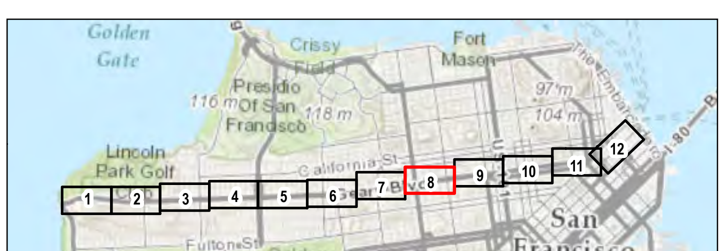
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013





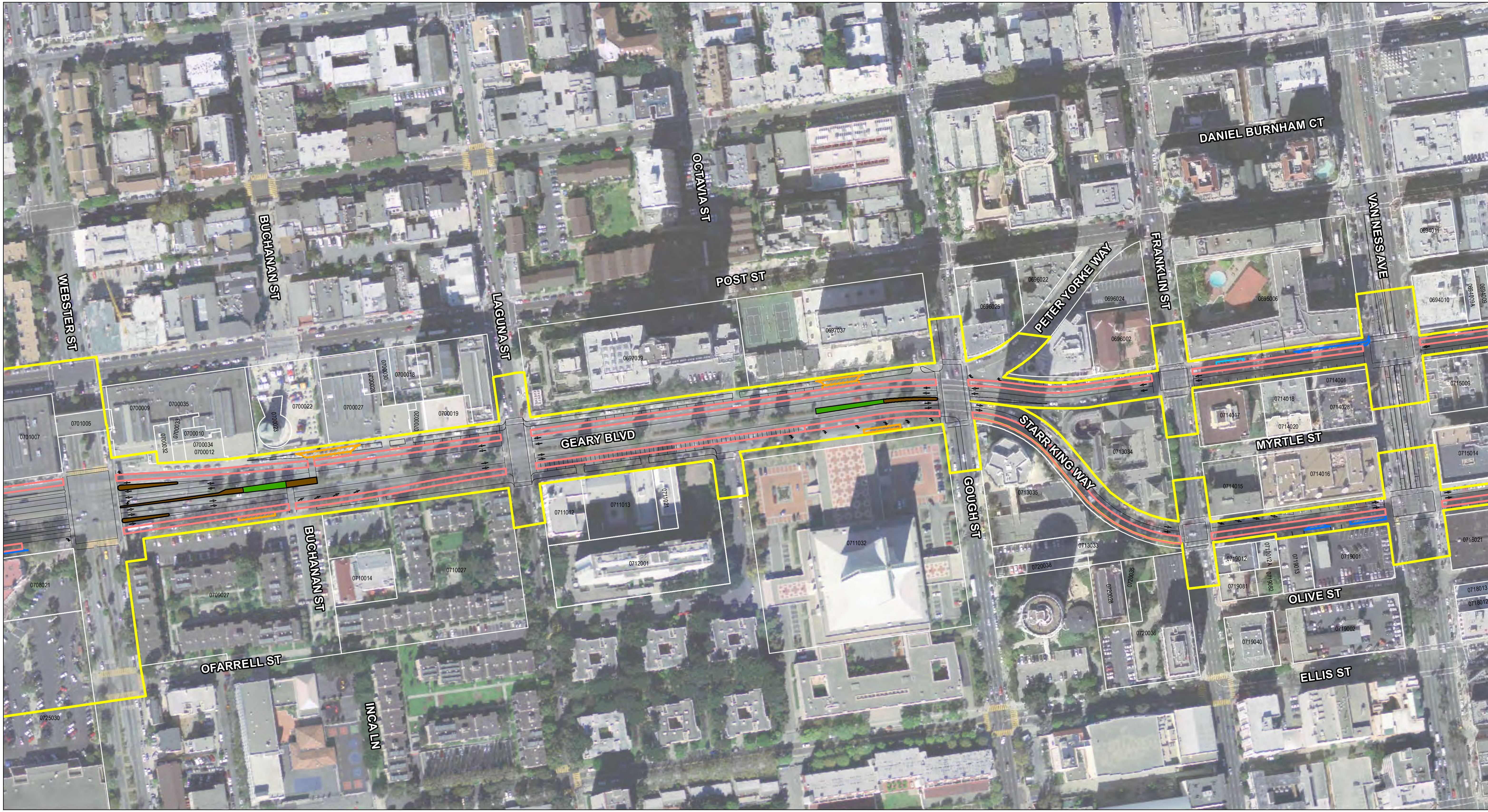
- Proposed Bus Lane Only
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

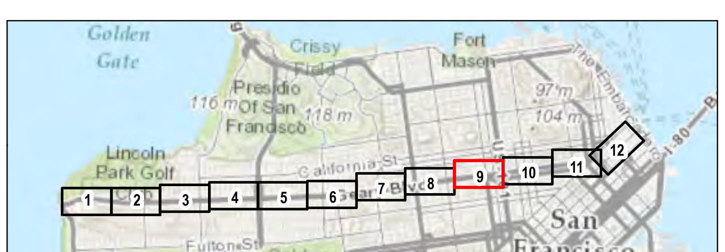
0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus Lane Only
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013

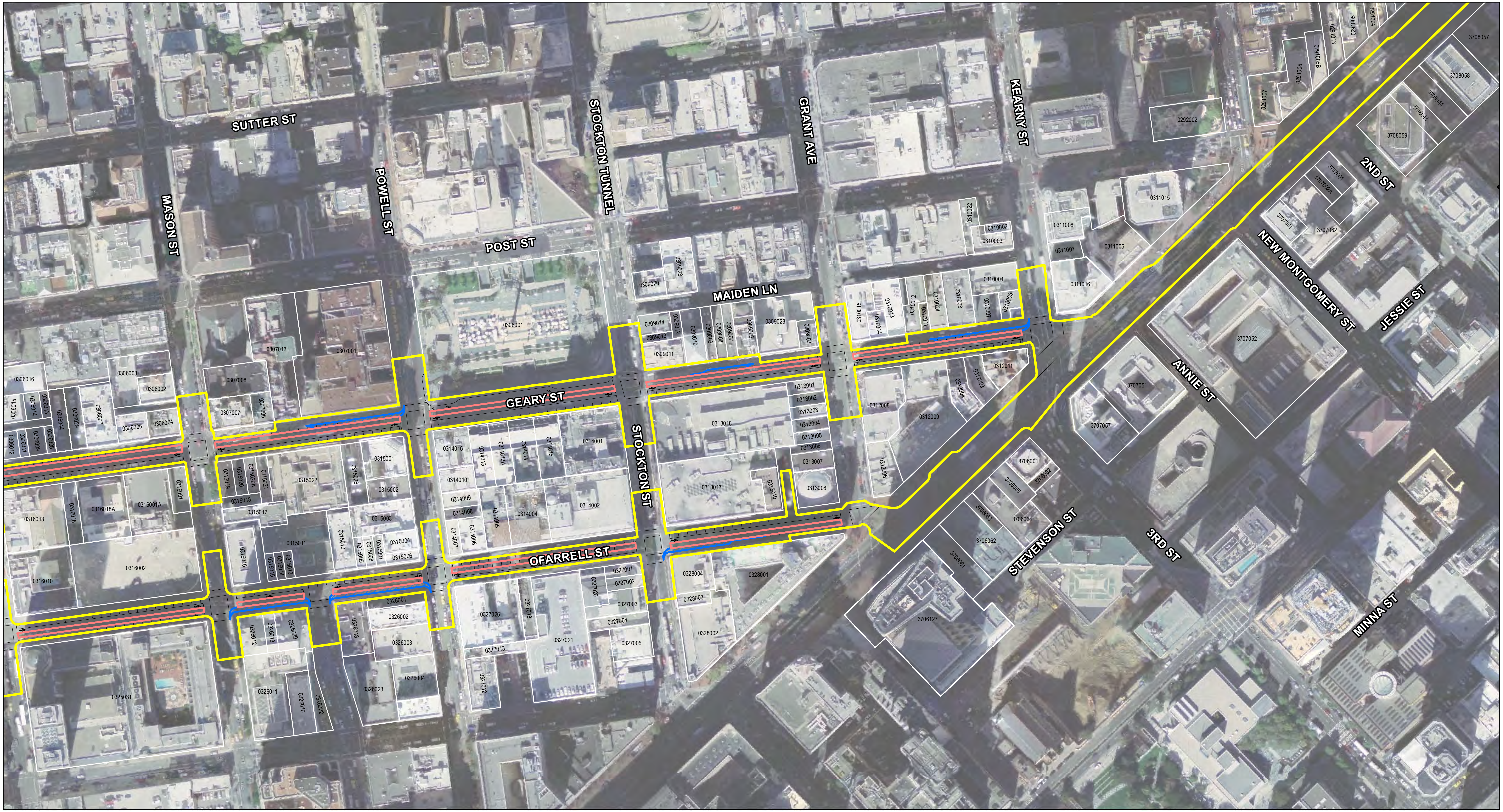
Proposed Bus Lane Only	Proposed Median
Proposed BRT/Local Stop	Proposed Solid Median
Proposed BRT Only Stop	Preserved Local Stop
Proposed Local Stop	Re-located #43 Bus Stop
Proposed Spillover Stop	Roadway and Pavement Markings
BRT Bus Layover	
Environmental Study Limits	Parcel Boundaries

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013



- Proposed Bus Lane Only
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

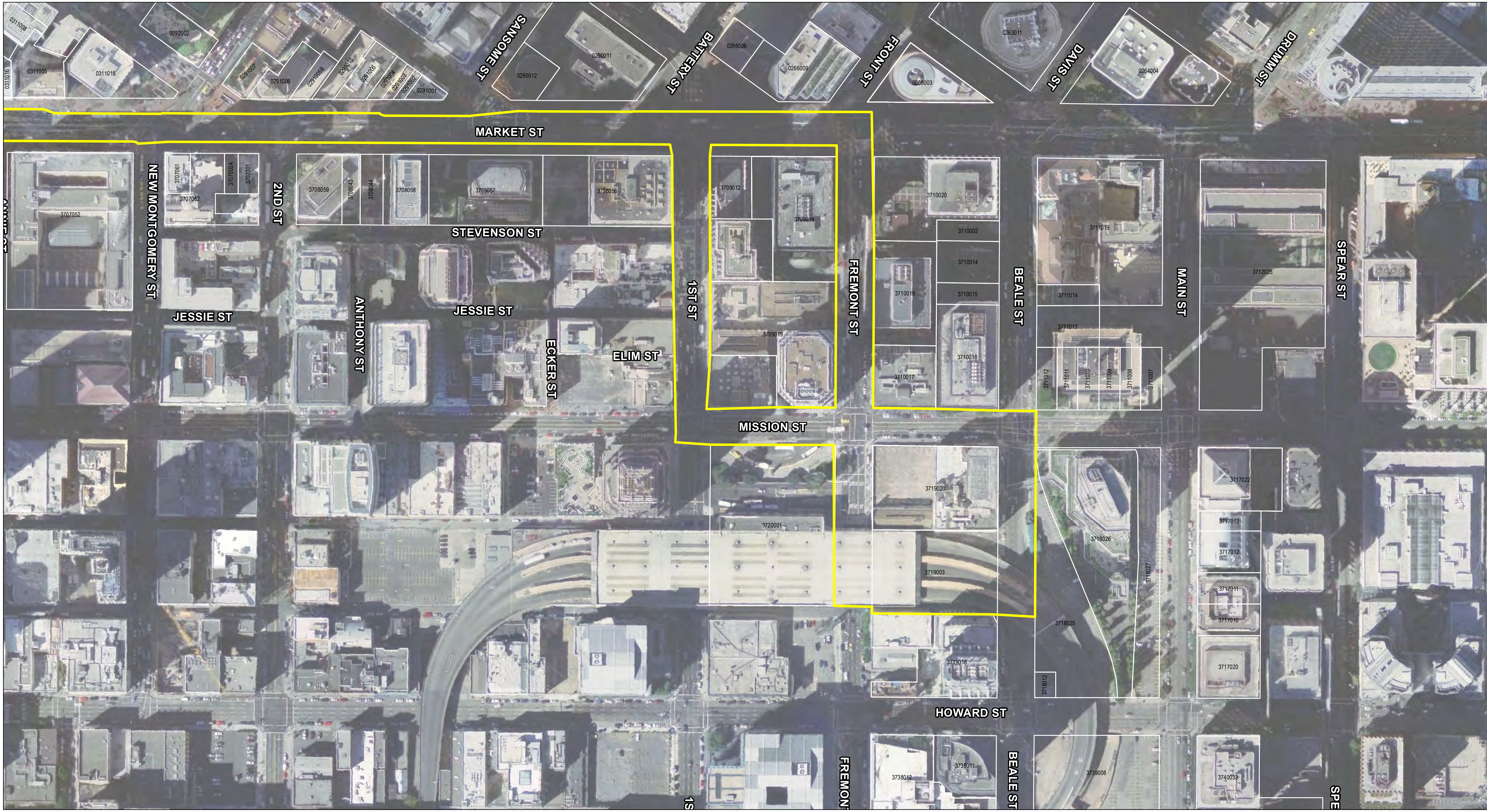
0 100 200 300 400 Feet

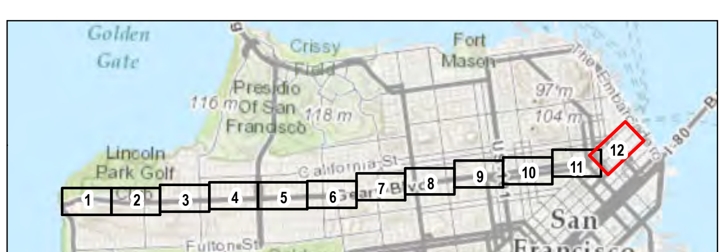
1:2,400 1 Inch = 200 Feet

N

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013





- Proposed Bus Lane Only
- Proposed BRT/Local Stop
- Proposed BRT Only Stop
- Proposed Local Stop
- Proposed Spillover Stop
- BRT Bus Layover
- Proposed Median
- Proposed Solid Median
- Preserved Local Stop
- Re-located #43 Bus Stop
- Roadway and Pavement Markings
- Environmental Study Limits
- Parcel Boundaries

0 100 200 300 400 Feet

1:2,400 1 Inch = 200 Feet

Geary Bus Rapid Transit Project
Locally Preferred Alternative
(Alt 3C + Alt 2)
Environmental Study Limits

Date: 11/6/2013

SHPO Correspondence

U.S. Department
of Transportation
Federal Transit Administration

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

201 Mission Street
Suite 1650
San Francisco, CA 94105-1839
415-744-3133
415-744-2726 (fax)

APR 17 2015

Carol Rowland-Nawi
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

Subject: Section 106 Consultation – SFMTA Geary BRT Project, San Francisco, California

Dear Dr. Roland-Nawi,

The San Francisco Municipal Transportation Agency (SFMTA) is proposing the construction and implementation of bus rapid transit (BRT) service along Geary Street and Boulevard (Project). The Project will be a federal undertaking because the Federal Transit Administration (FTA) would provide financial assistance, and as such, FTA is initiating consultation with the State Historic Preservation Officer (SHPO), under Section 106 of the National Historic Preservation Act of 1966 and its implementing regulation found in 36 CFR Part 800 and request your concurrence with the proposed Area of Potential Effect (APE) and concurrence on the eligibility of properties for the National Register of Historic Places (NRHP). Also enclosed are technical reports prepared for this undertaking.

FTA, the San Francisco County Transportation Authority (SFCTA), and partner agency SFMTA met with your staff (Kathleen Forrest and Patrick Riordan) on March 23, 2015 to provide a project overview and to discuss the Section 106 consultation process. We would also like to invite you and your staff for a site visit of the alignment in the near future.

Description of Undertaking
The proposed undertaking would construct and operate BRT service along dedicated lanes within various locations of San Francisco's Geary corridor, as described below. The proposed undertaking would include BRT-branded bus service as well as physical transit infrastructure improvements such as transit signal priority, pavement resurfacing, new and relocated stations, curb ramp and corner bulb installation. **Attachment A** depicts the Geary corridor.

The EIS/EIR assesses four build alternatives as well as a "No Build" alternative. Each includes some form of BRT service and various physical improvements, generally outlined as follows:

No Build Alternative

- No new BRT service or related physical infrastructure improvement. Existing SFMTA 38 Local, 38 Limited, and 38 Express routes would continue to operate in mixed-flow lanes. However, the Geary corridor would see previously planned/programmed transit and infrastructure improvements.

Alternative 2: Side-Lane BRT

- BRT service would replace the existing 38 Limited service; local and express bus service would operate.
- From the Transbay Terminal to 34th Avenue, buses would operate in dedicated side-running bus-only lanes replacing the existing outside travel lanes of the Geary corridor, next to the existing curbside parking lane that would remain at most locations.
- Between 34th Avenue and 48th Avenue, no bus-only lanes would be constructed; all buses would operate in mixed-flow lanes.
- Existing 38 Local service would also operate in the dedicated bus lanes but would pull out of them to service curbside local bus stops, enabling BRT buses to pass.

Alternative 3: Center-Lane BRT with Dual Medians and Bus Passing Lanes

- BRT, local, and express buses would operate.
- This alternative would be different from Alternative 2 from Gough Street to 27th Avenue. There, BRT and local service would operate in dedicated bus-only lanes in the center of the Geary corridor. A bus passing lane at local bus stops would enable BRT buses to pass local buses that are stopped to load and unload passengers.
- In all other locations, this alternative would be similar to Alternative 2.

Alternative 3-Consolidated: Center-Lane BRT with Consolidated Bus Stops, Dual Medians, and No Bus Passing Lanes

- Same as Alternative 3; however, BRT service would replace both 38 Limited and 38 Local service as a new consolidated service, eliminating the need for bus passing lanes.

Hybrid Alternative

- Incorporates various physical features of Alternatives 2 and 3 Consolidated in different segments, combined to provide a mix that intends to maximize benefits and minimize impacts.
- BRT, local, and express buses would operate.
    - From the Transbay Terminal to Palm Street, local and BRT buses would operate in existing or new side-running bus-only lanes.
    - Between Palm Street and 27th Avenue, local and BRT buses would operate in dedicated bus-only lanes in the center of the Geary corridor, with no bus passing lanes. Every stop would serve both local and BRT buses.
    - Between 27th Avenue and 34th Avenue, all buses would operate in new side-running bus-only lanes.

        - Between 34th Avenue and 48th Avenue, no bus-only lanes would be constructed; all buses would operate in mixed-flow lanes.
    - In side-running portions of the corridor, BRT buses would have the ability to pass local buses at local stops.

As indicated in our meeting with your staff on March 23, SFCTA and SFMTA staff have identified the Hybrid Alternative as the Staff-Recommended Alternative; the Draft EIS/EIR will reflect this identification. SFCTA and SFMTA staff members further anticipate that their respective Boards will ultimately select the Hybrid Alternative as the Locally Preferred Alternative at some time subsequent to publication of the Draft EIS/EIR.

Area of Potential Effect

Archaeology: The project archaeological APE covers approximately 131 acres in the Geary corridor. The APE includes the full width of the street and is fully contained within the public right-of-way, comprising the full length of the 38 Local and 38 Limited routes from 48th Avenue (on the west) to the Transbay Terminal (on the east). This includes the entirety of Geary Boulevard/Geary Street and portions of O'Farrell Street, Market Street, Mission Street, and First Streets. In areas where proposed improvements would be confined to the street itself, the APE is set to the curb-to-curb width of the corridor. In areas where a new or relocated curbside bus stop is proposed, the APE expands outwardly to encompass the entirety of the public right-of-way, including the sidewalk.

The horizontal extent of the archaeological APE is presented in **Attachments B.1-B.4** by alternative. The APE covers the entire Environmental Study Limits and is labeled as such in **Attachments B.1-B.4** (note that in the archaeological sensitivity report that this is also referred to as the Study Area).

The vertical extent for the archaeological APE has not been finalized, nor have potential areas of direct impact been precisely identified. However, as indicated in Table 1 below showing anticipated excavation depths by project feature, it is anticipated that maximum depths throughout the corridor would generally not exceed 16 feet (4.9 meters) below modern ground surface. This depth corresponds to the anticipated excavation required for new and/or relocated street lights and traffic signal poles, which would be dispersed throughout the entire length of the corridor in all build alternatives.

In the vicinity of Fillmore Street, two of the build alternatives (Alternatives 3 and 3-Consolidated) contemplate raising the level of Geary Boulevard to match surrounding streets and would thus convert the now grade-separated Fillmore Street underpass to a single-level intersection. If one of these alternatives is selected, additional excavation may be necessary in this area to decommission and/or remove an existing pump station that was installed at the time the Fillmore Street underpass was created in 1961.

Table 1. Anticipated Excavation Depths - Geary Corridor Bus Rapid Transit Project

CONSTRUCTION ITEM	APPROXIMATE AREA	DEPTH (FEET)	APPLICABILITY
Geary Underpass of Fillmore Street: Pump Station - Fuel Tank Removal	12-ft by 12-ft excavation	30	Only Alternatives 3 and 3-Consolidated - Fillmore Street underpass only
Street Lights, Pedestrian Scale Lights, and Traffic Signal Poles	3-ft by 3-ft excavations per Light Pole	16	Dispersed widely in all alternatives - those incorporating center-running bus lanes as well as modified curbside bus stops
Sewer Replacement	8-ft wide by 240-ft excavations per block	16	Only Alternatives 3, 3-Consolidated, and Hybrid; only between 12th and 15th Avenues
Geary Underpass and Pump Station Removal (Upper Portion Only)	8-ft wide by 100-ft (Blue Book limit)	12	Only Alternatives 3 and 3-Consolidated - Fillmore Street underpass only
Catch Basin with Inlet	6-ft by 6-ft excavation	8	Dispersed widely in alternatives with center-running bus lanes as well as select curb bulb-out locations
Hydrant Relocation	5-ft by 5-ft excavation	8	All alternatives involving new /modified curbside bus stops
Shelter Canopy Foundation	3-ft by 3-ft excavation per Canopy Post	1	All alternatives involving new /modified curbside bus stops
Median Platform	9-ft – 6-in wide by 240-ft long per block	3	Dispersed widely in alternatives with center-running bus lanes
New Center Median	Typically 10-ft wide by 240-ft long per block	3	Dispersed widely in alternatives with center-running bus lanes
Center Running Bus Lanes (New pavement section for 2 lanes)	26-ft to 240-ft long per block	3	Dispersed widely in alternatives with center-running bus lanes
Surface Mounted Utility (SMU) Foundation	3-ft by 5-ft excavations per SMU	3	All alternatives involving new /modified curbside bus stops or center-running bus lanes
BRT Bus Bulb	Typically 8-ft wide by 240-ft long per block	1.5	All alternatives involving new /modified curbside bus stops

CONSTRUCTION ITEM	APPROXIMATE AREA	DEPTH (FEET)	APPLICABILITY
Local Bus Bulb	Typically 8-ft wide by 195 ft long	1.5	All alternatives involving new /modified curbside bus stops
Pedestrian Crossing Bulb	40-ft by 8-ft at corners; 8-ft wide by 60-ft long at midblock	1.5	All alternatives
Side Running Bus Lane Pavement Rehabilitation	13-ft wide by 240-ft long excavations	1	All alternatives

Built Environment/Historic Architecture: The built environment or architectural APE generally follows the same boundary as the archaeological APE, encompassing the street width from curb to curb and fully within the public right-of-way, with the exception of areas where a new side or relocated curbside bus stop is proposed, at which the architectural APE expands outwardly to encompass one adjacent parcel. In the case of the Kearny/Market/Mason/Sutter Conservation District and the Uptown Tenderloin Historic District, the APE encompasses only those portions of the districts directly fronting proposed side BRT stations and/or new or moved local stops. **Attachment C** depicts the proposed architectural APE.

Research Method

The Northwest Information Center (NWIC) at Sonoma State University conducted a search of archaeological resources on February 9, 2009 and November 7, 2011. Additionally, the NWIC conducted a records search in May 2009 and September 2013 for historical structures within the APE. Historical specialists conducted field reconnaissance to account for all buildings, structures, objects that appeared to be 45 years of age or greater and to confirm the current condition of properties already listed or determined eligible for listing in the NRHP and/or CRHR, California Historical Landmarks, and the California Points of Historic Interest.

Furthermore, consultation with the Native American Heritage Commission (NAHC) was initiated in a letter dated November 21, 2008. A NAHC representative responded on December 5, 2008 that no Native American cultural resources were reported from the Sacred Lands file records search. The NAHC provided a list of six interested Native American groups and individuals; all of whom were sent letters on December 8, 2008. A second letter was sent on October 21, 2011 to inform contacts of the undertaking's expansion. No responses were received for either correspondence, but FTA will formally invite appropriate tribes to consult for purposes of Section 106 compliance.

Request for SHPO Review, Comments, and Concurrence
FTA hereby requests SHPO's ***comments*** on the enclosed APE mapping as well as SHPO's ***comments*** on two cultural resources technical reports prepared for this undertaking. These reports are attached and include:

> **Attachment D:** Historic Resources Inventory and Evaluation Report (HRIER)
>
> **Attachment E:** Archaeological and Native American Cultural Resources Sensitivity Assessment

According to the attached HRIER, the St. Francis Cooperative is the only historic resource within the APE that has been found eligible for individual listing in the NRHP and the CRHR as a result of this study. The St. Francis Square Cooperative is a low-income housing development constructed in 1963 as part of the City's redevelopment effort of the Western Addition, as further discussed in the Department of Parks and Recreation (DPR) form 523A on page 391 of the HRIER. The HRIER also identifies 20 additional properties in the APE as eligible for the NRHP and CRHR through earlier survey efforts. As a result, FTA also requests SHPO's ***concurrence*** on the eligibility determination for this particular resource.

Thank you for your assistance in this undertaking. If you have any questions or concerns, please contact Alex Smith at (415) 744-2599.

Sincerely,

Leslie T. Rogers
Regional Administrator

Copy (by email): Britt Tanner, SFMTA

Enclosures: Attachment A – Geary Corridor Study Area
Attachment B.1-B.4 – Archaeological APE (by alternative)
Attachment C – Architectural APE
Attachment D – Historic Resources Inventory Evaluation Report (HRIER)
Attachment E – Archaeological & Native American Cultural Resources Sensitivity Assessment

This page intentionally left blank.

STATE OF CALIFORNIA – THE RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

May 28, 2015 Reply To: FTA_2015_0423_001

Leslie Rogers
Regional Administrator
Federal Transit Administration
201 Mission Street, Suite 1650
San Francisco, CA 94105-1839

Re: Section 106 Consultation for the Geary Boulevard Bus Rapid Transit (BRT) Project, City and County of San Francisco, CA

Dear Mr. Rogers:

Thank you for your letter of April 17, 2015, initiating consultation for the above-referenced undertaking in order to comply with Section 106 of the National Historic Preservation Act of 1966 and its implementing regulation at 36 CFR Part 800. The Federal Transit Administration (FTA) is requesting my comments on the Area of Potential Effect (APE) for the undertaking, comments on the two cultural resources reports included with your letter, and concurrence with the determination of eligibility for the St. Francis Square Cooperative. Included with your letter were:

- *Draft Historic Resources Inventory and Evaluation Report, Geary Corridor Bus Rapid Transit (BRT) Project, San Francisco, California* (HRIER, JRP, March 2014)
- *Archaeological and Native American Cultural Resources Sensitivity Assessment for the Geary Corridor Bus Rapid Transit Project, San Francisco, California* (Far Western, May 2014)

FTA is providing funding to the San Francisco Municipal Transit Agency's (SFMTA) for the construction and implementation of BRT service along Geary Street and Geary Boulevard. The undertaking would construct and operate BRT service along dedicated lanes within various locations of San Francisco's Geary corridor, including physical transit infrastructure improvements such as transit signal priority, pavement resurfacing, new and relocated stations, and curb ramp and corner bulb installation. The SFMTA is currently analyzing multiple alternatives; however the Staff-Recommended Alternative is the Hybrid Alternative described in your letter.

FTA has delineated the APE for archaeology and the built environment. The archaeological APE covers approximately 131 acres in the Geary corridor, including the public right-of-way (ROW) including the full width of the street and the full length of the 38 Local and 38 Limited routes, from 48th Avenue (west) to the Transbay Terminal (east). This includes the entirety of Geary Boulevard/Geary Street and portions of O'Farrell Street, Market Street, Mission Street, and First Streets. In areas where proposed improvements would be confined to the street itself, the APE is set to the curb-to-curb width of the corridor. In areas where a new or relocated curbside bus stop is proposed, the APE expands to encompass the entirety of the public ROW, including the sidewalk. The maximum depth of ground disturbance has not been precisely identified, but would generally not exceed 16 feet below modern ground surface.

The built environment APE is generally the same as the archaeological APE described above, with the exception of areas where a new side or relocated curbside bus stop is proposed, at which the APE expands outwardly to encompass one adjacent parcel. In the area of the Kearny/Market/Mason/Sutter Conservation District and the Uptown Tenderloin Historic District, the built environment APE encompasses only those portions of the districts directly fronting proposes side BRT stations and/or new or moved local stops. Both the archaeological and built environment APE is subject to refinement once an alternative is chosen.

After reviewing the information submitted with your letter, I offer the following comments:

- I concur that the Area of Potential Effect (APE) as represented in the attachments to your letter is appropriate.
- I have no comments on the identification documents at this time. The identification efforts to date appear adequate.
- As the HRIER is in draft form, I cannot offer formal concurrence regarding the eligibility of the St. Francis Square Cooperative at this time. Once the report is finalized, please resubmit it for concurrence on eligibility determinations.

Thank you for considering historic properties in your planning process, and I look forward to continuing this consultation with you. If you have any questions, please contact Kathleen Forrest of my staff at (916) 445-7022 or e-mail at kathleen.forrest@parks.ca.gov.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer

U.S. Department
of Transportation
Federal Transit Administration

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

90 Seventh Street
Suite 15-300
San Francisco, CA 94103-6701

SEP 13 2016

Ms. Carol Roland-Nawi
State Historic Preservation Officer
Office of Historic Preservation
California Department of Parks and Recreation
1725 23rd Street, Suite 100
Sacramento, CA 95816
Attention: Dr. Susan Stratton and Kathleen Forrest, Project Review Unit

Re: Request for Concurrence on Eligibility of a Historic Resource and Finding of No Adverse Effect for Geary Bus Rapid Transit Project, San Francisco, California (FTA_2015_0423_001)

Dear Ms. Roland-Nawi:

The Federal Transit Administration (FTA) is continuing Section 106 consultation for the Geary Bus Rapid Transit (BRT) Project and is submitting a final Historic Resources Inventory and Evaluation Report (HRIER) and Finding of Effect (FOE) for your concurrence. Along with final HRIER and FOE, this letter provides updates and clarifications on the NEPA/CEQA process for the Project and requests concurrence from the California State Historic Preservation Office (SHPO) for eligibility of historic resources for the National Register of Historic Places (NRHP) and determination of no adverse effects to historic resources, pursuant to Section 106 of the National Historic Preservation Act (NHPA).

Project Description
SFMTA, in cooperation with FTA and SFCTA, proposes to implement BRT improvements along the City of San Francisco's Geary Street corridor. The Project would be located along the entire six-mile length of the Geary corridor, a primary east-west roadway and transit spine across the northern neighborhoods of San Francisco. The corridor is comprised of: Geary Boulevard, a two-way arterial between 48th Avenue and Gough Street; and the pair of one-way streets between Gough and Market Street including Geary Street, which runs westbound, and its companion, O'Farrell Street, which runs eastbound one block south of Geary Street. The corridor also includes Geary bus line routing between Market Street and the Transbay Terminal, although the Project does not propose infrastructure changes in this portion of the corridor.

On October 1, 2015 letters were sent to the following Native American tribal leaders per 36 CFR 800.2(c)(4) in order to help identify prehistoric sites, sacred sites, and/or traditional cultural properties located in the vicinity of the project area: Jakki Kehl (representative of the Ohlone/Costonoan Tribe), Irene Zwierlein (Chairperson of the Amah/Mutsun Tribal Band), Ann

Marie Sayers (chairperson of the Indian Canyon Mutsun Band of Costonoan), Rosemary Cambra (chairperson of the Muwekma Ohlone Indian Tribe of the SF Bay Area), Romana Garibay (representative of the Trina Marie Ruano Family), and Andrew Galvan (representative of the Ohlone Indian Tribe). No responses to these letters were received.

Update on NEPA/CEQA Process

FTA and SFMTA/SFCTA issued a Draft EIS/EIR for the Project on October 2, 2015. The comment period for the NEPA/CEQA and Section 106 materials closed 59 days later on November 30, 2015. Nearly 300 individual pieces of correspondence were received with several hundred public comments in total. The Draft EIS/EIR identified the Hybrid Alternative as the Staff-Recommended Alternative. Based on public comments received, SFMTA/SFCTA have identified three modifications to the Hybrid Alternative as follows.

Spruce/Cook bus stop changes. The LPA no longer adds a BRT stop to the Spruce-Cook block of Geary Boulevard. The existing eastbound and westbound bus stops on this block would remain and their lengths would be reduced slightly. These bus stops would serve Local-only buses rather than Local and Rapid buses under the existing service plan, which would increase the distance between Rapid bus stops.

Webster Street bridge. The existing pedestrian bridge at Webster Street would remain standing and open for use. In addition, the LPA would add two pedestrian surface crossings on either side of the bridge; a straight crossing on the west side of the intersection and a staggered crossing on the east side. The staggered crossing would improve pedestrian sight distance at the westbound frontage road, as pedestrians would cross in front of the existing bridge piers so they would not be obstructed behind the pier when crossing. Signal timing would be designed to allow pedestrians to cross in one cycle, with multiple wide medians providing pedestrian refuge areas. A pedestrian barrier would be installed on the center median of the staggered crossing to guide pedestrians to the second crossing.

Additional pedestrian crossing improvements at various intersections along the Geary corridor. The Hybrid Alternative had proposed to construct 51 pedestrian crossing bulbs at high-priority locations in the Geary corridor as detailed in the project plans (Appendix A), for a total of 65 (No Build plus Build Alternatives). Modifications to the Hybrid Alternative would add a further 26 pedestrian bulbs, plus a painted safety zone, and also implement daylighting at strategic intersection locations along the Geary corridor, both on the corridor streets themselves and on side streets at corridor intersections.

All of the proposed changes to the Hybrid Alternative would occur within public right-of-way areas. None of the proposed changes would alter the APE or involve any new effects to historic resources relative to what the Draft EIS/EIR identified for the Hybrid Alternative. Therefore, no changes to the HRIER or FOE are needed.

Request for Concurrence

In accordance with 36 CFR 800.4, FTA requests the SHPO's concurrence on the eligibility of the St. Francis Cooperative. Per the attached HRIER and FOE, the St. Francis Cooperative is the only historic resource within the APE that has been found eligible for individual listing in the NRHP and the CRHR as a result of this study. The St. Francis Square Cooperative is a low-income housing development constructed in 1963 as part of the City's redevelopment effort of the Western Addition, as further discussed in the Department of Parks and Recreation (DPR) form 523A on page 491 of the HRIER. The HRIER also identifies 20 additional properties in the APE as eligible for the NRHP and CRHR through earlier survey efforts. As a result, FTA requests SHPO's concurrence on the eligibility determination for this particular resource.

The FOE applies the criteria of adverse effect per, 36 CFR 800.5(a)(1) for the proposed undertaking and concludes that the undertaking would result in no adverse effect to the 52 historic properties and historic district within the architectural APE. Therefore, in accordance with 36 CFR 800.5, FTA requests SHPO's concurrence that the proposed undertaking would result in no adverse effect on historic resources.

We look forward to receiving your concurrence within 30 days of your receipt of this submittal. Thank you for your assistance in this undertaking. If you have any questions or concerns, please contact Alex Smith at (415) 734-9472.

Sincerely,

For Leslie T. Rogers
Regional Administrator

Attachments: A – Final HRIER, B – Finding of Effect (FOE)

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

90 Seventh Street
Suite 15-300
San Francisco, CA 94103-6701
415-734-9490
415-734-9489 (fax)

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
California Department of Parks and Recreation
1725 23rd Street, Suite 100
Sacramento, CA 95816

Attention: Kathleen Forrest, Historian

OCT 27 2016

Re: Supplemental Information for Eligibility of a Historic Resource and Finding of Effect for Geary Bus Rapid Transit Project, San Francisco, CA (FTA_2015_0423_001)

Dear Ms. Polanco:

The Federal Transit Administration (FTA) is continuing consultation under Section 106 of the National Historic Preservation Act and is supplementing our September 13, 2016 letter. The purpose of this letter is to provide additional information with respect to archaeological resources for the Geary Bus Rapid Transit (BRT) Project (Undertaking) and request your concurrence on the finding of no adverse effect on historic properties for this Undertaking.

Description of the Undertaking

The Hybrid Alternative represents the local agency staff recommended alternative that would be recommended to local legislative boards as the Locally Preferred Alternative. The Hybrid Alternative will operate within dedicated bus-only lanes along most of the Geary corridor. These lanes would be side running from Market Street, through the Inner Geary area, across the Fillmore District and Masonic Avenue. At Palm/Jordan Avenues, the bus-only lanes would transition to center running. This configuration would extend west to 27th Avenue. At 27th Avenue, bus-only lanes would revert to side-running until reaching 34th Avenue. BRT service would extend from the Transbay Transit Center to 48th Avenue, but from 34th to 48th Avenue buses would operate in mixed-flow travel lanes. Bus lanes and all related ancillary improvements would be implemented entirely within public right-of-way areas on the Geary corridor and intersecting streets. Two elements are no longer included with Hybrid Alternative the Hybrid Alternative: removal of the Webster Street pedestrian bridge and replacement of two local bus stops with new BRT stops at Spruce/Cook Streets. The Undertaking will not alter the pedestrian bridge or the two bus stops.

Archeological Resources Identification Efforts
On April 17, 2015, FTA submitted a letter to your office that delineated an archaeological area of potential effect (APE) and provided an *Archaeological & Native American Cultural Resources Sensitivity Assessment* for the Undertaking. On May 28th, 2015, your office concurred on the delineation of the APE and indicated that the identification efforts were adequate.

The sensitivity assessment examined the likelihood of encountering previously unrecorded or unknown archaeological resources during excavation. The sensitivity assessment identified 244 archaeological projects that have taken place within the records search area. These studies documented 26 formally recorded archaeological resources (including both prehistoric and historic-era sites) along with five potential/not formally recorded archaeological resources. No archeological resources were documented as extending into or within the APE.

No Native American cultural resources were reported from the Native American Heritage Commission sacred lands file records search. Nor were any areas of Native American concern identified by the list of Native American contacts provided by the Commission. The SFCTA sent letters to Native American contacts in 2009 and again in 2011. Consistent with 36 CFR 800.2(c)(4), FTA sent invitations regarding government to government consultation on October 1, 2015 to the following Native American tribal leaders in order to help identify prehistoric sites, sacred sites, and/or traditional cultural properties located in the vicinity of the project area: Jakki Kehl (representative of the Ohlone/Costonoan Tribe), Irene Zwierlein (Chairperson of the Amah/Mutsun Tribal Band), Ann Marie Sayers (chairperson of the Indian Canyon Mutsun Band of Costonoan), Rosemary Cambra (chairperson of the Muwekma Ohlone Indian Tribe of the SF Bay Area), Romana Garibay (representative of the Trina Marie Ruano Family), and Andrew Galvan (representative of the Ohlone Indian Tribe). No responses to these letters were received.

The sensitivity assessment indicated no or low potential exists to encounter undiscovered buried archaeological resources for the most of the APE. Two exceptions to this general assessment of low sensitivity are mid-nineteenth century area near the old Yerba Buena Cove, and the stretch of Geary between Masonic and Gough widened in the 1960s. However, any high potential for historic resources is tempered by earlier extensive ground disturbance and construction associated with the construction of the Fillmore underpass (and associated pump station) as well as the Masonic tunnel, which opened in 1974.

Effects Evaluation
As documented in the Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR), the maximum depth of disturbance for the Undertaking would be 16 feet for the installation of street lights/traffic signal poles, sewer replacement, and pedestrian-scale lights. Shelter canopies would require excavating up to 1.5 feet while bus bulb-outs would be up to 1 foot. Excavation of up to 16 feet would occur in areas considered to have low potential to yield prehistoric archaeological resources and higher potential for encountering historic-era resources, particularly between Masonic Avenue and Gough Street. However, as noted above, these areas have been the subject of extensive ground disturbance and construction associated with the construction of the Fillmore underpass (and associated pump station) as well as the Masonic tunnel . The construction of these would likely have disturbed or destroyed any intact historic-era resources, so that the likelihood of encountering new intact, eligible resources is low.

Construction of the Hybrid Alternative would also require sewer relocations near Park Presidio Boulevard at depths of up to 16 feet. These sewer relocations improvements would occur in areas considered to have low potential to encounter either pre-historic or historic-era archaeological resources. Streetscape features, particularly bus shelters and lighting, would require excavation to 16 feet in select locations, but these excavations are limited and located generally within areas of low or no sensitivity to yielding previously unrecorded archaeological resources. Between Palm/Jordan Avenues and 27th Avenue where the alignment would be center running and require the greatest excavation work, the potential to encounter historic era resources is low.

The infilling of the Old Yerba Buena Cove along with previous disturbance along Mission and Market Streets further reduces the potential for intact resources. The retention of the Webster Street pedestrian bridge and retention of two local bus stops at Spruce and Cook Streets reduces excavation work and the potential to encounter buried resources.

An Unanticipated Discovery Plan will be developed, in coordination with your office, for the Undertaking. In the unlikely event that intact archaeological resources are discovered during construction activities, construction will be halted and the discovery area isolated and secured until a qualified archaeologist assess the nature and significance of the find as outlined in the Unanticipated Discovery Plan.

Determination
Based on the supplemental information provided in this letter, the analysis in the Draft EIS/EIR, and the information provided in the previous consultations, FTA has determined that the Project would have no adverse effect on archaeological resources. As previously noted in our September 13, 2016 letter, FTA has also determined that the Project would have no adverse effect on built historic resources. Therefore, in accordance with 36 CFR § 800.5, FTA requests your concurrence with a finding of no adverse effect on historic properties for this undertaking.

Thank you for your assistance in this undertaking. If you have any questions or concerns, please contact Alex Smith at (415) 734-9472.

Sincerely,

Raymond Sukys for

Leslie T. Rogers
Regional Administrator

cc: Wahid Amiri, SFMTA

This page intentionally left blank.

STATE OF CALIFORNIA – THE RESOURCES AGENCY

EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

December 6, 2016

Reply To: FTA_2015_0423_001

Leslie Rogers
Regional Administrator
Federal Transit Administration
90 Seventh Street, Suite 15-300
San Francisco, CA 94103-6701

Re: Section 106 Consultation for the Geary Boulevard Bus Rapid Transit (BRT) Project, City and County of San Francisco, CA

Dear Mr. Rogers:

Thank you for the letter received September 15, 2016, continuing consultation for the above-referenced undertaking in order to comply with Section 106 of the National Historic Preservation Act of 1966 and its implementing regulation at 36 CFR Part 800. The Federal Transit Administration (FTA) provided additional information in the letter received November 2, 2016. Included with the September 15, 2016, letter were:

- *Historic Resources Inventory and Evaluation Report, Geary Corridor Bus Rapid Transit (BRT) Project, San Francisco, California* (HRIER, JRP, August 2015)
- *Finding of Effect Geary Corridor Bus Rapid Transit (BRT) Project, San Francisco, California* (FOE, JRP, August 2015)

FTA is providing funding to the San Francisco Municipal Transit Agency's (SFMTA) for the construction and implementation of BRT service along Geary Street and Geary Boulevard. The undertaking would construct and operate BRT service along dedicated lanes within various locations of San Francisco's Geary corridor, including physical transit infrastructure improvements such as transit signal priority, pavement resurfacing, new and relocated stations, and curb ramp and corner bulb installation. The SFMTA is currently analyzing multiple alternatives; however the Staff-Recommended Alternative is the Hybrid Alternative described in FTA's letter and is the alternative that will be brought forward for approval, and comprises the undertaking for the purposes of this consultation.

The letter from my office dated May 28, 2015 agreed with FTA's delineation of the Area of Potential Effect (APE) and the identification efforts to that date. The current submittal requests concurrence on the eligibility of the St. Francis Cooperative as well as a finding of no adverse effect for the undertaking.

On April 17, 2015, FTA submitted to our office an *Archaeological and Native American Cultural Resources Sensitivity Assessment* (Byrd, Kaijankoski, and Costello 2014). As explained in Byrd, Kaijankoski, and Costello 2014, the purpose of the sensitivity assessment was to help project planners anticipate the general types of cultural resources for the area. As an alternative had yet to be chosen, including the placement of the vertical area of direct impact (ADI), the sensitivity analysis was limited to providing a "general assessment of the potential for encountering previous undocumented archaeological sites below the modern urban land surface" (Byrd, Kaijankoski, and Costello 2014: 1).

As indicated in FTA's November 2, 2016, letter, the result of the sensitivity assessment was successful in identifying areas that have the potential to contain archaeological deposits below the modern urban landscape. However, the November 2 letter only references the Yerba Buena Cove Reclaimed land and the Geary Expressway and Cemetery Area as having a moderate to high sensitivity level for encountering historic-era archaeological deposits. The letter fails to mention that the prehistoric archaeological sensitivity analysis also identified areas that not only have varied potential to contain buried prehistoric archaeological resources, but that considerable areas within the western and eastern portions of the APE were found to have a high potential for buried prehistoric archaeological deposits. Additionally, as stated above, the findings of the sensitivity analysis were limited being that a final alternative had yet to be chosen, in particular the placement of the vertical ADI. As such Byrd, Kaijankoski, and Costello 2014 provided recommendations and a very detailed process for completing identification efforts "once a final alternative is chosen, and the vertical Study Area and the ADI are identified" (56), including specific efforts to be conducted by a historical archaeologist.

After reviewing the information submitted with your letter, I offer the following comments:

- Following the review of Byrd, Kaijankoski, and Costello 2014, the SHPO had "no comments on the identification documents at this time" and further stated that "the identification efforts to date appear adequate" (SHPO to FTA, letter, 28 May 2015). These comments were provided with the expectation that further identification efforts, as described in Byrd, Kaijankoski, and Costello 2014, were to occur once an alternative had been chosen. At this time, the SHPO <u>cannot concur with FTA's finding of no adverse effect for this undertaking for the following reasons</u>:
    - There is no discussion or analysis for the potential to effect buried prehistoric archaeological deposits within the APE. In particular, potential effects to buried prehistoric archaeological deposits within the western and eastern locations, two locations Byrd, Kaijankoski, and Costello 2014 identified as being highly sensitive for buried prehistoric archaeological deposits;
    - As indicated in Byrd, Kaijankoski, and Costello 2014, it was inconclusive whether or not previous construction had destroyed buried historic-era archaeological deposits within the Yerba Buena Cove Reclaimed land and the Geary Expressway and Cemetery Area. Therefore, it is unclear how FTA has determined that there is very little to no likelihood of encountering intact archaeological resources within areas of the APE determined to have a moderate to high potential for buried historic-era resources; and

- It is unclear why the recommendations detailed in Byrd, Kaijankoski, and Costello 2014 on pages 54 through 58 for further identifying the potential for encountering buried prehistoric and historic-era archaeological resources within areas of the APE determined to have a moderate to high level of sensitivity has not occurred.

- The HRIER and FTA's September 15, 2016, letter identified the St. Francis Cooperative as a historic property eligible for listing on the National Register of Historic Places (NRHP). Table 3 on page 5-7 of the HRIER also lists an additional 21 previously surveyed properties within the APE that had been recommended as eligible for the NRHP, but have not received concurrence. Please clarify whether FTA is requesting concurrence on those recommendations, or assuming them eligible for the purposes of this project. Please also clarify the effect of the undertaking on these properties.
- Table 5 on page 5-9 of the HRIER lists 70 properties recommended as not eligible for listing on the NRHP. Please clarify whether FTA is requesting concurrence on the ineligibility of these properties.

Additionally, as stated in 36 CFR § 800.13(a)(2) it is the agency's responsibility to include in the FOE a process to resolve any adverse effects on historic properties likely to be discovered during implementation of an undertaking. The identification of subsurface archaeological properties is obviously limited by the urban nature of the APE, and areas of sensitivity were identified in the *Archaeological and Native American Cultural Resources Sensitivity Assessment* (Byrd, Kaijankoski, and Costello 2014). The unanticipated discovery plan proposed by FTA in the November 2, 2016, letter to address the post-review discovery of subsurface resources needs to be submitted for SHPO review and comment prior to concurrence with a finding of effect.

I look forward to continuing this consultation with you. If you have any questions, please contact Kathleen Forrest of my staff at (916) 445-7022 or e-mail at kathleen.forrest@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

90 Seventh Street
Suite 15-300
San Francisco, CA 94103-6701
415-734-9490
415-734-9489 (fax)

SEP 14 2017

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
California Department of Parks and Recreation
1725 23rd Street, Suite 100
Sacramento, CA 95816
Attention: Kathleen Forrest, State Historian

Re: Request for Concurrence on Eligibility of a Historic Resource and Finding of No Adverse Effect for Geary Bus Rapid Transit Project, San Francisco, CA (FTA_2015_0423_001)

Dear Ms. Polanco:

The Federal Transit Administration (FTA), in cooperation with the San Francisco Municipal Transportation Agency (SFMTA) and San Francisco County Transportation Authority (SFCTA), is continuing consultation with the California State Historic Preservation Officer (SHPO) pursuant to Section 106 of the National Historic Preservation Act (NHPA) for the Geary Bus Rapid Transit (BRT) Project in San Francisco, California. This letter responds to your letter of December 6, 2016 and provides additional information on archaeological resources. In accordance with 36 CFR 800.5, FTA requests your concurrence with the determination of eligibility and determination of no adverse effect to historic properties.

Additional Information on the Undertaking

The undertaking involves the implementation of BRT improvements along a five-mile segment of Geary between 48th Avenue and Market Street in San Francisco, California. The enclosed Finding of Effect (FOE) report provides an analysis of potential effects of each project alternative to support the Environmental Impact Statement (EIS) prepared pursuant to the National Environmental Policy Act; however, the undertaking is defined as the Hybrid Alternative since it was identified as the locally preferred alternative.

The Hybrid Alternative extends side-running bus-only lanes between Market Street and Palm Avenue, center-running lanes without passing lanes in a dedicated median from Palm Avenue to 27th Avenue, and side-running lanes from 27th Avenue to 34th Avenue. The refinements to the Hybrid Alternative since publication of the 2015 Draft EIS/EIR include the following:

- Removal of the proposed Webster Street pedestrian bridge, thus retaining the existing bridge
- New BRT stops at Spruce/Cook Streets (existing local/express stops retained)
- Additional pedestrian improvements (primarily pedestrian bulbs) at locations throughout the Geary corridor
- New BRT stops at Laguna Street

- Retained local stops at Collins Street. (i.e. no changes to local bus stops at Collins)
- Minor shift of the westbound center-running to side-running bus-only lane transition area by one block, from 26th and 27th avenues to the block between 27th and 28th Avenues.

As noted in our previous letter, the refinements occur within the area of potential (APE). FTA and SHPO agreed on the delineation of the APE in May 2015. As shown on Table 2 of the FOE, the archeological APE includes a depth of 1 to 3 feet below surface within the roadway or sidewalk of Geary, which encompasses the depth of ground disturbance due to construction and utility relocation. The exceptions are locations of street lights and other signal poles (16 feet), sewer replacement between 12th and 16th Avenues on Geary (16 feet), and catch basin inlet and hydrant relocations (8 feet). Additional detail on the Hybrid Alternative and these refinements may be found in Section 1.4 of the FOE.

Determination of Eligibility

In accordance with 36 CFR § 800.4, FTA is requesting your concurrence on the following determinations of eligibility for the National Register of Historic Places (NRHP). As stated in our letter of September 15, 2016, FTA determined that the St. Francis Cooperative is a historic property eligible for listing on the NRHP under Criteria A and C as part of this study. Twenty-one (21) properties, shown on Table 3 of the enclosed Final Historic Resources Inventory and Evaluation Report (HRIER), were previously surveyed and recommended as eligible; however, no previous consultation with your office was conducted for these properties. Therefore, FTA is also requesting concurrence that these 21 properties are eligible for the NRHP. Table 5 of the HRIER lists 69 properties that were found to be ineligible for the NRHP. Appendix B of the HRIER includes the associated State of California Department of Parks and Recreation (DPR) 523 Forms.

Supplemental Archaeological Resources Identification Efforts

In the letter dated December 6, 2016, SHPO found that it could not concur with FTA's finding of no adverse effect because additional details to elaborate on the specific sensitivity of the Geary corridor for archaeological resources had not been provided. SHPO recommended that the recommendations in the *Archaeological and Native American Cultural Resources Sensitivity* Assessment (2014 Sensitivity Assessment) be followed. The 2014 Sensitivity Assessment identified two areas of elevated sensitivity in the eastern end of the project along Market Street within the historic-era margin of Yerba Buena Cove and the western portion of the project between Masonic and Gough Streets. These recommendations included more detailed historic archival study of the chosen alternative and of buried site sensitivity for both historic-era and prehistoric resources within the project area.

In response to those recommendations, the enclosed *Addendum to the Archaeological Resources Sensitivity Assessment, Research Design, and Treatment Plan* (2017 Addendum) for the Geary Corridor Bus Rapid Transit Project was prepared. The 2017 Addendum re-assessed site sensitivity based on revised modeling of sub-surface soils and additional archival study. This study updates the earlier one with new information on the age of the soils and the locations of historic-era fresh water sources and dune fields in the northern San Francisco Peninsula. Although the prehistoric sensitivity has moderate or low potential throughout the entire project area, an analysis of the cut-and-fill history of the Geary Corridor was conducted to further rule out areas where prehistoric deposits may have been found but are unlikely to be encountered by the project.

Sensitivity assessments for sub-surface prehistoric archaeological sites identified areas of moderate, low, and very low sensitivity for prehistoric archaeological resources for most the corridor. On the Market Street portion in the eastern edge of the corridor, the project is within areas of low or moderate sensitivity for buried prehistoric resources. The project area along Market Street is within the historic-era margin of Yerba Buena Cove. Therefore, although the project area has lowest sensitivity for surface or buried archaeological sites, the project area has a high potential for sites submerged beneath Bay Mud as the bay expanded during the Middle and Late Holocene. Sites submerged below the Bay Mud have been found at depths greater than 20 feet. Since project excavations would occur at depths of up to 16 feet, project excavations in this area would not be sufficiently deep to encounter buried prehistoric resources. (See 2017 Addendum Section 2 for additional information on the research conducted for archeological sensitivity).

The Geary corridor between Masonic Avenue and Gough Street was characterized with moderate sensitivity for historic-era archaeological resources in the 2014 Sensitivity Assessment. Historic-era archaeological sensitivity analysis indicated the potential to disturb elements of urban infrastructure and potential historic-era graves, occupational debris, and other features along the Geary Expressway and Cemetery Area between Masonic and Gough Streets. A systematic review of project design plans was undertaken to evaluate the potential to encounter such remains during construction. As shown on Table 5 of the 2017 Addendum, the sensitivity for encountering these resources was reduced to low since areas were either within areas disturbed during the original construction of Geary Street or project elements will be built within footprints previously disturbed by modern infrastructure associated with Geary Street and the public right-of-way.

Effects evaluation

No archaeological sites have been recorded within the APE. No known sites will be affected by the project. However, five historic-era sites have been previously recorded adjacent to the archaeological APE. These five sites are historic-era resources that were identified well below the street surface and they do not appear that they extend into the archaeological vertical APE. In the unlikely event that archaeological deposits are encountered, a late discovery treatment plan was developed to address any inadvertent late discoveries during project implementation. (See Section 3.2 of the FOE).

Project components of the Hybrid Alternative, such as transit signal priority (TSP), traffic signal upgrades or replacement, medians, pedestrian countdown signals, accessible pedestrian signals, curb ramps, corner bulbs (curb extensions), the bicycle path, and mixed-flow traffic lanes and parallel parking, are considered minor project elements. These features occur primarily within the active transportation corridor and within footprints previously disturbed by modern infrastructure, and are consistent with the existing urban landscape, they have no potential to adversely affect historic properties, either directly or indirectly. The only project components that may have potential effects on historic properties are the BRT lanes and stations/stops; however, no direct impacts on historic properties are anticipated, including the underground pipes or other contributing features of the Auxiliary Water Supply System (AWSS). If during refinement of project design, it is determined that pipes will be directly impacted, the relocation and use of in-kind materials at these locations would be consistent with the Secretary of Interior (SOI) Standards and conducted in consultation with your office. The AWSS system would retain its overall integrity of location, design, setting, materials, workmanship, feeling, and association. In general, utility relocations would be done in advance of construction and would be done in coordination with the appropriate utility provider.

The Hybrid Alternative is adjacent to fourteen of the Golden Triangle Light Standards historic property, but all proposed stations/stops would be designed to avoid removal, relocation or damage to these historic structures. The Hybrid Alterative would also include the construction of a new westbound local stop at the intersections of Geary and Webster Streets and Geary and Buchannan Streets, respectively, that would be near or adjacent to as many as eight light standards that contribute to the Japan Center. Like the Golden Triangle Light Standards, the light standards associated with Japan Center would be designed to avoid removal, relocation or damage to the eight contributing Japan Center light standards. If during further design refinement a light standard cannot be avoided, the light standard will be relocated to another location within the historic property boundary of either the Golden Triangle Light Standard or Japan Center. While the relocation of any light standards would be a direct effect to these historic properties, it would not be adverse. These historic properties would retain overall integrity of setting, feeling, and association. All effort will be made first for relocation of light standards within the immediate vicinity of their original location while maintaining placement (distance) of the standard within the sidewalk in respect to curb and/or adjacent buildings; second, relocation within the same block if there is a site where the original light standard has been removed or replaced by modern standards; and last, relocation to an available site within the historic property boundary where an original standard has been removed or replaced by modern standards.

The Hybrid Alternative would not cause indirect adverse effects to the 53 historic properties identified along the corridor or associated historic district from operational or construction noise (36 CFR 800.5[a][2][v]) because none of these historic properties have an inherent quiet quality that is part of a property's historic character and significance. Similarly, there would be no indirect adverse effects from operational vibration as the BRT buses would have rubber tires and suspension systems that isolate vibrations from the ground.

Section 106 Determination

Based on the provided information with this letter, the supplemental reports transmitted herein, and the information provided previously, FTA has determined that the Project would have no adverse effect on built environment resources or archaeological resources. In accordance with 36 CFR 800.5, FTA requests your concurrence with a finding of no adverse effect on historic properties for this undertaking.

Section 4(f) Notification

Per 23 CFR Section 774.5(b), FTA is notifying you of our intent to make a *de minimis* impact determination under Section 4(f) of the Department of Transportation Act of 1966 for three historic resources, namely the Auxiliary Water Supply System, the Golden Triangle Light Standards, and light standards associated with Japan Center. FTA's *de minimis* impact determination is contingent upon your concurrence with the Section 106 finding of no adverse effect to historic properties.

Thank you for your assistance in this undertaking. If you have any questions or concerns, please contact Alex Smith, Community Planner, at (415) 734-9472.

Sincerely,

Leslie T. Rogers
Regional Administrator

Enclosures:

1. Final Historic Resources Inventory and Evaluation Report (HRIER) (2017)
2. Addendum Archaeological and Native American Cultural Resources Sensitivity Assessment, Research Design, and Treatment Plan (2017)
3. Finding of Effect (FOE) (July 2017)

STATE OF CALIFORNIA – THE RESOURCES AGENCY

EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

October 17, 2017

Reply To: FTA_2015_0423_001

Leslie Rogers
Regional Administrator
Federal Transit Administration
90 Seventh Street, Suite 15-300
San Francisco, CA 94103-6701

Re: Geary Boulevard Bus Rapid Transit (BRT) Project, City and County of San Francisco, CA

Dear Mr. Rogers:

Thank you for the letter received September 18, 2017, continuing consultation with the State Historic Preservation Officer (SHPO) for the above-referenced undertaking in order to comply with Section 106 of the National Historic Preservation Act of 1966 and its implementing regulation at 36 CFR § 800. The Federal Transit Administration (FTA) provided the following documents:

- *Historic Resources Inventory and Evaluation Report, Geary Corridor Bus Rapid Transit (BRT) Project, San Francisco, California* (HRIER, JRP Historical Resources Consulting, LLC, April 2017)
- *Finding of Effect Geary Corridor Bus Rapid Transit (BRT) Project, San Francisco, California* (FOE, JRP Historical Resources Consulting, LLC and Far Western Anthropological Research Group, July 2017)
- *Addendum Archaeological and Native American Cultural Resources Sensitivity Assessment, Research Design, and Treatment Plan for the Geary Corridor Bus Rapid Transit Project, San Francisco, California* (2017 Addendum, Far Western Anthropological Research Group, Albion Environmental, and JRP Historical Resources Consulting, LLC, June 2017)

FTA is providing funding to the San Francisco Municipal Transit Agency's (SFMTA) for the construction and implementation of BRT service along Geary Street and Geary Boulevard. SFMTA has chosen the Hybrid Alternative as the locally preferred alternative, which extends side-running bus-only lanes between Market Street and Palm Avenue, center-running lanes without passing lanes in a dedicated median from Palm Avenue to 27th Avenue, and side-running lanes from 27th Avenue to 34th Avenue.

The letter from my office dated May 28, 2015 agreed with FTA's delineation of the Area of Potential Effect (APE) and the identification efforts to that date. The current submittal responds to the SHPO's comments of December 6, 2016, and requests concurrence with the identification efforts and finding of effect.

FTA has provided additional information regarding the archaeological sensitivity of the Geary corridor. The 2017 Addendum re-assessed site sensitivity based on revised modeling of sub-surface soils and additional archival study. The sensitivity assessments for sub-surface prehistoric archaeological sites identified areas of moderate, low, and very low sensitivity. No new archaeological sites were recorded within the APE and no known sites will be affected by the undertaking. Five-historic era sites have been previously recorded within the APE, but are located well below street surface and do not appear to extend into the vertical APE. A late discovery treatment plan was developed to address any inadvertent discoveries during project implementation.

FTA has identified the St. Francis Square Cooperative as eligible for listing in the National Register of Historic Places (NRHP) within the APE. Twenty-one properties were previously surveyed and recommended as eligible, but were not submitted to the SHPO for concurrence. FTA has determined that these properties, shown in the table below, are also eligible for listing in the NRHP:

Properties that appear to be eligible for listing in the NRHP.

Map Reference No.	Block/Lot No.	Address	Year Built	Status Code	Resource Name
05-15	n/a	n/a	1908-1964	3S	Auxiliary Water Supply System
06-03	1433 009	3700 Geary Blvd.	1893	3S	Park & Ocean Railroad Company, Geary St. Car Barn.
09-01	0709 027	1510 O'Farrell St.	1962-63	3S	St. Francis Square Cooperative
09-02	0700 022, 0700 023, 0700 027, 0700 028, 0700 029	1610 Geary Blvd.	1965-68	3S	Japan Center
09-03	0711 012, 0711 013, 0711 021	1450 Laguna St.	1936, 1955, 1963	3S, 6Z	San Francisco Japanese Salvation Army
10-04	0303 003	601 Leavenworth St.	1924	3D	Casa Feliz Apartments
11-01	n/a	Geary Blvd./O'Farrell St.	1917-18	3S	Golden Triangle Light Standards
11-02	0307 001	301-345 Powell St.	1904-13	3S	St. Francis Hotel
11-03	0326 018	235-243 O'Farrell St.	1910	3S	Hotel Barclay
11-04	0326 001	201-219 O'Farrell St.	1907	3S	Marquard's Little Cigar Store
11-05	0309 010	166-170 Geary St.	1906-07	3S	Whittell Building
11-06	0309 009	156 Geary St.	1907	3S	
11-07	0309 008	152 Geary St.	1907	3S	
11-08	0309 007	146 Geary St.	1907	3S	
11-09	0309 006	132-140 Geary St.	1907	3S	Sachs Building
11-10	0328 003, 0328 004	46-48 Stockton St.	1909	3S	Newman & Levinson Bldg.
11-11	0328 001	760-784 Market St.	1908	3S	Phelen Building
11-13	0310 024	46 Geary St.	1907	3S	
11-14	0310 008	28-36 Geary St.	1908	3S	Rosenstock Building

Map Reference No.	Block/Lot No.	Address	Year Built	Status Code	Resource Name
11-16	0310 005	10-12 Geary St.	1907, 1908	3S	Schmidt Building
11-17	0310 006	2 Geary St.	1908	3S	Fidelity Savings
11-18	0310 012	66 Geary St.	1906	3S	Hotel Greystone

FTA has also identified 69 properties that have been determined to be ineligible for the NRHP, listed in the table below:

Properties that do not appear eligible for listing in the NRHP and do not appear to be historical resources for the purposes of CEQA.

Map Reference No.	Block/Lot No.	Address	Year Built	Status Code
02-01	1465 022	6940 Geary Blvd.	1955	6Z
02-02	1511 043A	6945-6947 Geary Blvd.	1941	6Z
02-03	1511 044	6939 Geary Blvd.	1958	6Z
02-04	1511 045	6931-6933 Geary Blvd.	1949	6Z
03-01	1457 024	6150 Geary Blvd.	1922	6Z
03-02	1457 023	6146 Geary Blvd.	1912	6Z
03-03	1457 022A	6138 Geary Blvd.	1921	6Z
03-04	1457 022	6130-6134 Geary Blvd.	1922	6Z
03-05	1457 021	6126-6128 Geary Blvd.	1920	6Z
03-06	1457 020	6120-6124 Geary Blvd.	1923	6Z
03-07	1457 019	6114-6118 Geary Blvd.	1940	6Z
03-08	1457 017, 1457 018	6100-6102 Geary Blvd.	1898, 1922	6Z
03-09	1519 035A	6149-6157 Geary Blvd.	1926	6Z
03-10	1519 037	6135 Geary Blvd.	1937	6Z
03-11	1519 039	6127 Geary Blvd.	1922	6Z
04-01	1446 028	5050 Geary Blvd.	1917	6Z
04-02	1446 027	5036-5038 Geary Blvd.	1909	6Z
04-03	1446 025, 1446 026	5026-5032 Geary Blvd.	1913, 1948	6Z
04-04	1446 024	5000-5020 Geary Blvd.	1918	6Z
04-05	1530 028	410 15th Ave.	1916	6Z
04-06	1530 029	5039-5045 Geary Blvd.	1922	6Z
04-07	1530 031	5025-5031 Geary Blvd.	1923	6Z
04-08	1530 001	5001 Geary Blvd.	1946	6Z
05-01	1538 031	4249 Geary Blvd.	1922	6Z
05-02	1538 033	4237-4239 Geary Blvd.	1922	6Z
05-03	1538 034	4233-4235 Geary Blvd.	1921	6Z
05-04	1538 035	4225 Geary Blvd.	1947	6Z
05-05	1538 036	4221-4223 Geary Blvd.	1919	6Z
05-06	1538 037	4215-4217 Geary Blvd.	1919	6Z
05-07	1538 001	4201-4207 Geary Blvd.	1925	6Z
05-08	1437 021	4138-4142 Geary Blvd.	1925	6Z
05-09	1437 020	4134 Geary Blvd.	1905	6Z

Map Reference No.	Block/Lot No.	Address	Year Built	Status Code
05-10	1437 019A	4126-4130 Geary Blvd.	ca. 1900	6Z
05-11	1437 019	4120-4124 Geary Blvd.	ca. 1895	6Z
05-12	1437 017, 1437 018	4110-4116 Geary Blvd.	ca. 1890s, 1921	6Z
05-13	1437 016	397 5th Ave.	ca. 1899	6Z
05-14	1540 001A, 1540 050, 1540 051	4001-4099 Geary Blvd.	1947, ca. 2005	6Z
06-01	1433 014	3750-3754 Geary Blvd.	ca. 1885, 1925	6Z
06-02	1433 013	3744-3746 Geary Blvd.	1949	6Z
06-04	1543 042	3751 Geary Blvd.	1922	6Z
06-05	1543 043	3745-3747 Geary Blvd.	1922	6Z
06-06	1543 044	3739-3741 Geary Blvd.	1923	6Z
06-07	1543 045	3733-3735 Geary Blvd.	1895	6Z
06-08	1543 046	3727-3729 Geary Blvd.	1923	6Z
06-09	1543 047	3721-3723 Geary Blvd.	1896	6Z
06-10	1066 027	3138-3142 Geary Blvd.	ca. 1896	6Z
06-11	1066 026	3134-3136 Geary Blvd.	1897	6Z
06-12	1066 023	3120-3122 Geary Blvd.	ca. 1911	6Z
06-13	1066 022	3112-3114 Geary Blvd.	1949	6Z
06-14	1088 028	3151-3157 Geary Blvd.	ca. 1894	6Z
06-15	1088 029	3145-3147 Geary Blvd.	ca. 1899	6Z
06-16	1088 030	3139-3141 Geary Blvd.	1922	6Z
06-17	1088 031	3133-3135 Geary Blvd.	1922	6Z
06-18	1088 033	3123-3125 Geary Blvd.	1907	6Z
06-19	1088 001	3101-3105 Geary Blvd.	1893	6Z
07-01	1072 001	2630-2640 Geary Blvd.	1912-49	6Z
07-02	1094 001	2675 Geary Blvd.	1950-51	6Z
07-03	1080 035	2398 Geary Blvd.	1929	6Z
07-04	1080 020B	2364 Geary Blvd.	1931, 1956	6Z
08-01	1098 038, 1098 050	2201-2241 Geary Blvd.	1952-92	6Z
08-02	0703 002	1550 Scott St.	1966	6Z
08-03	0705 001, 0705 003	1430 Scott St.	1912-52	6Z
08-04	0702 033	1601 Fillmore St.	1968	6Z
09-04	n/a	n/a	1861-early 1960s	6Z
09-05	0697 037	1333 Gough St.	1966	6Z
10-01	0693 011	950 Geary St.	1946	6Z
10-03	0303 021	720-728 Geary St.	1922	6Z
11-12	0310 011	54 Geary St.	1907	6Z
11-15	0310 007	14-26 Geary St.	1907	6Z

FTA has found that the undertaking will result in no adverse effect to historic properties. After reviewing the information submitted with your letter, I offer the following comments:

- I agree that the 22 properties shown in the table above are eligible for listing in the NRHP, per 36 CFR § 800.4(c)(2).
- I agree that the 69 properties shown in the second table above are ineligible for listing in the NRHP, per 36 CFR § 800.4(c)(2).
- I agree that the undertaking as described in the consultation package will have no adverse effects to historic properties, per 36 CFR 36 CFR § 800.5(b).
- Please be advised that under certain circumstances, such as an unanticipated discovery or a change in project description or method of implementation, the FTA may have future responsibilities for this undertaking under 36 CFR § 800.

If you have any questions, please contact Kathleen Forrest of my staff at (916) 445-7022 or Kathleen.Forrest@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

This page intentionally left blank.

Tribal Consultation

This page intentionally left blank.

U.S. Department
of Transportation
Federal Transit Administration

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

201 Mission Street
Suite 1650
San Francisco, CA 94105-1839
415-744-3133
415-744-2726 (fax)

OCT 1 2015

Jakki Kehl
Representative
Ohlone/Costanoan Tribe
720 North 2nd Street
Patterson, CA 95363

Re: Geary Bus Rapid Transit Project,
Cultural and Historic Resources

Dear Ms. Kehl,

The Federal Transit Administration (FTA), in coordination with the San Francisco County Transportation Authority (SFCTA) and the San Francisco Municipal Transportation Agency (SFMTA), is conducting consultation under the National Historic Preservation Act for the proposed Geary Corridor Bus Rapid Transit (BRT) Project. We are contacting interested parties including Native American tribes per 36 CFR Part 800.2(c)(4) and other consulting parties per 36 CFR Part 800.2(c)(5) to help identify prehistoric sites, sacred sites, and/or traditional cultural properties located in the vicinity of the project area. You have been identified as a consulting party with interest or knowledge of the project study area. The Native American Heritage Commission (NAHC) has been contacted regarding the Project and recommended that we contact you.

We have conducted archaeological research and incorporated the findings into the Project's Draft Environmental Impact Statement/Report (EIS/R) that has been developed to comply with National Environmental Policy Act, National Historic Preservation Act (NHPA), and California Environmental Quality Act requirements.

The proposed Project would construct and operate BRT service along dedicated lanes through San Francisco's Geary Boulevard/Street corridor between 48th Avenue and the Transbay Terminal. The purpose of the Project is to improve bus transit performance, pedestrian conditions, and pedestrian access to transit in this high-ridership corridor (see enclosed fact sheet).

The Project consists of: colorized side- and center-running bus-only lanes, bus stop operational improvements and passenger amenity upgrades, bus service and vehicle changes, new traffic signal equipment and communications infrastructure, and pedestrian crossing improvements including sidewalk bulb-outs and crosswalk striping, all on existing City of San Francisco right-of-way. The Project also proposes new landscaped medians and street lighting, traffic lane reductions, sidewalk curb ramp upgrades, and street re-surfacing and utility re-locations as needed on selected portions of the corridor.

Excavations of approximately sixteen (16) feet deep may be required in various locations along the Geary corridor for street light pole installation, and for sewer relocation work near Park Presidio Boulevard. Previous construction activities for installation of existing lighting and utility infrastructure have disturbed or removed sediments to similar depths. The Draft EIS/R contains further detail on areas of construction.

To comply with Section 106 of the NHPA, the Project has conducted a sensitivity assessment to anticipate the general types of cultural resources within the project area. This investigation included: delineation of the study area, archival records search, consultation with the Native American Heritage Commission (NAHC), and a general assessment of the potential for encountering previously undocumented archaeological sites below the modern urban land surface. The records search found 26 formally recorded archaeological resources (including both prehistoric and historic-era sites) along with five potential/not formally recorded archaeological resources. None of these resources are documented as extending into or within the archaeological Area of Potential Effects (APE); however, eight historic period resources are situated immediately adjacent to the archaeological APE.

NAHC provided a list of six interested Native American groups and individuals; all of whom were sent letters on December 8, 2008. A second letter was sent on October 21, 2011 to inform contacts of the undertaking's expansion. No responses were received from either correspondence. Additionally, no Native American cultural resources were reported from the NAHC sacred lands file records search.

If you have any information that would be relevant to this Project and its possible effect on cultural resources, or if you have any questions contact Mr. Alex Smith, Community Planner, at (415) 744-2599.

Sincerely,

Leslie T. Rogers
Regional Administrator

Enclosures: Project Fact Sheet
CD Copy of Draft Environmental Document

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

201 Mission Street
Suite 1650
San Francisco, CA 94105-1839
415-744-3133
415-744-2726 (fax)

OCT 1 2015

Irene Zwierlein
Chairperson
Amah/Mutsun Tribal Band
Ohlone/Costanoan Tribe
789 Canada Road
Woodside, CA 94062

Re: Geary Bus Rapid Transit Project,
Cultural and Historic Resources

Dear Ms. Zwierlein,

The Federal Transit Administration (FTA), in coordination with the San Francisco County Transportation Authority (SFCTA) and the San Francisco Municipal Transportation Agency (SFMTA), is conducting consultation under the National Historic Preservation Act for the proposed Geary Corridor Bus Rapid Transit (BRT) Project. We are contacting interested parties including Native American tribes per 36 CFR Part 800.2(c)(4) and other consulting parties per 36 CFR Part 800.2(c)(5) to help identify prehistoric sites, sacred sites, and/or traditional cultural properties located in the vicinity of the project area. You have been identified as a consulting party with interest or knowledge of the project study area. The Native American Heritage Commission (NAHC) has been contacted regarding the Project and recommended that we contact you.

We have conducted archaeological research and incorporated the findings into the Project's Draft Environmental Impact Statement/Report (EIS/R) that has been developed to comply with National Environmental Policy Act, National Historic Preservation Act (NHPA), and California Environmental Quality Act requirements.

The proposed Project would construct and operate BRT service along dedicated lanes through San Francisco's Geary Boulevard/Street corridor between 48th Avenue and the Transbay Terminal. The purpose of the Project is to improve bus transit performance, pedestrian conditions, and pedestrian access to transit in this high-ridership corridor (see enclosed fact sheet).

The Project consists of: colorized side- and center-running bus-only lanes, bus stop operational improvements and passenger amenity upgrades, bus service and vehicle changes, new traffic signal equipment and communications infrastructure, and pedestrian crossing improvements including sidewalk bulb-outs and crosswalk striping, all on existing City of

San Francisco right-of-way. The Project also proposes new landscaped medians and street lighting, traffic lane reductions, sidewalk curb ramp upgrades, and street re-surfacing and utility re-locations as needed on selected portions of the corridor.

Excavations of approximately sixteen (16) feet deep may be required in various locations along the Geary corridor for street light pole installation, and for sewer relocation work near Park Presidio Boulevard. Previous construction activities for installation of existing lighting and utility infrastructure have disturbed or removed sediments to similar depths. The Draft EIS/R contains further detail on areas of construction.

To comply with Section 106 of the NHPA, the Project has conducted a sensitivity assessment to anticipate the general types of cultural resources within the project area. This investigation included: delineation of the study area, archival records search, consultation with the Native American Heritage Commission (NAHC), and a general assessment of the potential for encountering previously undocumented archaeological sites below the modern urban land surface. The records search found 26 formally recorded archaeological resources (including both prehistoric and historic-era sites) along with five potential/not formally recorded archaeological resources. None of these resources are documented as extending into or within the archaeological Area of Potential Effects (APE); however, eight historic period resources are situated immediately adjacent to the archaeological APE.

NAHC provided a list of six interested Native American groups and individuals; all of whom were sent letters on December 8, 2008. A second letter was sent on October 21, 2011 to inform contacts of the undertaking's expansion. No responses were received from either correspondence. Additionally, no Native American cultural resources were reported from the NAHC sacred lands file records search.

If you have any information that would be relevant to this Project and its possible effect on cultural resources, or if you have any questions contact Mr. Alex Smith, Community Planner, at (415) 744-2599.

Sincerely,

Leslie T. Rogers
Regional Administrator

Enclosures: Project Fact Sheet
CD Copy of Draft Environmental Document

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

201 Mission Street
Suite 1650
San Francisco, CA 94105-1839
415-744-3133
415-744-2726 (fax)

OCT 1 2015

Ann Marie Sayers
Chairperson
Indian Canyon Mutsun Band of Costanoan
Ohlone/Costanoan Tribe
P.O. Box 28
Hollister, CA 95024

Re: Geary Bus Rapid Transit Project,
Cultural and Historic Resources

Dear Ms. Sayers,

The Federal Transit Administration (FTA), in coordination with the San Francisco County Transportation Authority (SFCTA) and the San Francisco Municipal Transportation Agency (SFMTA), is conducting consultation under the National Historic Preservation Act for the proposed Geary Corridor Bus Rapid Transit (BRT) Project. We are contacting interested parties including Native American tribes per 36 CFR Part 800.2(c)(4) and other consulting parties per 36 CFR Part 800.2(c)(5) to help identify prehistoric sites, sacred sites, and/or traditional cultural properties located in the vicinity of the project area. You have been identified as a consulting party with interest or knowledge of the project study area. The Native American Heritage Commission (NAHC) has been contacted regarding the Project and recommended that we contact you.

We have conducted archaeological research and incorporated the findings into the Project's Draft Environmental Impact Statement/Report (EIS/R) that has been developed to comply with National Environmental Policy Act, National Historic Preservation Act (NHPA), and California Environmental Quality Act requirements.

The proposed Project would construct and operate BRT service along dedicated lanes through San Francisco's Geary Boulevard/Street corridor between 48th Avenue and the Transbay Terminal. The purpose of the Project is to improve bus transit performance, pedestrian conditions, and pedestrian access to transit in this high-ridership corridor (see enclosed fact sheet).

The Project consists of: colorized side- and center-running bus-only lanes, bus stop operational improvements and passenger amenity upgrades, bus service and vehicle changes, new traffic signal equipment and communications infrastructure, and pedestrian crossing improvements including sidewalk bulb-outs and crosswalk striping, all on existing City of

San Francisco right-of-way. The Project also proposes new landscaped medians and street lighting, traffic lane reductions, sidewalk curb ramp upgrades, and street re-surfacing and utility re-locations as needed on selected portions of the corridor.

Excavations of approximately sixteen (16) feet deep may be required in various locations along the Geary corridor for street light pole installation, and for sewer relocation work near Park Presidio Boulevard. Previous construction activities for installation of existing lighting and utility infrastructure have disturbed or removed sediments to similar depths. The Draft EIS/R contains further detail on areas of construction.

To comply with Section 106 of the NHPA, the Project has conducted a sensitivity assessment to anticipate the general types of cultural resources within the project area. This investigation included: delineation of the study area, archival records search, consultation with the Native American Heritage Commission (NAHC), and a general assessment of the potential for encountering previously undocumented archaeological sites below the modern urban land surface. The records search found 26 formally recorded archaeological resources (including both prehistoric and historic-era sites) along with five potential/not formally recorded archaeological resources. None of these resources are documented as extending into or within the archaeological Area of Potential Effects (APE); however, eight historic period resources are situated immediately adjacent to the archaeological APE.

NAHC provided a list of six interested Native American groups and individuals; all of whom were sent letters on December 8, 2008. A second letter was sent on October 21, 2011 to inform contacts of the undertaking's expansion. No responses were received from either correspondence. Additionally, no Native American cultural resources were reported from the NAHC sacred lands file records search.

If you have any information that would be relevant to this Project and its possible effect on cultural resources, or if you have any questions contact Mr. Alex Smith, Community Planner, at (415) 744-2599.

Sincerely,

Leslie T. Rogers

Leslie T. Rogers
Regional Administrator

Enclosures: Project Fact Sheet
CD Copy of Draft Environmental Document

U.S. Department
of Transportation
Federal Transit Administration

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

201 Mission Street
Suite 1650
San Francisco, CA 94105-1839
415-744-3133
415-744-2726 (fax)

OCT 1 2015

Rosemary Cambra
Chairperson
Muwekma Ohlone Indian Tribe of the SF Bay Area
Ohlone/Costanoan Tribe
P.O. Box 360791
Milpitas, CA 95036

Re: Geary Bus Rapid Transit Project,
Cultural and Historic Resources

Dear Ms. Cambra,

The Federal Transit Administration (FTA), in coordination with the San Francisco County Transportation Authority (SFCTA) and the San Francisco Municipal Transportation Agency (SFMTA), is conducting consultation under the National Historic Preservation Act for the proposed Geary Corridor Bus Rapid Transit (BRT) Project. We are contacting interested parties including Native American tribes per 36 CFR Part 800.2(c)(4) and other consulting parties per 36 CFR Part 800.2(c)(5) to help identify prehistoric sites, sacred sites, and/or traditional cultural properties located in the vicinity of the project area. You have been identified as a consulting party with interest or knowledge of the project study area. The Native American Heritage Commission (NAHC) has been contacted regarding the Project and recommended that we contact you.

We have conducted archaeological research and incorporated the findings into the Project's Draft Environmental Impact Statement/Report (EIS/R) that has been developed to comply with National Environmental Policy Act, National Historic Preservation Act (NHPA), and California Environmental Quality Act requirements.

The proposed Project would construct and operate BRT service along dedicated lanes through San Francisco's Geary Boulevard/Street corridor between 48th Avenue and the Transbay Terminal. The purpose of the Project is to improve bus transit performance, pedestrian conditions, and pedestrian access to transit in this high-ridership corridor (see enclosed fact sheet).

The Project consists of: colorized side- and center-running bus-only lanes, bus stop operational improvements and passenger amenity upgrades, bus service and vehicle changes, new traffic signal equipment and communications infrastructure, and pedestrian crossing improvements including sidewalk bulb-outs and crosswalk striping, all on existing City of

San Francisco right-of-way. The Project also proposes new landscaped medians and street lighting, traffic lane reductions, sidewalk curb ramp upgrades, and street re-surfacing and utility re-locations as needed on selected portions of the corridor.

Excavations of approximately sixteen (16) feet deep may be required in various locations along the Geary corridor for street light pole installation, and for sewer relocation work near Park Presidio Boulevard. Previous construction activities for installation of existing lighting and utility infrastructure have disturbed or removed sediments to similar depths. The Draft EIS/R contains further detail on areas of construction.

To comply with Section 106 of the NHPA, the Project has conducted a sensitivity assessment to anticipate the general types of cultural resources within the project area. This investigation included: delineation of the study area, archival records search, consultation with the Native American Heritage Commission (NAHC), and a general assessment of the potential for encountering previously undocumented archaeological sites below the modern urban land surface. The records search found 26 formally recorded archaeological resources (including both prehistoric and historic-era sites) along with five potential/not formally recorded archaeological resources. None of these resources are documented as extending into or within the archaeological Area of Potential Effects (APE); however, eight historic period resources are situated immediately adjacent to the archaeological APE.

NAHC provided a list of six interested Native American groups and individuals; all of whom were sent letters on December 8, 2008. A second letter was sent on October 21, 2011 to inform contacts of the undertaking's expansion. No responses were received from either correspondence. Additionally, no Native American cultural resources were reported from the NAHC sacred lands file records search.

If you have any information that would be relevant to this Project and its possible effect on cultural resources, or if you have any questions contact Mr. Alex Smith, Community Planner, at (415) 744-2599.

Sincerely,

Leslie T. Rogers

Leslie T. Rogers
Regional Administrator

Enclosures: Project Fact Sheet
CD Copy of Draft Environmental Document

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

201 Mission Street
Suite 1650
San Francisco, CA 94105-1839
415-744-3133
415-744-2726 (fax)

OCT 1 2015

Romana Garibay
Representative
Trina Marie Ruano Family
Ohlone/Costanoan, Bay Miwok, Plains Miwok, Patwin
30940 Watkins Street
Union City, CA 94587

Re: Geary Bus Rapid Transit Project,
Cultural and Historic Resources

Dear Ms. Garibay,

The Federal Transit Administration (FTA), in coordination with the San Francisco County Transportation Authority (SFCTA) and the San Francisco Municipal Transportation Agency (SFMTA), is conducting consultation under the National Historic Preservation Act for the proposed Geary Corridor Bus Rapid Transit (BRT) Project. We are contacting interested parties including Native American tribes per 36 CFR Part 800.2(c)(4) and other consulting parties per 36 CFR Part 800.2(c)(5) to help identify prehistoric sites, sacred sites, and/or traditional cultural properties located in the vicinity of the project area. You have been identified as a consulting party with interest or knowledge of the project study area. The Native American Heritage Commission (NAHC) has been contacted regarding the Project and recommended that we contact you.

We have conducted archaeological research and incorporated the findings into the Project's Draft Environmental Impact Statement/Report (EIS/R) that has been developed to comply with National Environmental Policy Act, National Historic Preservation Act (NHPA), and California Environmental Quality Act requirements.

The proposed Project would construct and operate BRT service along dedicated lanes through San Francisco's Geary Boulevard/Street corridor between 48th Avenue and the Transbay Terminal. The purpose of the Project is to improve bus transit performance, pedestrian conditions, and pedestrian access to transit in this high-ridership corridor (see enclosed fact sheet).

The Project consists of: colorized side- and center-running bus-only lanes, bus stop operational improvements and passenger amenity upgrades, bus service and vehicle changes, new traffic signal equipment and communications infrastructure, and pedestrian crossing improvements including sidewalk bulb-outs and crosswalk striping, all on existing City of

San Francisco right-of-way. The Project also proposes new landscaped medians and street lighting, traffic lane reductions, sidewalk curb ramp upgrades, and street re-surfacing and utility re-locations as needed on selected portions of the corridor.

Excavations of approximately sixteen (16) feet deep may be required in various locations along the Geary corridor for street light pole installation, and for sewer relocation work near Park Presidio Boulevard. Previous construction activities for installation of existing lighting and utility infrastructure have disturbed or removed sediments to similar depths. The Draft EIS/R contains further detail on areas of construction.

To comply with Section 106 of the NHPA, the Project has conducted a sensitivity assessment to anticipate the general types of cultural resources within the project area. This investigation included: delineation of the study area, archival records search, consultation with the Native American Heritage Commission (NAHC), and a general assessment of the potential for encountering previously undocumented archaeological sites below the modern urban land surface. The records search found 26 formally recorded archaeological resources (including both prehistoric and historic-era sites) along with five potential/not formally recorded archaeological resources. None of these resources are documented as extending into or within the archaeological Area of Potential Effects (APE); however, eight historic period resources are situated immediately adjacent to the archaeological APE.

NAHC provided a list of six interested Native American groups and individuals; all of whom were sent letters on December 8, 2008. A second letter was sent on October 21, 2011 to inform contacts of the undertaking's expansion. No responses were received from either correspondence. Additionally, no Native American cultural resources were reported from the NAHC sacred lands file records search.

If you have any information that would be relevant to this Project and its possible effect on cultural resources, or if you have any questions contact Mr. Alex Smith, Community Planner, at (415) 744-2599.

Sincerely,

Leslie T. Rogers
Regional Administrator

Enclosures: Project Fact Sheet
CD Copy of Draft Environmental Document

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION IX
Arizona, California,
Hawaii, Nevada, Guam
American Samoa,
Northern Mariana Islands

201 Mission Street
Suite 1650
San Francisco, CA 94105-1839
415-744-3133
415-744-2726 (fax)

OCT 1 2015

Andrew Galvan
Representative
The Ohlone Indian Tribe
P.O. Box 3152
Fremont, CA 94539

Re: Geary Bus Rapid Transit Project,
Cultural and Historic Resources

Dear Mr. Galvan,

The Federal Transit Administration (FTA), in coordination with the San Francisco County Transportation Authority (SFCTA) and the San Francisco Municipal Transportation Agency (SFMTA), is conducting consultation under the National Historic Preservation Act for the proposed Geary Corridor Bus Rapid Transit (BRT) Project. We are contacting interested parties including Native American tribes per 36 CFR Part 800.2(c)(4) and other consulting parties per 36 CFR Part 800.2(c)(5) to help identify prehistoric sites, sacred sites, and/or traditional cultural properties located in the vicinity of the project area. You have been identified as a consulting party with interest or knowledge of the project study area. The Native American Heritage Commission (NAHC) has been contacted regarding the Project and recommended that we contact you.

We have conducted archaeological research and incorporated the findings into the Project's Draft Environmental Impact Statement/Report (EIS/R) that has been developed to comply with National Environmental Policy Act, National Historic Preservation Act (NHPA), and California Environmental Quality Act requirements.

The proposed Project would construct and operate BRT service along dedicated lanes through San Francisco's Geary Boulevard/Street corridor between 48th Avenue and the Transbay Terminal. The purpose of the Project is to improve bus transit performance, pedestrian conditions, and pedestrian access to transit in this high-ridership corridor (see enclosed fact sheet).

The Project consists of: colorized side- and center-running bus-only lanes, bus stop operational improvements and passenger amenity upgrades, bus service and vehicle changes, new traffic signal equipment and communications infrastructure, and pedestrian crossing improvements including sidewalk bulb-outs and crosswalk striping, all on existing City of San Francisco right-of-way. The Project also proposes new landscaped medians and street lighting, traffic lane reductions, sidewalk curb ramp upgrades, and street re-surfacing and utility re-locations as needed on selected portions of the corridor.

Excavations of approximately sixteen (16) feet deep may be required in various locations along the Geary corridor for street light pole installation, and for sewer relocation work near Park Presidio Boulevard. Previous construction activities for installation of existing lighting and utility infrastructure have disturbed or removed sediments to similar depths. The Draft EIS/R contains further detail on areas of construction.

To comply with Section 106 of the NHPA, the Project has conducted a sensitivity assessment to anticipate the general types of cultural resources within the project area. This investigation included: delineation of the study area, archival records search, consultation with the Native American Heritage Commission (NAHC), and a general assessment of the potential for encountering previously undocumented archaeological sites below the modern urban land surface. The records search found 26 formally recorded archaeological resources (including both prehistoric and historic-era sites) along with five potential/not formally recorded archaeological resources. None of these resources are documented as extending into or within the archaeological Area of Potential Effects (APE); however, eight historic period resources are situated immediately adjacent to the archaeological APE.

NAHC provided a list of six interested Native American groups and individuals; all of whom were sent letters on December 8, 2008. A second letter was sent on October 21, 2011 to inform contacts of the undertaking's expansion. No responses were received from either correspondence. Additionally, no Native American cultural resources were reported from the NAHC sacred lands file records search.

If you have any information that would be relevant to this Project and its possible effect on cultural resources, or if you have any questions contact Mr. Alex Smith, Community Planner, at (415) 744-2599.

Sincerely,

Leslie T. Rogers
Regional Administrator

Enclosures: Project Fact Sheet
CD Copy of Draft Environmental Document

Letters to Interested Parties

This page intentionally left blank.

JRP HISTORICAL CONSULTING, LLC

2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Mike Buhler, Executive Director
San Francisco Architectural Heritage
2007 Franklin Street
San Francisco, CA 94109

Dear Sir:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC

2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Kearstin Krehbiel, Executive Director
San Francisco Beautiful
100 Bush Street, Suite 1812
San Francisco, CA 94104

Dear Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

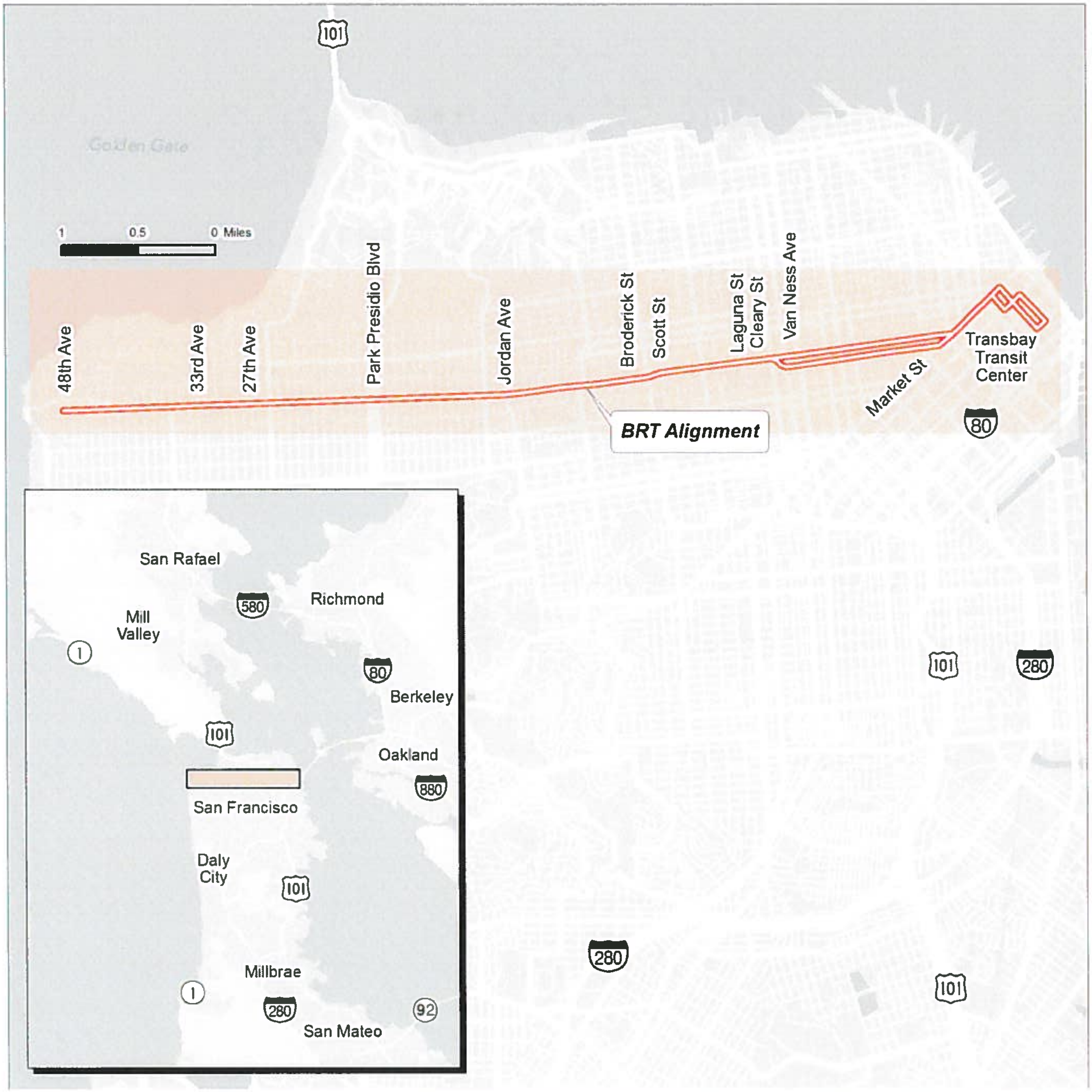


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Ron Ross, President
San Francisco History Association
PO Box 31907
San Francisco, CA 94131

Dear Sir:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

San Francisco Museum and Historical Society
PO Box 420470
San Francisco, CA 94142-0470

Dear Sir/Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

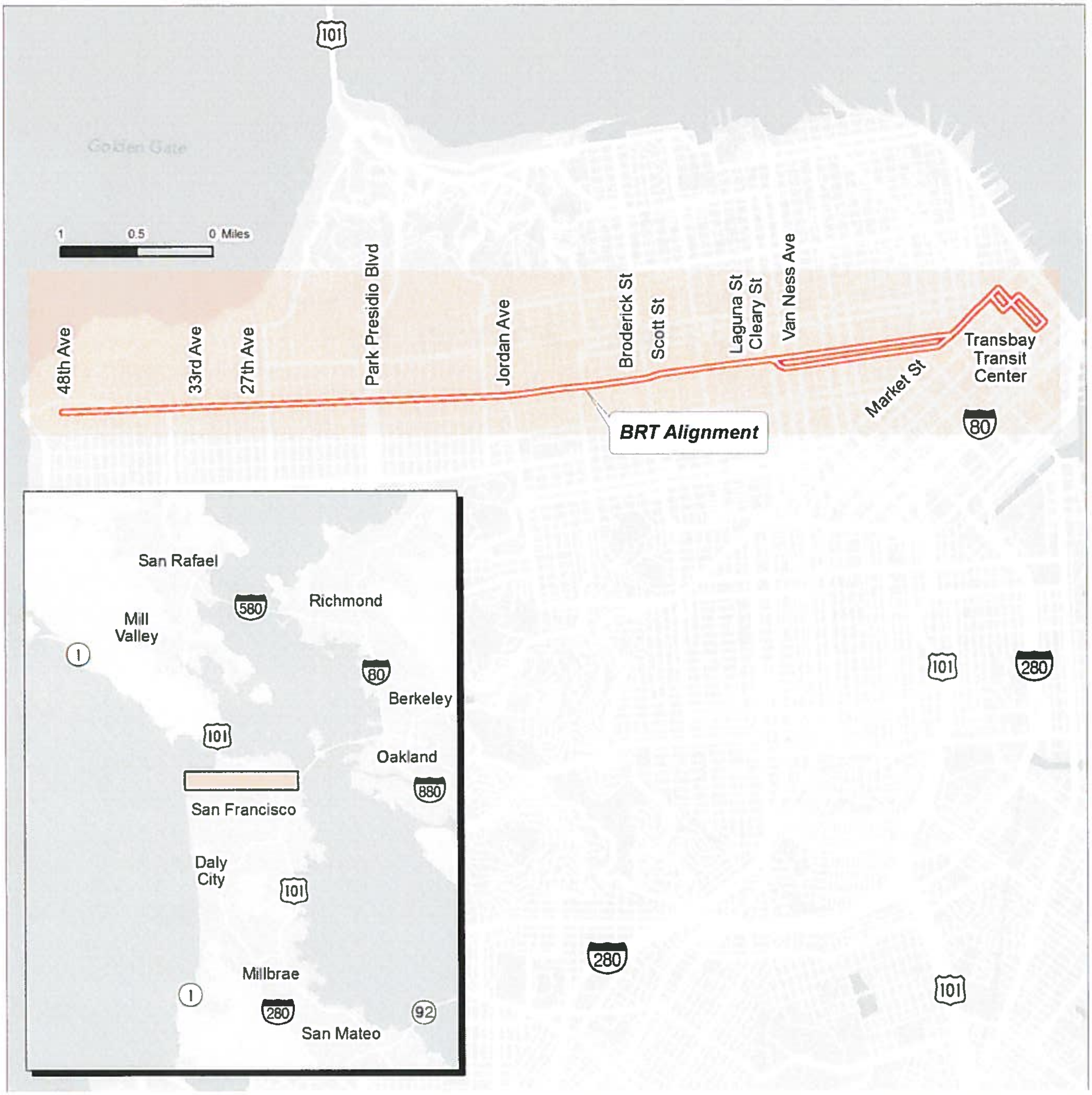


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Gretchen Hilyard, President
DOCOMOMO US/Northern California
PO Box 29226
San Francisco, CA 94129-0226

Dear Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

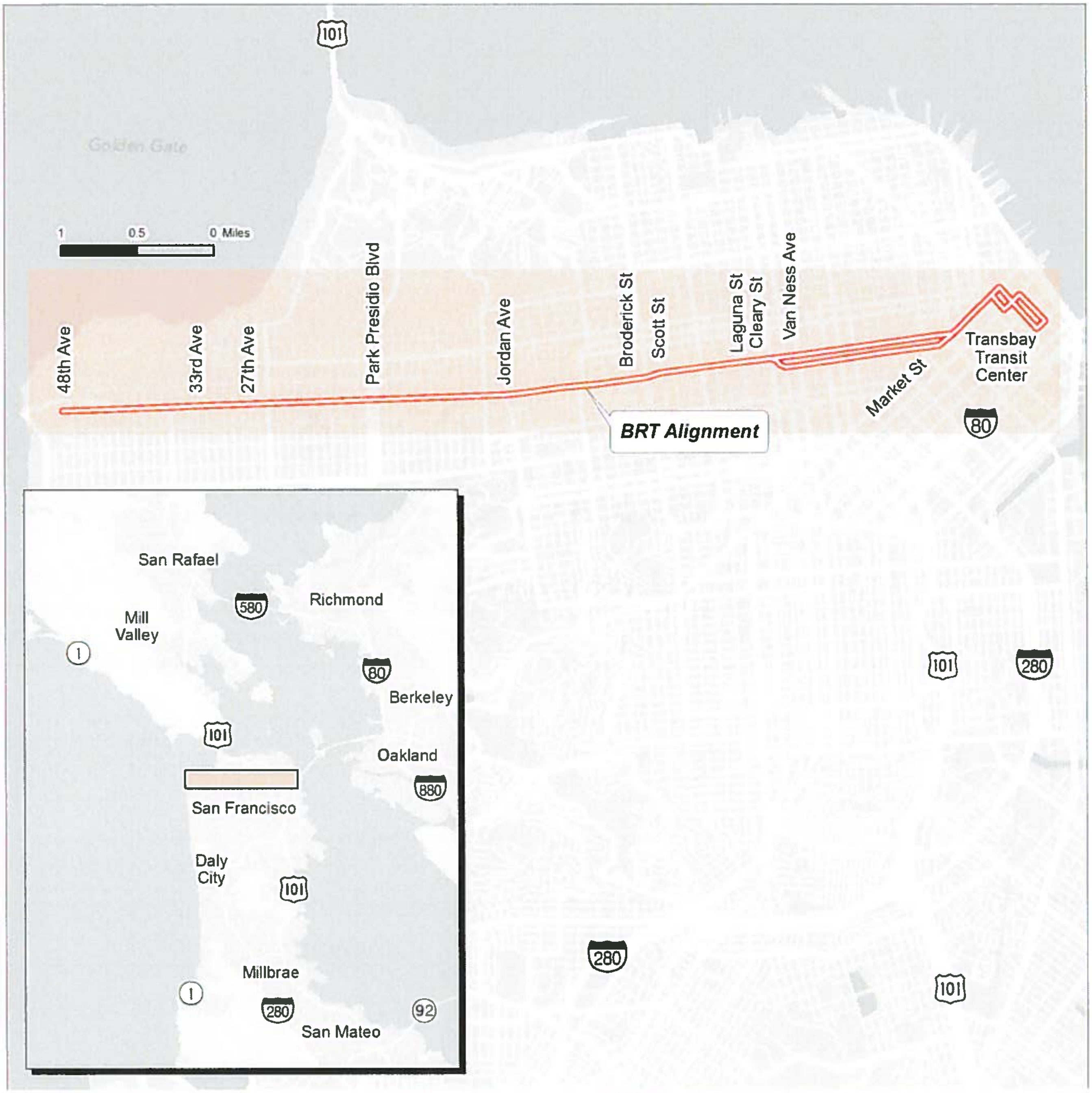


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Margie O'Driscoll, Executive Director
American Institute of Architects, Historic Resources Committee
130 Sutter Street, Suite 600
San Francisco, CA 94102

Dear Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

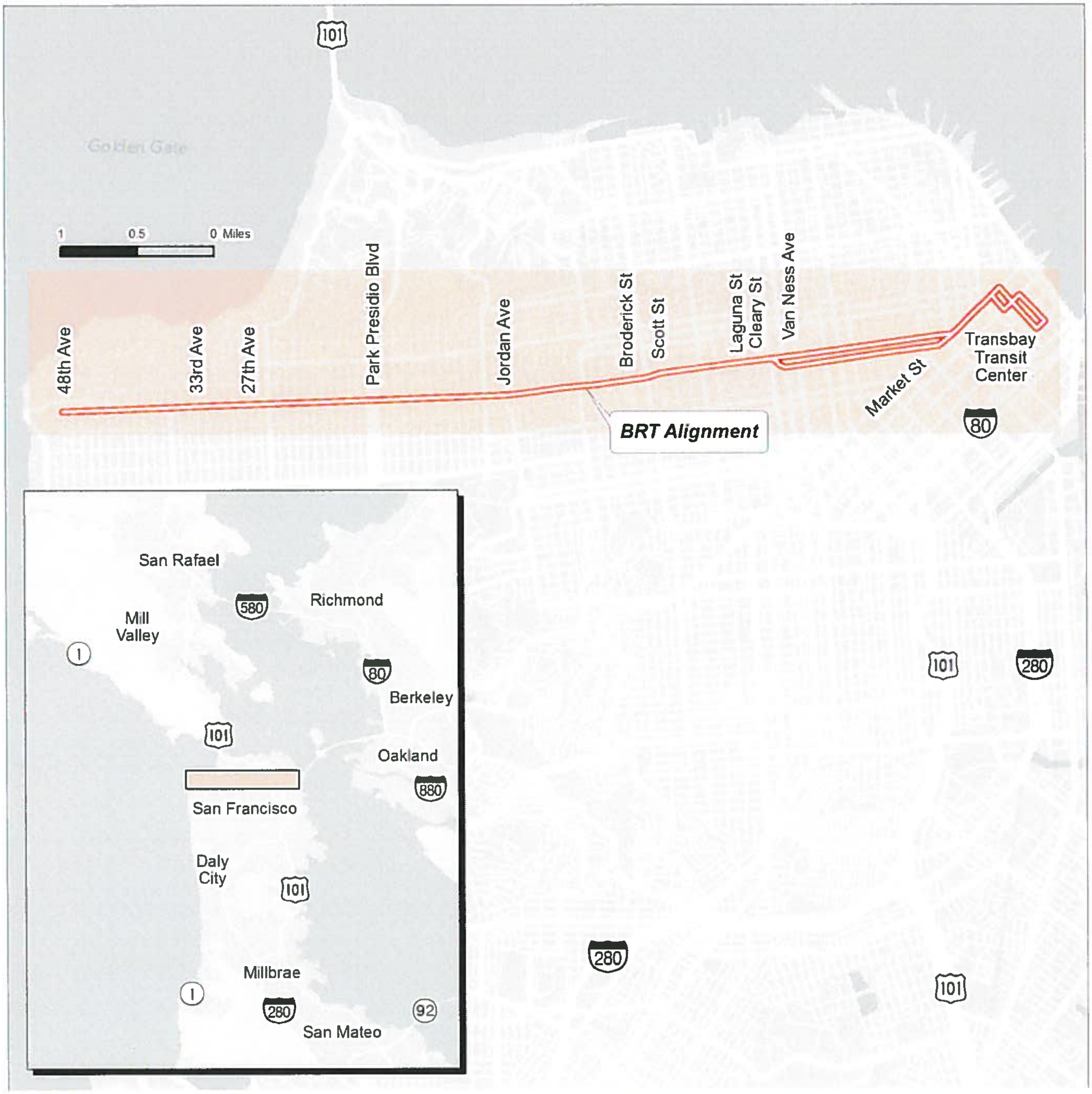


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

San Francisco Historic Preservation Commission
c/o Tina Frye, Preservation Coordinator
The Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Dear Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

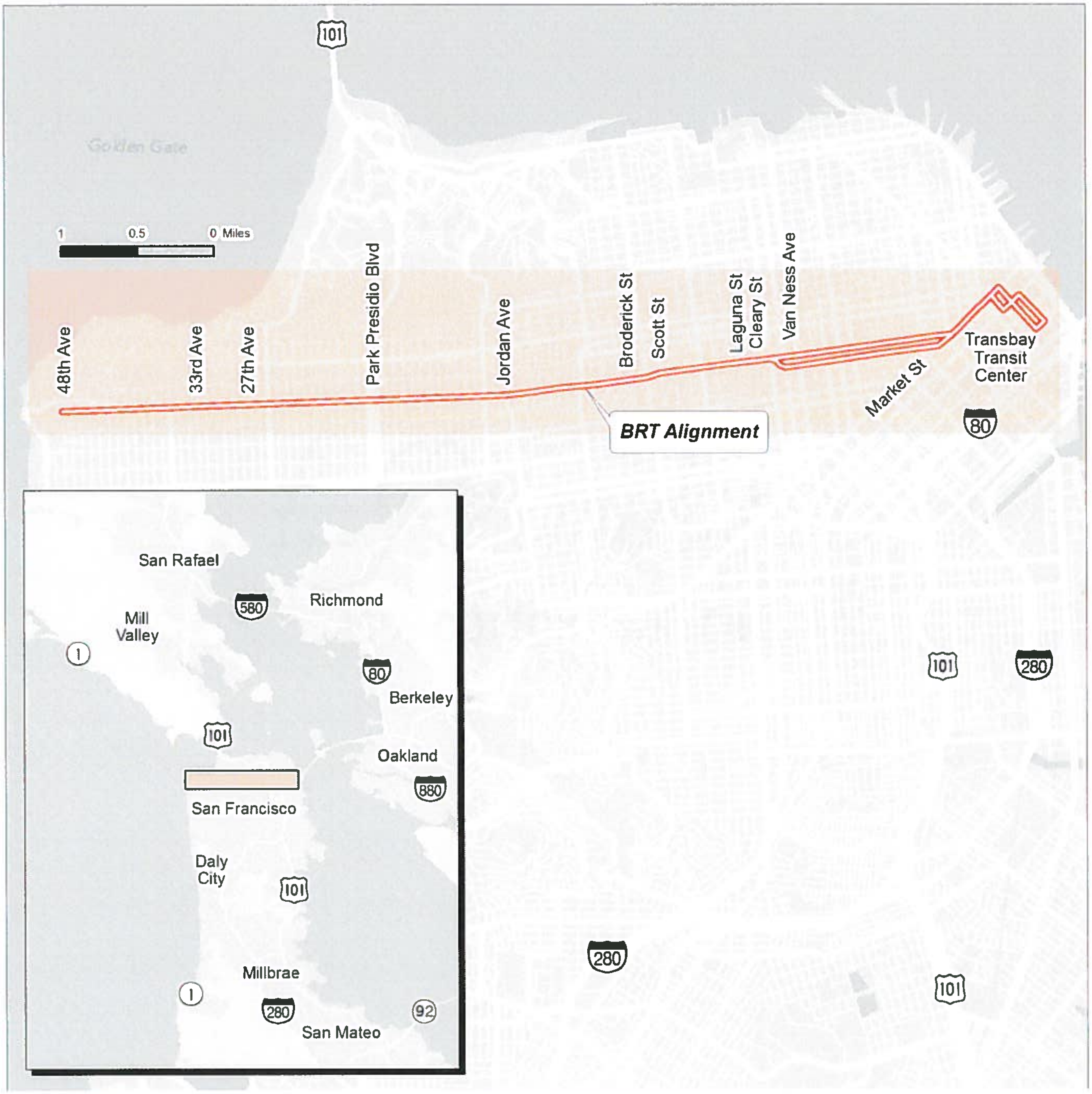


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Bonnie Spindler, President
The Victorian Alliance of San Francisco
1550 Fell Street
San Francisco, CA 94117

Dear Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC

2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Art Deco Society of California
100 Bush Street, Suite 511
San Francisco, CA 94104

Dear Sir/Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Anthea M. Hartig, Ph.D., Executive Director
California Historical Society
678 Mission Street
San Francisco, CA 94105

Dear Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

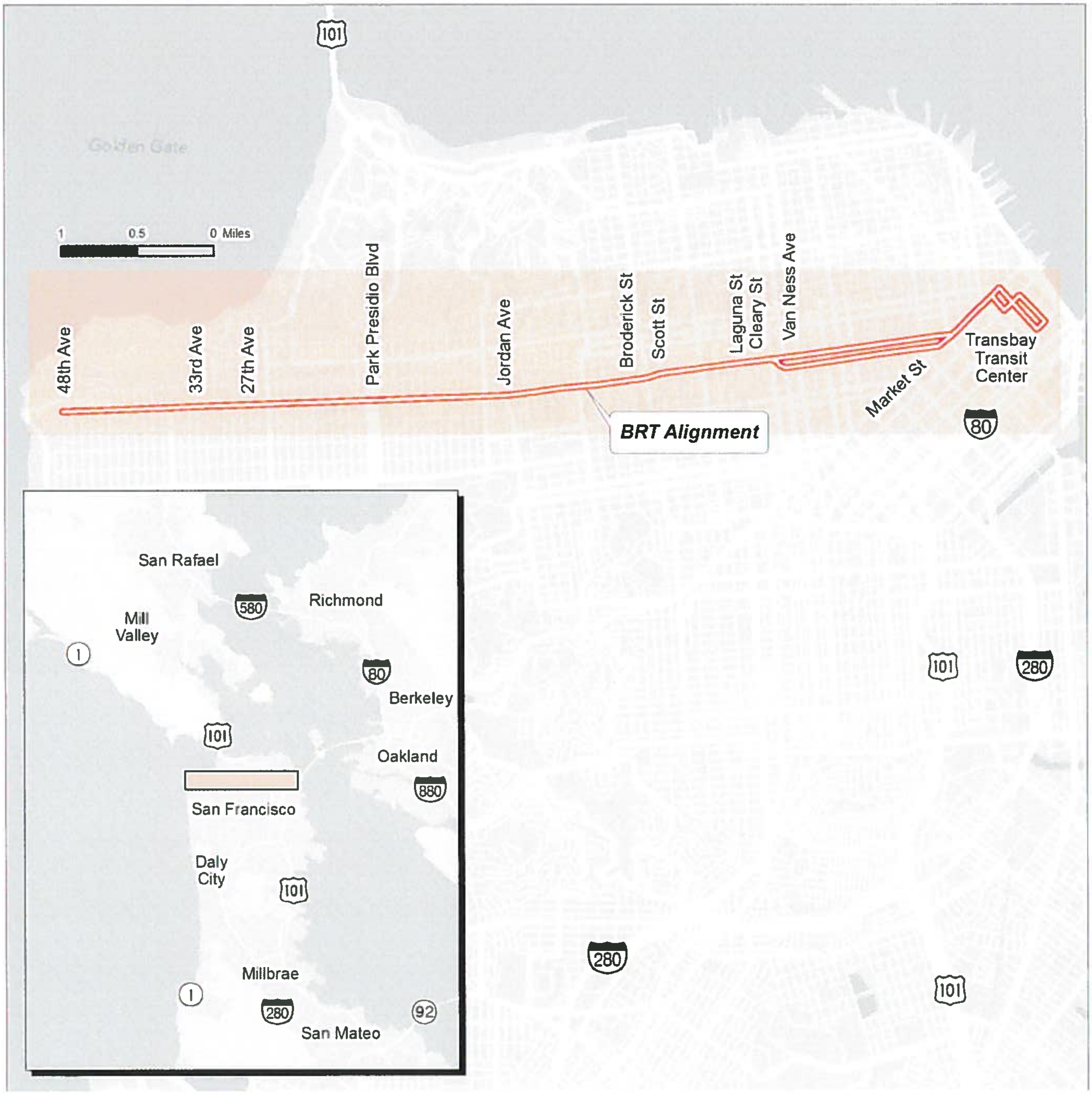


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC

2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Western Neighborhoods Project
P.O. Box 460936
San Francisco, CA 94146-0936

Dear Sir/Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

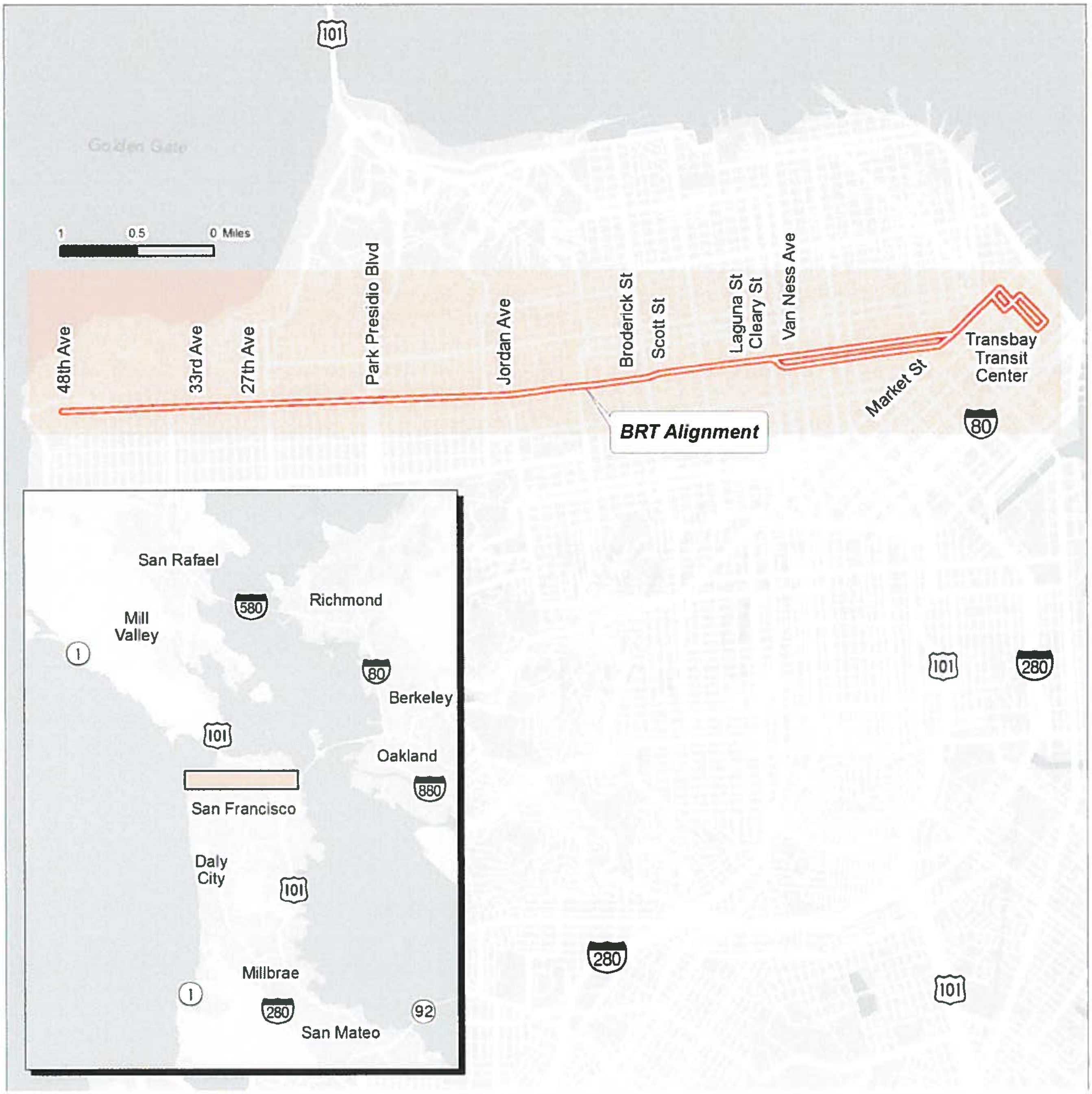


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

San Francisco City Guides
c/o SF Public Library
100 Larkin Street
San Francisco, CA 94102

Dear Sir/Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

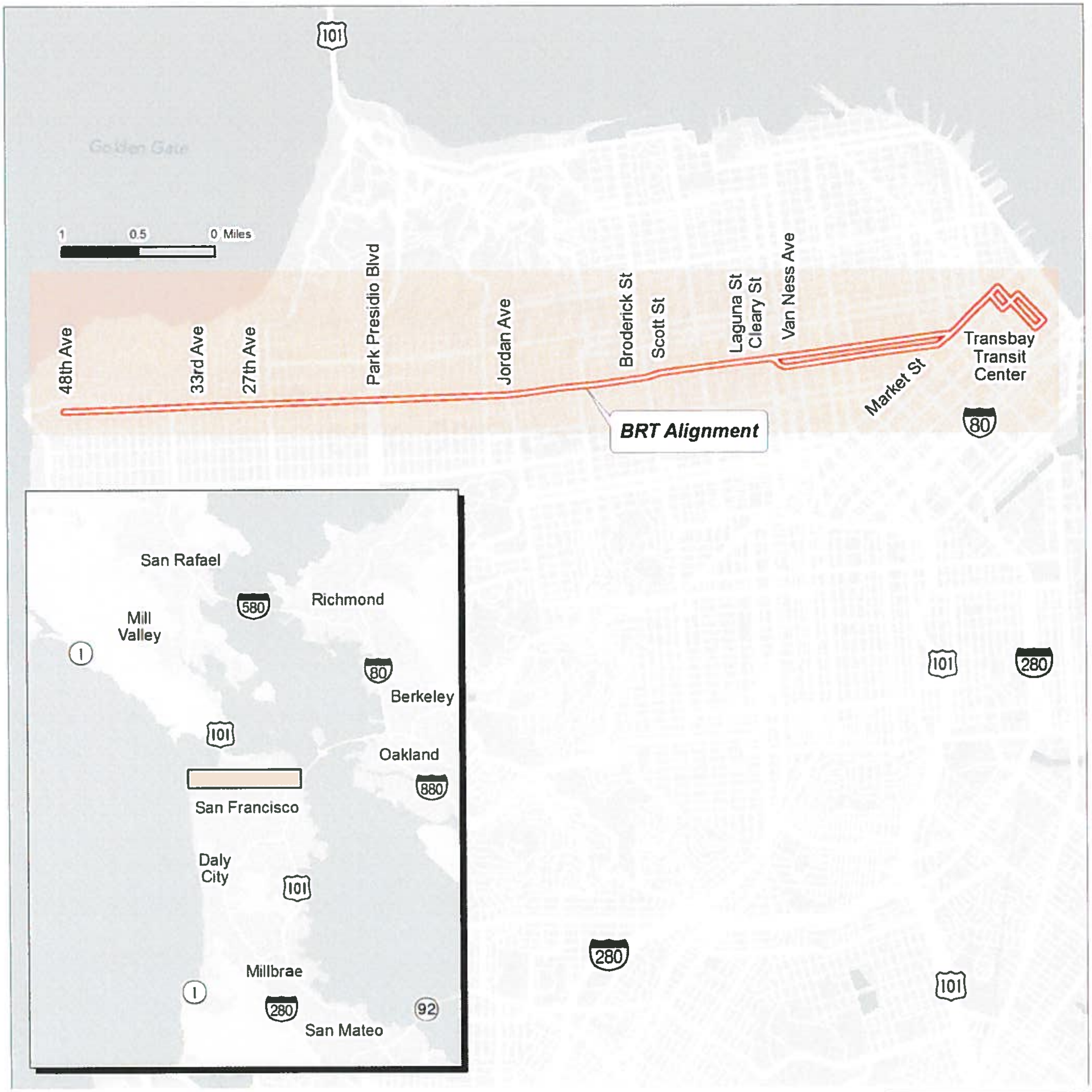


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

San Francisco Cable Car Museum
1201 Mason Street
San Francisco, CA 94108

Dear Sir/Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

National Japanese American Historical Society
1684 Post Street
San Francisco, CA 94115

Dear Sir/Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

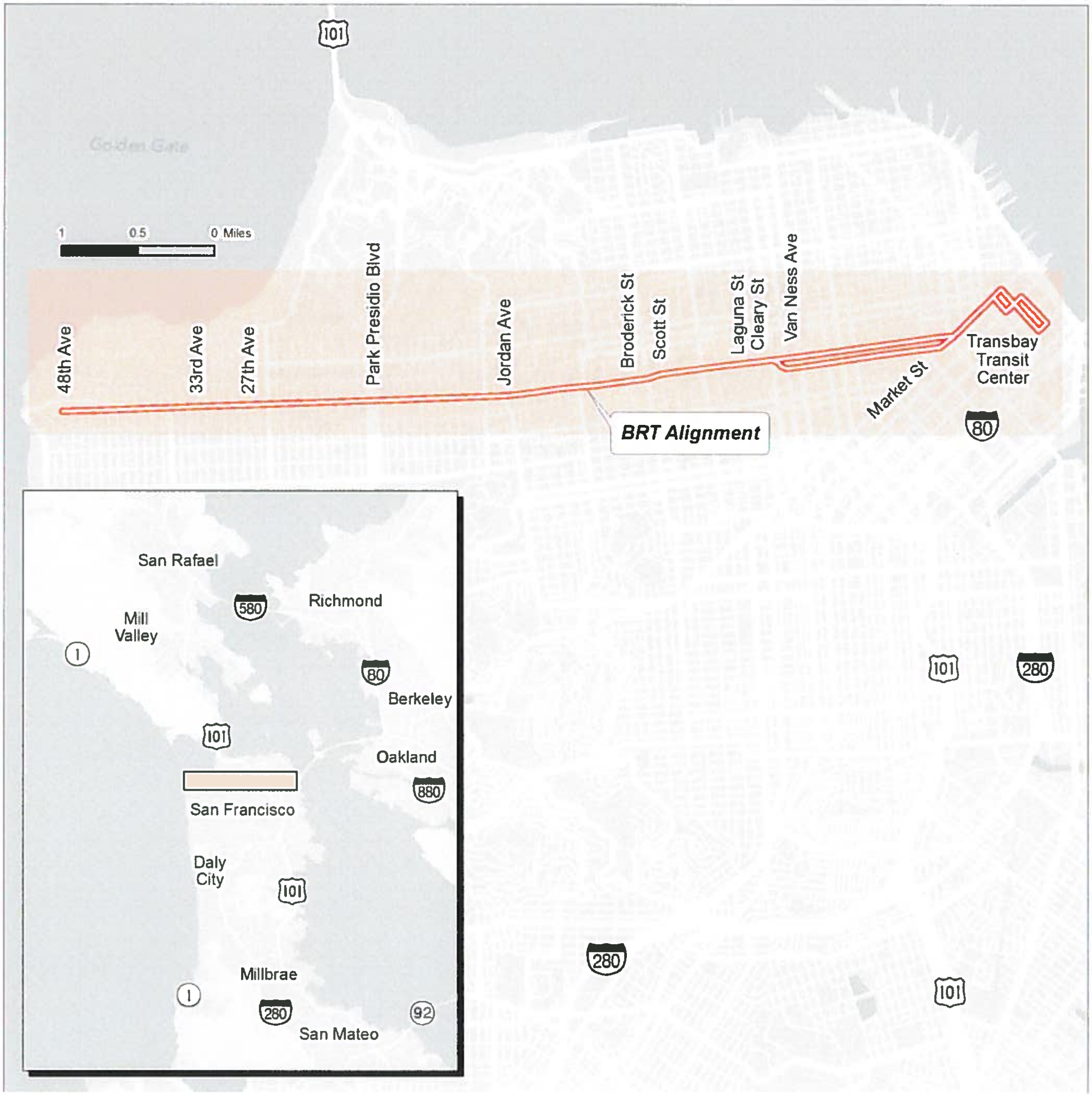


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

Friends of 1800
7 Beaver Street
San Francisco, CA 94114

Dear Sir/Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location

JRP HISTORICAL CONSULTING, LLC
2850 Spafford Street • Davis, CA 95618 • (530) 757-2521 • (530) 757-2566 Fax • www.jrphistorical.com

Stephen R. Wee, Principal / President
Rand F. Herbert, Principal / Vice President
Meta Bunse, Partner
Christopher D. McMorris, Partner

September 20, 2013

SPUR
654 Mission Street
San Francisco, CA 94105-4015

Dear Sir/Madam:

The San Francisco County Transportation Authority (SFCTA), in cooperation with the Federal Transit Administration (FTA) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement bus rapid transit (BRT) improvements along Point Lobos Avenue, Geary Boulevard, Geary Street and O'Farrell Street (referred to as the "Geary corridor") in San Francisco. A figure showing the proposed alignment follows this correspondence.

The proposed project would involve reconfiguration of portions of the Geary corridor to provide dedicated bus lanes and transit platforms, and to upgrade pedestrian safety and urban design features. Four alternatives have been identified for analysis, including one no-build alternative and three build alternatives. Implementation of the build alternatives would involve converting one existing mixed-traffic lane along portions of each direction of the Geary corridor to bus-only. Bus service would operate in this lane in both the eastbound and westbound directions. Existing bus stops would be replaced with BRT stations under each of the build alternatives. Other transit enhancements that would be implemented on all build alternatives include increased bus service; deployment of specialized, branded bus vehicles; and distinctive branded BRT stations.

Implementation of each of the build alternatives would include the following elements:

- Higher-capacity bus vehicles
- Sidewalk extensions, or bulb-outs, at some corners
- Pedestrian safety, landscaping, and streetscape improvements and amenities
- Access and lighting improvements in the station area
- High-quality stops/stations at BRT stops
- Proof of payment/all-door boarding/fare prepayment at BRT stops
- Left- and right-turn pocket modifications to smooth traffic flow and reduce conflicts between modes
- Side-running bus lane configuration east of Gough Street
- Transportation system management (TSM) improvements
- Low-floor buses that allow for level boarding
- Transit signal priority

The section below provides specific information for each of the project alternatives:

Alternative 1: No-Build Alternative/Baseline/TSM

This alternative includes low-cost transit improvements for the full study area that are expected to be implemented whether the proposed project is built or not. These improvements comprise TSM measures expected to be implemented between 2020 and 2035.

Alternative 2: Side-Running BRT

From west to east, implementation of Alternative 2 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, side-running bus lane in the existing rightmost lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way from Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA Under Alternative 2, dedicated bus-only lanes would be permeable for mixed traffic, which could enter the bus lanes to parallel park in the curb lane, make a right turn, or enter a garage. For this alternative, BRT stations would be located within the parking strip as extensions to the sidewalk, eliminating the need for buses to pull in and out of the bus lane to drop off or pick up passengers.

Alternative 3: Center-Running BRT with Right-Side Boarding/Dual Medians, and passing lanes

From west to east, implementation of Alternative 3 would result in:

- Continuation of a mixed-flow configuration from 48th Avenue to 33rd Avenue along Point Lobos Avenue and Geary Boulevard.
- A dedicated, center-running bus lane in the existing center lane of the east- and west-bound Geary Boulevard between 33rd Avenue and Gough Street.
- A dedicated side-running bus lane in the existing rightmost lane of east-bound O'Farrell Street / Starr King Way From Gough Street to Market Street
- A dedicated side-running bus lane in the existing rightmost lane of west-bound Geary Street from Market Street to Gough Street.
- Continuation of a mixed flow configuration along Market Street and 1st Street from the intersection of Market Street and O'Farrell Street to the Transbay Transit Center. Buses would run in mixed-flow lanes on Market Street to First Street and follow a circulation pattern into and out of the Transbay Terminal that will be established by SFMTA

Alternative 3B: Center-Running BRT with Right-Side Boarding/Dual Medians, no passing lanes

Similar to Alternative 3, Alternative 3B would convert the existing center traffic lanes in each direction and the existing center medians into bus-only lanes separated from traffic by two medians from 26th Avenue to Buchanan Street. Like the preceding Build alternatives, bus service under Alternative 3B would span 48th Avenue to the Transbay Transit Center. However, under Alternative 3B, the existing 38-Limited and 38-Local lines would be consolidated into one BRT line. No bus-only lanes would not be built from 48th Avenue to 34th Avenue under Alternative 3B. From 34th Avenue to 27th Avenue and from Laguna Street to Market Street, the bus-only lanes would take on a side-running configuration identical to Alternatives 2 and 3.

In accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), the proposed project is subject to environmental review, including review of historic resources. For the purposes of this project, SFCTA is the lead agency under CEQA, while FTA is the lead agency under NEPA.

As part of this process, JRP Historical Consulting, LLC (JRP) has been hired to prepare a Historical Resources Inventory and Evaluation Report (HRIER) to identify any possible or existing historic properties within the Area of Potential Effects (APE). Historic properties are those properties potentially eligible for, determined eligible for, or listed in the National Register of Historic Places or the California Register of Historical Resources. The purpose of the HRIER is to facilitate compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires Federal agencies to take into account the effects of their undertakings (projects or activities) on historic properties (36 CFR §800.1).

Section 106 mandates that the lead agency seek public comment and notify interested parties of the undertaking (36 CFR §800.2).

This letter is intended to seek your input regarding historic properties that may occur in the project area. If you or your organization has any concerns or information regarding existing or potential historical resources in the project area, please respond in writing to JRP citing your concerns. Receipt of your input within the next thirty days would be most appreciated.

Thank you for your attention. For additional project information or to receive copies regarding the project via regular mail, please contact Chester Fung, Principal Transportation Planner at chester.fung@sfcta.org, or 415.522.4804; or visit the project's website at www.gearybrt.org.

Sincerely,

Toni Webb
JRP Historical Consulting, LLC

Enclosure: Project Map

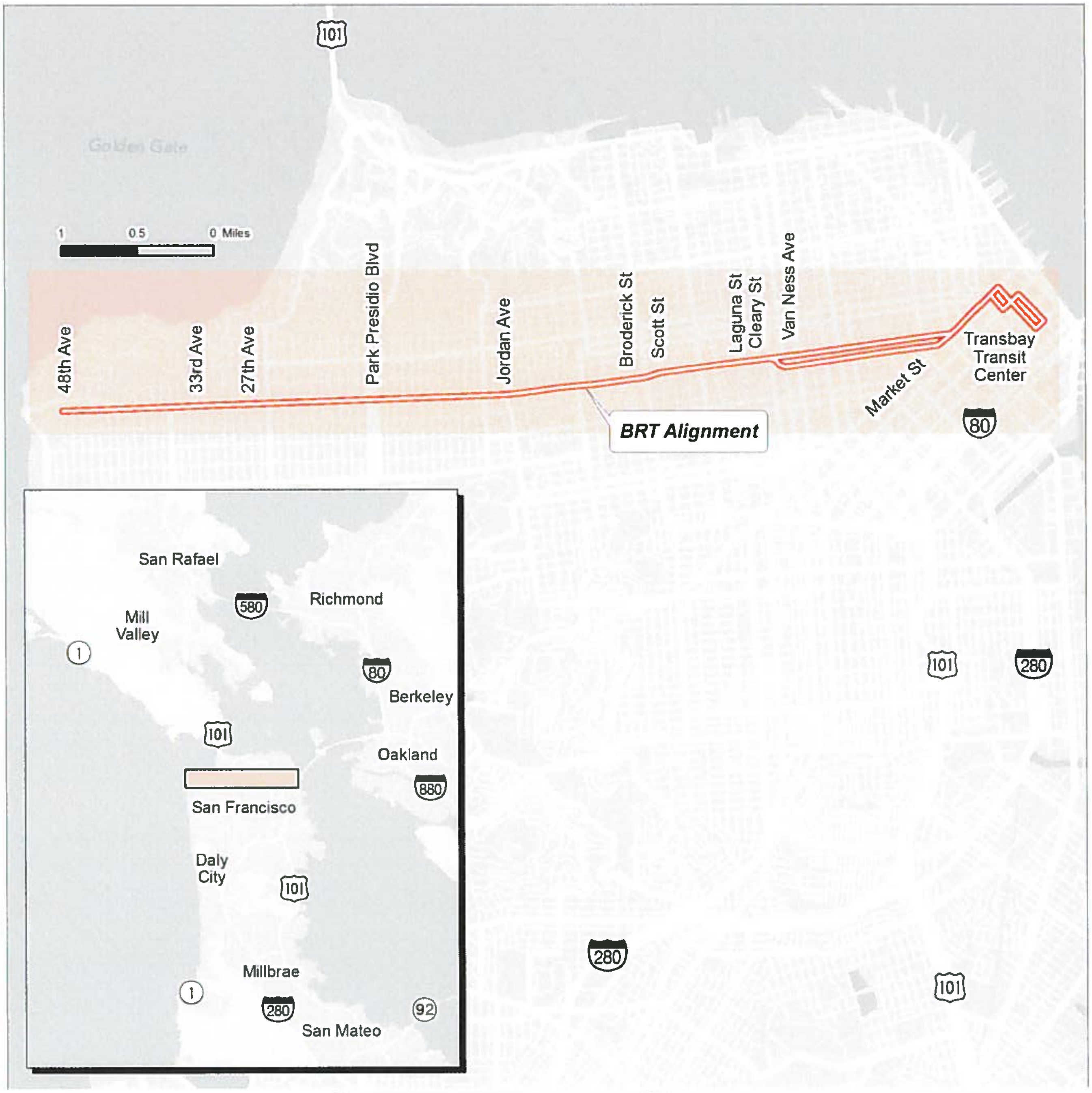


Figure 1. Geary Bus Rapid Transit Project, Proposed Project Location