Meeting Notice

1111 Broadway, Suite 800, Oakland, CA 94607 • 510.208.7400 • www.AlamedaCTC.org

Alameda County Technical Advisory Committee

Thursday, October 8, 2015, 1:30 p.m.
1111 Broadway, Suite 800
Oakland, CA 94607

Mission Statement

The mission of the Alameda County Transportation Commission (Alameda CTC) is to plan, fund, and deliver transportation programs and projects that expand access and improve mobility to foster a vibrant and livable Alameda County.

Public Comments

Public comments are limited to 3 minutes. Items not on the agenda are covered during the Public Comment section of the meeting, and items specific to an agenda item are covered during that agenda item discussion. If you wish to make a comment, fill out a speaker card, hand it to the clerk of the Commission, and wait until the chair calls your name. When you are summoned, come to the microphone and give your name and comment.

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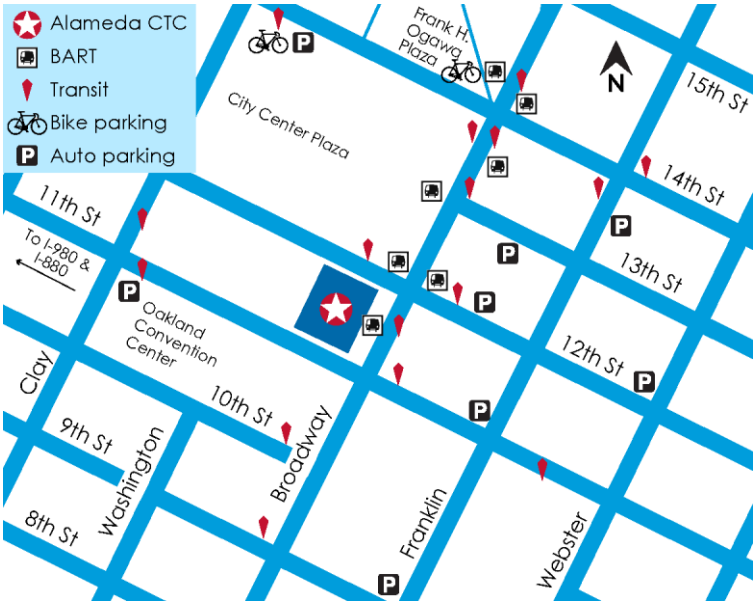
Glossary of Acronyms

A glossary that includes frequently used acronyms is available on the Alameda CTC website at www.AlamedaCTC.org/app_pages/view/8081.

Location Map

Alameda CTC
1111 Broadway, Suite 800
Oakland, CA 94607



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Meeting Schedule

The Alameda CTC meeting calendar lists all public meetings and is available at www.AlamedaCTC.org/events/upcoming/now.

Paperless Policy

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Alameda County Technical Advisory Committee Meeting Agenda
Thursday, October 8, 2015, 1:30 p.m.

1111 Broadway, Suite 800, Oakland, CA 94607 • PH: (510) 208-7400 • www.AlamedaCTC.org

***NOTE: COUNTYWIDE GOODS MOVEMENT PLAN TECHNICAL ADVISORY COMMITTEE MEETS FROM 11:00 A.M. TO 1:00 P.M.**

The Countywide Multimodal Arterial Plan Technical Advisory Committee Meeting Agenda is available on the Alameda CTC website.

Chair: Arthur L. Dao, Alameda CTC Executive Director
Staff Liaison: James O'Brien
Public Meeting Coordinator: Angie Ayers

		Page	A/I
1.	**Introductions/Roll Call**		
2.	**Public Comment**		
3.	**Administration**		
3.1.	September 10, 2015 ACTAC Meeting Minutes Recommendation: Approve the September 10, 2015 meeting minutes.	1	A
4.	**Policy and Transportation Planning**		
4.1.	Countywide Multimodal Arterial Plan: Typology Framework and Modal Priorities Recommendation: Approve the Countywide Multimodal Arterial Plan typology framework and modal priorities.	7	A
4.2.	Alameda Countywide Transit Plan Draft Network Recommendations, Evaluation Methodology, and Performance Measures Recommendation: Approve the Countywide Transit Plan draft network recommendations, evaluation methodology, and performance measures.	51	A
4.3.	Countywide Goods Movement Plan Draft Strategy Evaluation	205	I
4.4.	Countywide Transportation Plan: Alameda County Final Project and program List for Plan Bay Area 2040 Recommendation: (1) Approve the Final lists of regional, committed, county-level projects and programs for submittal to the RTP and (2) Direct staff to forward both the Final lists to MTC by October 30, 2015.	207	A
4.5.	Draft 2015 Congestion Management Program Recommendation: Approve the 2015 CMP, augmentation and extension of the Travel Demand Management Program contract for the Guaranteed Ride Home program, and the FY2014-15 CMP Conformity Findings.	231	A

5. Programs/Projects/Monitoring

5.1. Transportation Fund for Clean Air (TFCA) FY 2015-16 Program Recommendation: Approve the TFCA FY 2015-16 Program.	239	A
5.2. Alameda County Federal Inactive Projects List: September 2015 Update	243	I

6. Member Reports

6.1. Metropolitan Transportation Commission Local Streets and Roads Working Group Update	247	I
6.2. Other Reports		I

7. Adjournment/Next Meeting
Thursday, November 5, 2015

All items on the agenda are subject to action and/or change by the committee.

ALAMEDA County Transportation Commission
1111 Broadway, Suite 800, Oakland, CA 94607 • 510.208.7400 • www.AlamedaCTC.org

Alameda County Technical Advisory Committee
Fiscal Year 2014-2015

Member Agencies

AC Transit
BART
City of Alameda
City of Albany
City of Berkeley
City of Dublin
City of Emeryville
City of Fremont
City of Hayward
City of Livermore
City of Newark
City of Oakland
City of Piedmont
City of Pleasanton
City of San Leandro
City of Union City
County of Alameda

Other Agencies

Chair, Alameda CTC
ABAG
ACE
BAAQMD
Caltrans
CHP
LAVTA
MTC
Port of Oakland
Union City Transit
WETA

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1. **Introductions/Roll Call**
   Arthur L. Dao called the meeting to order. The meeting began with introductions, and the chair confirmed a quorum. Representatives from all cities and agencies were present, except from the following: Altamont Corridor Express (ACE), Association of Bay Area Governments (ABAG), Bay Area Air Quality Management District (Air District), California Highway Patrol (CHP), City of Hayward, City of Newark, City of Oakland, Union City Transit, and San Francisco Bay Area Water Emergency Transportation Authority (WETA).

2. **Public Comment**
   Art Dao congratulated Keith Cooke on his promotion to director of the engineering and transportation department for the City of San Leandro. He welcomed new members Hans Larsen (Fremont) and Beth Thomas (Berkeley).

   Michael Kaufman an Oakland resident stated that on the behalf of the No Coal in Oakland Coalition, he commended the Technical Advisory Committee and the Commission for looking to the future with the newest Transportation Expenditure Plan. It contains many steps in the right direction, such as deemphasizing cars and emphasizing bikes and pedestrian transportation, and public transit. He cautioned ACTAC and the Commission against taking steps backward by continuing to rely on funding for the transport of fossil fuel in the Goods Movement Plan or funding individual proposals for moving fossil fuel. Mr. Kaufman invited the committee to attend a rally at the City of Oakland City Hall on September 23, 2015 at 3:30 p.m.

3. **Administration**
   3.1. Approval of July 9, 2015 Minutes
   Farid Javandel (Berkeley) moved to approve the July 9, 2015 meeting minutes. Debbie Bell (Livermore) seconded the motion. The motion passed unanimously (ACE, ABAG, Air District, CHP, City of Hayward, City of Newark, City of Oakland, Union City Transit, WETA were absent).

4. **Policy and Transportation Planning**
   4.1. Goods Movement Plan Strategy Evaluation Results
   Tess Lengyel introduced Michael Fischer with Cambridge Systematics. Michael gave a summary of the Draft Strategy Evaluation memorandum and the concept of opportunity strategies. He informed the committee that comments should be returned to Michael Bomberg at mbomberg@alamedactc.org by September 25, 2015.

4.2. Countywide Transportation Plan: Regional Transportation Plan (RTP) Draft Project and Program List for Submittal to Metropolitan Transportation Commission (MTC) and Update on MTC RTP Development

Tess Lengyel requested ACTAC to recommend that the Commission approve the draft project and program lists that Alameda CTC will submit to MTC for *Plan Bay Area.* She requested ACTAC provide comments to Alameda CTC by September 18, 2015. The draft list must be submitted to MTC by September 30, 2015. Tess explained that the projects and programs on the list will also feed into the Countywide Transportation Plan (CTP) and the RTP. The CTP will be adopted in June 2016 and the RTP will be adopted in 2017.

Questions/feedback from members:

- Does Table 5 include both the direct local distribution (DLD) and other local funding? Tess said that DLD is included in "Program Funding." The "Requested Funding" column is for jurisdictions/agencies that did not define local or regional funding.
- Does the footnote on Table 4 apply to the entire table or just to that page? Tess said the footnote is for the entire table, and staff will make that clearer.
- Correct the funding on Table 2 for BART Metro Bay Fair Connections and BART to Livermore projects.
- Correct the heading on Table 5 to include RTP.
- The City of Berkeley requested a name change for project 105 from "Southside Two-way Streets Conversion Project" to "Complete Streets Conversion Project" to avoid future confusion.

Farid Javandel (Berkeley) moved to approve this agenda item with the minor corrections listed above. Thomas Raurk (Union City) seconded the motion. The motion passed unanimously (ACE, ABAG, Air District, CHP, City of Hayward, City of Newark, City of Oakland, Union City Transit, WETA were absent).

5. Programs/Projects/Monitoring

5.1. Transportation Fund for Clean Air (TFCA) Expenditure Deadline Extension Requests

Jacki Taylor requested ACTAC recommend that the Commission approve the TFCA Extension Requests for projects 11ALA01,11ALA02, and 11ALA07, and the amendment to the Master Program Funding Agreement with the Air District. She stated that Alameda CTC's TFCA Program Guidelines require Commission approval for any TFCA projects requesting a third, or subsequent, extension. She provided information on the three projects requesting extensions.

Ruben Izon (Alameda County) moved to approve this agenda item. Aleida Andrino (Albany) seconded the motion. The motion passed unanimously (ACE, ABAG, Air District, CHP, City of Hayward, City of Newark, City of Oakland, Union City Transit, WETA were absent).

5.2. Transportation Fund for Clean Air (TFCA) FY2015-16 Program Update

Jacki Taylor gave a status update on the FY2015-16 TFCA Program. She reviewed the evaluated projects and draft results with the committee.

5.3. Measure BB Community Development Investments Program (MBB 045/PN 1460.000): Program Development Overview

Trinity Nguyen presented an overview of the Measure BB Community Development Investments Program. She stated that the 2014 Transportation Expenditure Plan establishes a total of 4 percent of net sales tax revenue to be distributed on a discretionary basis for the development and implementation of the Community Development Investments Program. Trinity covered the development process and purpose of the program. She also provided information on the objectives of the program and programming methodology, specifically the funding framework and selection process.

5.4. 2014 Measure BB Scoping Funds Update

James O'Brien updated the committee on the 2014 Measure BB scoping funds. He stated that the goal is to give the committee a refresher on the scoping fund agreements. He noted that the boilerplate scoping agreements have been developed and distributed to project sponsors that requested scoping funds. James stated that effective June 1, 2015, the project sponsors that requested funds are able to proceed with their scoping projects.

5.5. One Bay Area Grant (OBAG) Cycle 2 Update

Vivek Bhat updated the committee on OBAG Cycle 2. He stated that MTC staff recently released the proposal for OBAG Cycle 2 (FYs 2017-18 to 2021-22) outlining principles for changes, program funding levels, and policy revisions. He stated that staff will present the Alameda County OBAG Cycle 2 principles to the Committees and Commission later this year or in early 2016.

5.6. California Transportation Commission August 2015 Meeting Summary

Vivek Bhat stated that the August 2015 California Transportation Commission (CTC) meeting was held in San Diego, CA. He summarized four items of significance pertaining to projects/programs within Alameda County which were considered at the CTC meeting.

5.7. Alameda County Federal Inactive Projects List: August 2015 Update

Vivek Bhat provided an update on the August 2015 federal inactive projects list. He encouraged committee members to stay current with their invoicing activity.

6. Member Reports

6.1. Metropolitan Transportation Commission Local Streets and Roads Working Group Update

Vivek Bhat said a working group meeting was not held in August. The September meeting is scheduled for September 18, 2015.

6.2. Other Reports

None

7. Adjournment and Next Meeting

The meeting adjourned at 4:00 p.m. The next meeting is:

Date/Time: Thursday, October 8, 2015 at 1:30 p.m.
Location: Alameda CTC Offices, 1111 Broadway, Suite 800, Oakland, CA 94607

Attested by:

_____

Angie Ayers,
Public Meeting Coordinator

ALAMEDA County Transportation Commission
1111 Broadway, Suite 800, Oakland, CA 94607 • PH: (510) 208-7400 • www.AlamedaCTC.org

ALAMEDA COUNTY TECHNICAL ADVISORY COMMITTEE
September 10, 2015
ROSTER OF MEETING ATTENDANCE

	NAME	JURISDICTION/ ORGANIZATION	PHONE #	E-MAIL
1	Gail Payne	City of Alameda	510 747 6892	gpayne@alamedaca.gov
2.	Aleida Andrino-Chavez	Albany	510. 528 5759	achavez@albanyca.org
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5.	Amber Evans	City of Emeryville	510-596-4382	aevans@emeryville.org
6.	Mike Tassano	City of Pleasanton	(925) 931-5670	MTASSANO@cityofpleasantonca.gov
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10.	Donna Lee	BART	510-464-6282	dlee@bart.gov
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12.	Hans Larsen	Fremont	510-494-4722	hlarsen@fremont.gov
13.	Carmela Campbell	Union City	510-675-5321	carmela@unioncity.org
14.	Christy Wegener	LAVTA	925.455-7560	cwegener@lavta.org
15.	Angela Swanson	LAVTA	925.455-7561	aswanson@lavta.org
16.	Beth Thomas	City of Berkeley	510-981-7068	bthomas@cityofberkeley.info
17.	Fredrick Schermer	CalTrans	510 286 5557	fschermer@dot.ca.gov
18.	Thomas Ruark	Union City	510 675-5301	thomasr@unioncity.org
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20.	Chris Andrichak	ACTransit	5108918455	candrichak@actransit.org

	NAME	JURISDICTION/ ORGANIZATION	PHONE #	E-MAIL
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22.	John O'Brien	Alameda CTC	510-208-7464	jobrien@alamedactc.org
23.	ARTHUR DAO	"	7402	adao "
24.	Tess Lengyel	"		
25.	Flora Law	HNTB	510 587 8661	FLaw@HNTB.com
26.	Daniel Wu	Alameda CTC	510-208-7456	dwu@alamedactc.org
27.	Saravana Suthanthira	"	510 208 7426	ssuthanthira@alamedactc.org
28.	Trinity Nguyen	Alameda CTC	510.208.7441	tnguyen@alamedactc.org
29.	Matthew Bomberg	Alameda CTC	510-208-7444	mbomberg@alamedactc.org
30.	FRANCIS LO	BAYPAC CONSULT	510-517-3680	FLO@BAYPACCONSULT.COM
31.	Evelyn Ng	AC Transit	510-891 5405	eng@actransit.org
32.	CINDY HORVATH	ALAMEDA COUNTY PLNG.	510 670-6511	CINDY.HORVATH@acgov.org
33.	NIKKI DIAZ	LAVTA		
34.	Tamorat Habtes	Alameda CTC	510.208.7475	thabtes@alamedactc.org
35.	Heather Lasser	Alameda CTC	510208-7459	hlasser@alamedactc.org
36.	Kara Vuicich	Alameda CTC	510 208 7410	kvuicich@alamedactc.org
37.	Mollie Cohen Rosenthal	Alameda CTC	510 208 7471	mrosenthal@alamedactc.org
38.	VIVEK BHAT	ALAMEDA CTC	510-208-7430	vbhat@alamedactc.org
39.	JACKI TAYLOR	ALAMEDA CTC	(510) 208-7413	JTAYLOR@ALAMEDACTC.ORG
40.	RODNEY PIMENTEL	PARSONS	(510) 693-2094	RODNEY.PIMENTEL@PARSONS.COM
41.	TRISH REAVEY	ALAMEDA CTC	(510) 208-7422	treavey@alamedactc.org
42.	JOHN NGUYEN	Alameda CTC	(510) 208-7419	jnguyen@alamedactc.org
43.				
44.				
45.				
46.				

DATE:	October 5, 2015
SUBJECT:	Countywide Multimodal Arterial Plan: Typology Framework and Modal Priorities
RECOMMENDATION:	Approve the Countywide Multimodal Arterial Plan typology framework and modal priorities.

Summary

Arterial roadways are the core of the transportation system in Alameda County, moving people and goods within the county and the region and serve the second highest number of users as compared to freeways. These roadways provide regional and local mobility for multiple transportation modes, access to surrounding land uses, and connectivity between employment and activity centers that is essential for Alameda County's economy and quality of life. Alameda CTC is developing a Countywide Multimodal Arterial Plan, a first of its kind that will provide a framework for addressing needs for all modes on the county's arterials.

The Arterials Plan essentially provides a high-level framework for a Complete Streets Network that the jurisdictions can use and build upon to meet the state and regional complete streets requirements. The plan development is being closely coordinated with local jurisdictions, the California Department of Transportation (Caltrans), transit operators, and non-agency members representing all modes. Further, this coordination also considers the prior related efforts by three Alameda County jurisdictions (the cities of Alameda, Emeryville, and Fremont) and current ongoing complete streets efforts by the Cities of Oakland and Berkeley.

The Commission approved the vision, goals, and performance measures for the Arterials Plan in February 2015. As a next step, the project team has been working with the stakeholders to develop a typology framework, a classification of the arterials that is reflective of the surrounding land use context and identifies the role and needs of various modes on these roads (as defined further below), which will inform prioritizing various modes on these arterials.

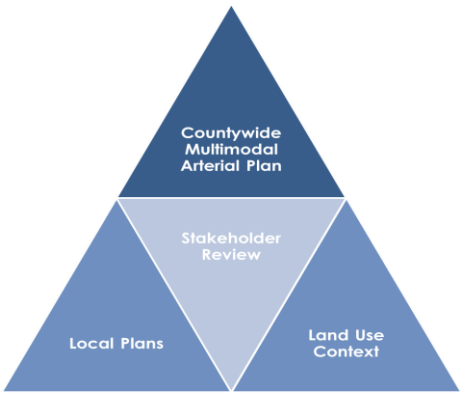
The development process is based on a combination of technical analyses from the project team and priorities defined by the jurisdictions, transit agencies, and Caltrans.

Discussion

Alameda CTC is developing the Arterials Plan to comprehensively study the existing and future conditions for all transportation modes on the arterials, identify needs and develop recommendations for transportation improvements. Attachment A provides a flow chart of the Arterials planning framework that includes distinct three milestones.

A key component of the Arterials Plan is the roadway typology framework that enhances and supplements the traditional arterial-collector-local functional classification system by recognizing the importance of local land use context and all transportation modes. In this regard, the typology framework focuses not only on roadway volume throughput, but also evaluates roadways in terms of land use context and local multimodal (transit, bike, pedestrian, auto, and truck) needs as part of the countywide transportation system. This unprecedented countywide planning process (shown in Figure 1) begins with two components: 1) local multimodal needs as reflected in local planning efforts and data collected on existing conditions; and 2) land use context. These two components have been aggregated from the local level to the countywide level through technical analyses and extensive stakeholder review.

Figure 1. Alameda Countywide Arterials Plan Development Process Framework



The Arterial Plan provides a technical basis for Alameda County jurisdictions in their implementation of a Complete Streets Plan as required by state legislation (California Complete Streets Act of 2008) and the region's complete streets requirements (Metropolitan Transportation Commission [MTC] Resolution Number 4035). In particular, the Arterial Plan's typology framework provides a basis for identifying the county's Complete Streets Network, assessing arterial roadway's multimodal performance and needs in the context of the surrounding land use, and identifying and prioritizing appropriate short- and long-term improvements on arterial roads.

Many jurisdictions in Alameda County including the cities of Oakland and Berkeley, and Central County jurisdictions are working on developing a Complete Streets Plan, and Alameda CTC's Arterial Plan coordinates with these efforts. Additionally, the cities of Alameda, Emeryville, and Fremont have already adopted their typology framework, and the

Arterial Plan's typology framework has been coordinated with their work, so that their frameworks nest within the countywide typology.

Outreach and Coordination with Stakeholders

Close coordination with local jurisdictions, bus transit operators, Caltrans, MTC, and non-agency stakeholders (representatives from seniors, people with disabilities, emergency response, bicycle and pedestrian user groups, and trucking) has been an integral part of the Arterial Plan development process. Regarding the typology and modal priorities development, Alameda CTC held two rounds of meetings, one in April and one in July 2015, and addressed over 600 comments received from these reviews.

In April 2015, the project team presented the draft typology framework and resulting roadway modal priorities to the stakeholders at the Alameda County Plan Technical Advisory Committee (TAC) and four planning area meetings. The framework and modal priorities were also presented to non-agency stakeholders at a separate meeting.

The project team provided the typology and roadway modal priority maps via an online GIS server to facilitate the review process that allowed stakeholders to focus and comment on particular roadway segments. Based on comments received from jurisdictions and stakeholders in April 2015, the project team presented an updated typology framework and modal priorities maps at the July 2015 Arterial Plan TAC meeting and received comments. The project team finalized the typology framework and modal priorities based on the extensive input received from jurisdictions and stakeholders from April through July 2015.

Typology Framework

The Arterial Plan's typology framework expands beyond evaluating roadway characteristics solely on volume throughputs by identifying the multimodal functions and characteristics of arterial roadways in the context of the roadways' adjacent land use, while ensuring a continuous Complete Streets Network on a county level. The Arterial Plan's typology framework provides jurisdictions with a technical basis for additional community outreach to develop and coordinate policies, strategies, and appropriate improvements for each arterial roadway to address the complete streets requirements. Attachments B and C present detailed descriptions of the three overlay components of the typology framework and describe how it informed development of modal priorities. Attachment B also presents the summary of stakeholder comments and Alameda CTC's responses.

For the Arterial Plan purposes, a broad local road network of 1,200 miles of major arterial and collectors across the county, called the "Study Network," was identified to carry out initial work related to data collection, analysis, and typology development and modal priority identification.

The typology framework consists of three key components or overlays: Land Use Context, Auto Overlay or Street Typology, and Multimodal Emphasis Overlay.

Land Use Context

The land use context defines the context of built and natural environments adjacent to an arterial roadway. It is based on the Association of Bay Area Governments priority development area place types and the Alameda Countywide Transportation Plan Sustainable Communities Strategy. The land use types are aggregated into three groups:

- Urban
- Suburban
- Industrial

Auto Overlay or Street Typology

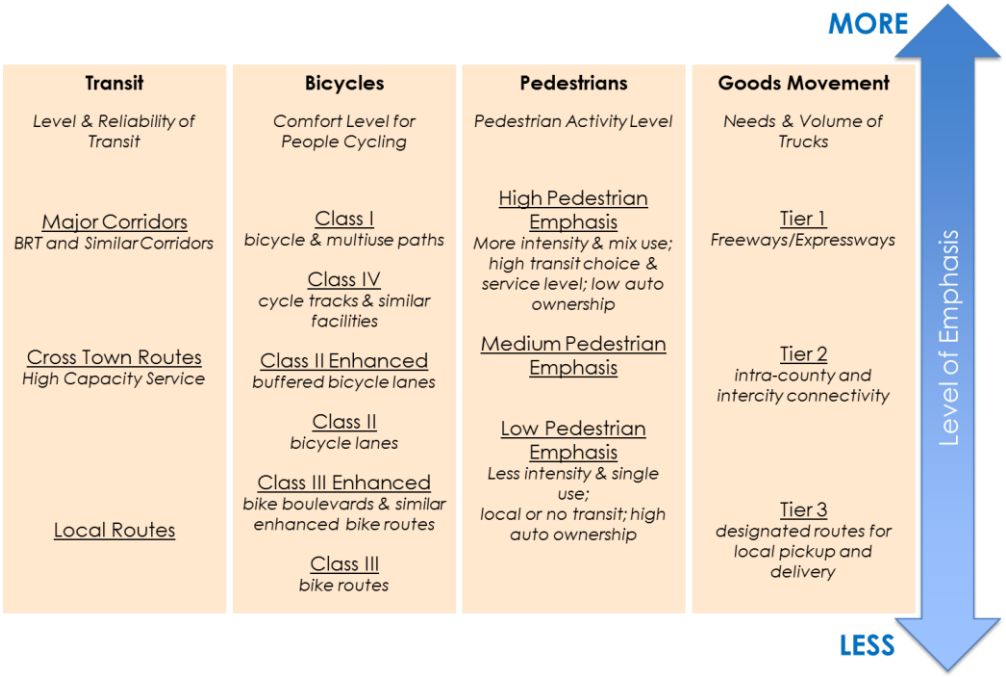
The auto overlay, or street typology, describes a roadway's mobility function and is based on traffic volumes and its role in carrying sub-regional or local traffic (trip length). The proposed street typology consists of the following four classification types:

- Throughway
- County Connector
- Community Connector
- Local Road

Multimodal Emphasis Overlays

Four multimodal transportation overlays add definition to the multimodal characteristics and function of the streets in the Study Network, which identifies roadway networks with varying levels of emphasis on specific transportation modes such as transit, bicycle, pedestrian, and goods movement, as illustrated in Figure 2.

Figure 2. Multimodal Overlays – Emphasis Matrix



Mapping of all these overlays was developed for the Arterial Plan's Study Network.

Modal Priorities

The typology framework uses modal priorities to balance multimodal needs on a roadway considering land use context—urban land use, suburban land use, and industrial land use (see Figure 3 on the next page). These modal priorities are derived by applying the auto, multimodal, and land use overlays to the Arterial Plan Study Network roadways. Modal priorities define how well each mode should perform on a given roadway and inform the roadway's needs assessment and recommended improvements based on the Arterial Plan's performance measures approved by the Commission in February 2015.

Attachment D presents a detailed description of how modal priorities were determined for the Study Network segments, which was closely reviewed by the stakeholders. While the typology framework identified Study Network segments' modal priorities, ultimately, jurisdictions had the opportunity to review these priorities and decide on their appropriateness for a given Study Network roadway.

Figure 3. Modal Priorities by Land Use Context

Urban Land Use Context Types	Suburban Land Use Context Types	Industrial Land Use Context Types
Associated Modal Emphasis	Associated Modal Emphasis	Associated Modal Emphasis
Transit	Transit	Transit
Pedestrian	Auto	Goods Movement/Truck
Bicycle	Goods Movement/Truck	Auto
Auto	Bicycle	Bicycle
Goods Movement/Truck	Pedestrian	Pedestrian

Next Steps

Based upon Commission approval ofthe typology and modal priority, the project team will complete the existing and future year (2020 and 2040) conditions, and develop a needs assessment of each mode based on the Study Network's modal priorities and the approved performance measures. The needs assessment will be presented in November. The project team will then recommend improvements for a core subset of the study network—the Arterials of Countywide Significance. Alameda CTC will review and discuss these with the jurisdictions and transit agencies in various meetings in late fall and bring them to the Commission for approval in January 2016.

Fiscal Impact: There is no fiscal impact.

Attachment:

A. Arterial Plan Development Process and Three Milestones
B. Arterial Plan – Draft Final Arterial Street Typology and Modal Priority Comments and Responses
C. April 2015 Draft Typology Memorandum
D. April 2015 Draft Modal Priority Memorandum

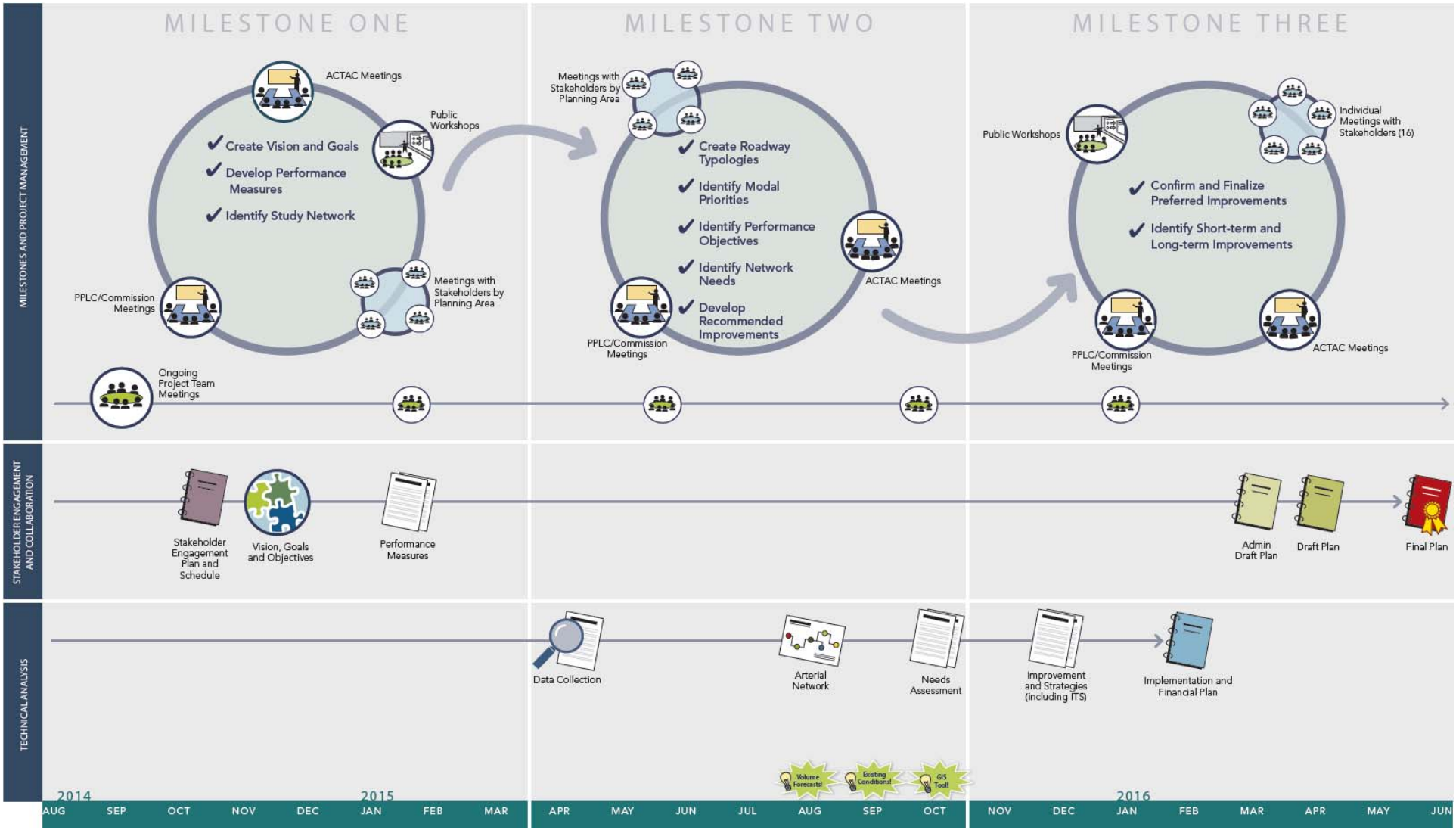
Staff Contact

Tess Lengyel, Deputy Director of Planning and Policy

Saravana Suthanthira, Senior Transportation Planner

Daniel Wu, Assistant Transportation Planner

MAP Development Process Framework



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COMMUNITY DESIGN + ARCHITECTURE

Philip Erickson, Architect, AIA
Timothy Rood, AICP, LEED AP ND

MEMORANDUM

Date: September 16, 2015

To: Saravana Suthanthira, Alameda CTC

Cc: Matthew Ridgway and Francisco Martin, Fehr & Peers

From: Phil Erickson, Bharat Singh, and Warren Logan

Re: Alameda Countywide Multimodal Arterial Plan: Draft Final Arterial Street Typology and Modal Priority Comments and Responses

The Alameda CTC Multimodal Arterial Plan (MAP) is developing a street typology framework to enhance the traditional arterial-collector-local functional classification system with a system that recognizes the importance of land use context and all the transportation modes. The development of a Countywide typology framework is an unprecedented effort that identifies the characteristics of major streets across Alameda County. The MAP evaluates street performance as *multimodal complete streets*, and will suggest potential improvements to streets that do not adequately serve their multimodal function within the Countywide network.

In April 2015, a draft typology framework (Figure 1) was developed for the MAP Study Network, and applied to identify the modal priority for the Study Network segments. The three components of the typology framework are:

- **Land Use Context Types –** that define the context of built and natural environments that the streets pass through.
- **Base Street Types –** that are defined by their role in carrying sub-regional and local traffic along the '*Study Network's*[1] streets.
- **Multimodal Transportation Overlays –** that define the priority given to other transportation modes: transit, bicycle, pedestrian, and goods movement.

The typology framework and modal priority methodology were described in separate memos along with the mapping of street typology (land use types, street types, and multimodal overlays) and were first presented to ACTAC on April 9, 2015. These materials were distributed prior to Planning Area meetings taking place during the week of April 20, 2015 and at a meeting with non-agency stakeholders on April 20, 2015 for review and comment. Stakeholders also had an option to provide comments on the

[1] The *Study Network* consists of the arterials and collectors that are part of the California Road System (CRS) which was sent to all Alameda County jurisdictions for review, and to support data collection in December 2014.

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typology and modal priority directly on a GIS server in addition to separate comments by email. The first round review period ended May 15, 2015, revised land use context, base street type and multimodal transportation overlay maps were presented to PlanTAC on July 21, 2015 for review. The second round review period ended August 17, 2015. The first draft memos that were distributed to stakeholders for review and comment in April are provided in Appendices A1 and A2 to this memorandum.

This memorandum describes the comments received between April and August 2015, and updates made to the typology framework and modal priority in response to those comments. It first provides a high-level summary of the comments received and the approach adopted to addressing the comments and then describes the comments and responses by each component of the typology framework – land use context, base street type, modal overlays by mode (transit, bicycle, pedestrian, and goods movement). Finally, it describes the updated modal priority for the Study Network.

Typology

Comments were primarily received on the maps directly on the GIS server on the modal emphasis and priority and some comments were received via emails. Comments received well after the deadline have been addressed using the same approach, and changes have been incorporated into the mapping.

Overview of Comments

Many comments were received on the **land use layer** requesting change for certain areas of a jurisdiction. The land use data used for the typology task is based on a combination of Priority Development Area (PDA) place types and the land use types developed in close coordination with the local jurisdictions planning departments for the purposes of Plan Bay Area Sustainable Community Strategy (SCS) and used in the adopted *2012 Countywide Transportation Plan*. Therefore, the project team incorporated changes requested to the land use only if the change influences any of the modal emphasis, mainly pedestrian emphasis and left the land use for the other areas unchanged with the intent of generally maintaining consistency with the SCS land use adopted for the model.

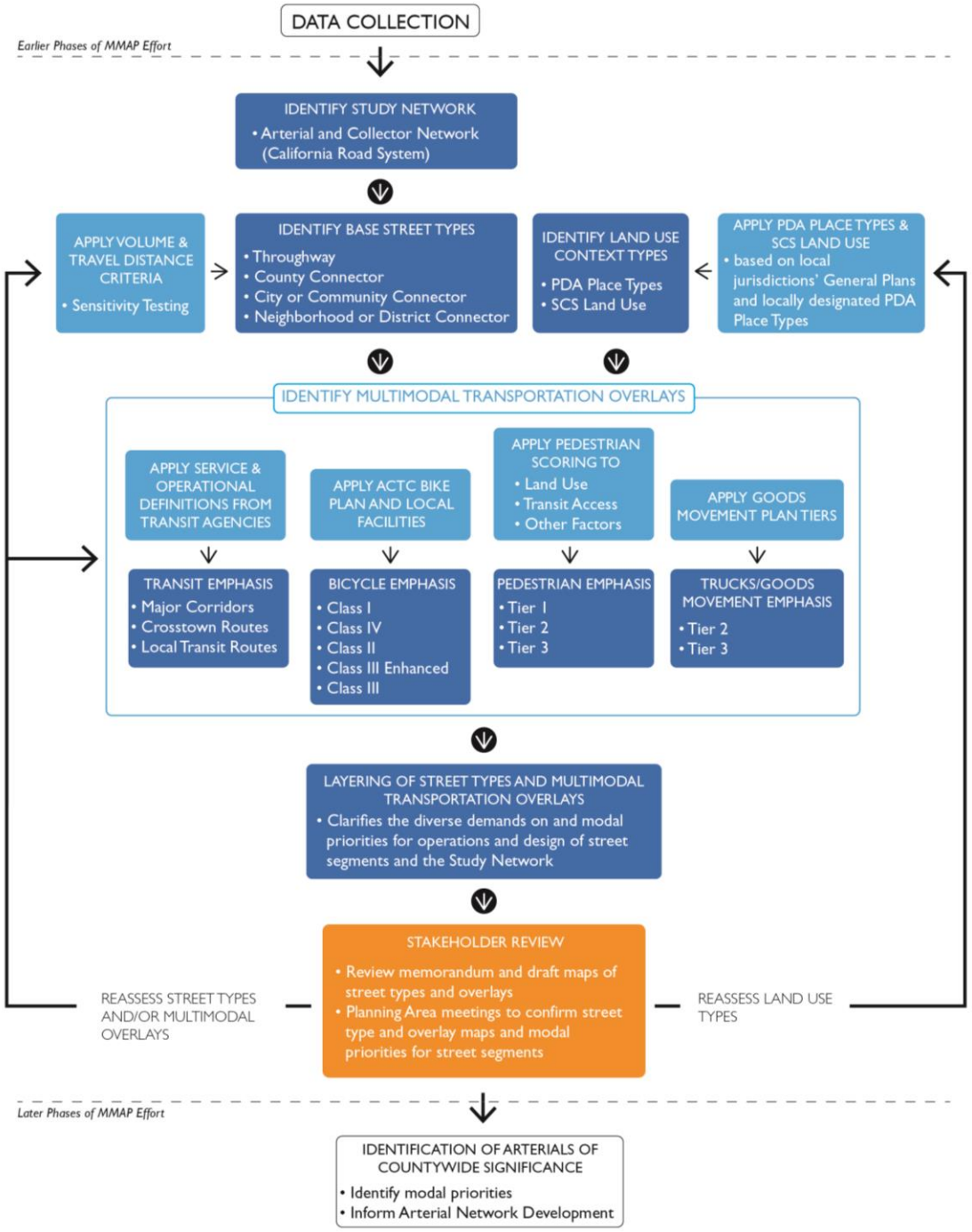
Comments on **street typology** focused on street types reflecting local priorities and sometimes to appropriately reflect the function of the street if the MAP methodology was not resulting in the street type that jurisdiction staff would expect given their local knowledge and experience. Most of these changes were incorporated.

Comments on **transit emphasis** include identifying new major corridors from transit agencies based on their respective Comprehensive Operations Analysis (COA) studies and also reflecting the transit corridor alternatives developed from the Countywide Transit Plan.

Comments on **bicycle emphasis** generally include providing information on built and planned bicycle facilities that were not in the draft data, as well as several regarding bicycle planning efforts that are in process and that will likely result in future changes to the bicycle network. Comments from several jurisdictions around the County regarding the initial draft typology mapping have also led to many refinements to the bicycle emphasis overlay.

Pedestrian emphasis comments generally related to jurisdictions desiring a higher level of emphasis on some downtown and mixed use commercial "main street" street segments, and as mentioned above, some land use comments were focused on areas where recently adopted land use policies are more oriented to pedestrian activity and providing transit-oriented development.

Figure 1: Multimodal Arterial Plan Typology Framework Process Diagram



Comments and Responses on Land Use Context

First Round Review Period (April – May 2015)

A key element of the typology framework defines the physical context of streets using land use types developed for the Alameda County Land Use Scenario approved through the 2012 Countywide Transportation Plan, this was then used as an input for the Plan Bay Area Sustainable Community Strategy (SCS).

Several jurisdictions have asked for revisions and updates to the land use mapping provided for review. For the purposes of the MMAP effort, the project team determined that if a requested land use change will not affect the resulting modal priorities for a street segment then land use change will not be made. For example:

- If a proposed land use does not shift the street segment from one land use context modal group to another (see Table 1 on page 10), the land use change will not be made; or
- If the parcel is relatively small (a street frontage of about 250 feet or less), the land use change will not be made because modal priorities should not change for such a small length of street frontage, given that a change in street design over this short of a distance is unlikely.

There are several large areas throughout the County where new land use plans have been adopted since land use mapping was developed during the *2012 Countywide Transportation Plan*:

- Fremont asked that the detailed land use designations for the Warm Springs Community Plan be used in the land use context type mapping for the MAP. But the detailed land uses are not necessary for the MAP typology and modal priority mapping, because land use for this area is defined by PDA place type, and the PDA place type is mapped correctly in the MAP land use context mapping.
- At the request of City of Alameda and Dublin, Alameda Point and Dublin Crossings respectively will be updated to the MAP land use type of Town Center Mixed Use, based on their PDA place types of Transit Town Center and Suburban Town Center respectively. They had been mapped according to their 2012 Countywide Transportation Plan Land Use Scenario designation of public lands.

Second Round Review Period (July – August 2015)

Albany and Emeryville staff provided comments on the land use context overlay during the second round review period:

- Albany provided the latest citywide zoning map to inform the land use context map; relevant changes were made to the land use context map.
- Emeryville requested the inclusion of Doyle Hollis Park to the land use context map, however, the park has less than 250-foot frontage on Hollis Street and will not affect the modal priority, therefore no change to the land use context map was made.

A revised map of land use context overlay is provided in Appendix B.

Comments and Responses on Street Typology

First Round Review Period (April – May 2015)

A range of specific comments about street typology has been provided by jurisdictions throughout the County. Most of these relate to changing a City or Neighborhood Connector street segment to County Connector, such as E. 14th Street in San Leandro and Alameda County, and Grant Line Road in the unincorporated East County. The majority of these changes were made to the street typology mapping. Some comments regard details of street function that the regional model does not fully reflect. For example, Livermore requested changing First Street to Neighborhood Connector from County Connector given the character and function of First Street as Downtown Livermore's main street and that Railroad Avenue provides parallel vehicle functionality as a County Connector. Similarly, Fremont has asked for classification of several streets in the downtown area that are not included in the Study Network. The Study Network is based on the California Roadway System classification, which was previously presented to stakeholders in December 2014 for review and comment, therefore additions to the Study Network will no longer be considered. Finally, a few jurisdictions requested that planned and funded streets in new development areas (e.g., Innovation Way in the Warm Springs area of Fremont) be included as part of the Study Network. Planned and funded roadways to be constructed in the future will be shown on future year maps, but will not be included as part of the Study Network. It is assumed that planned and funded new streets will be designed to the latest complete street standards; therefore, the Multimodal Arterial Plan will not evaluate these new street segments for future needs assessments. However, new street segments are included in the travel demand modal and considered in the development of future year (2020 and 2040) Study Network forecasts.

Second Round Review Period (July – August 2015)

Comments on the base street type overlay were not provided during the second round review period. A couple of first round comments were not adequately addressed within unincorporated Alameda County during the first round and were therefore addressed during the second round of updates (e.g., East Lewelling Boulevard was changed from Community Connector to County Connector).

A revised map of the base street type overlay is provided in Appendix C.

Comments and Responses on Transit Emphasis

First Round Review Period (April – May 2015)

Comments received on the transit emphasis overlay are:

- AC Transit requested additional roadway segments be designated as Major Corridors reflective of their COA study draft alternatives and the draft alternative corridors from the Alameda CTC Countywide Transit Plan. These have been marked as an alternative layer while keeping the initial modal priority in the base layer until the final future network or corridors are adopted, which is expected in October 2015. Keeping the alternative layer showing the new transit emphasis corridors serves two purposes –
    1. enables the project team to verify that the potential suggested improvements in the next steps do not adversely impact transit performance on these roadway segments identified in the final transit network; and
    2. to inform the jurisdictions on the potential modal emphasis change or added modal emphasis and help to initiate discussions between AC Transit and jurisdictions, as appropriate

- The City of Emeryville requested that Emery Go-Round service be added to the transit network and this has been done as discussed above.
- Several cities and LAVTA asked that transit service be located on segments of the network where it had not been indicated. These revisions have been made except for those routes that are not on the Study Network.

Second Round Review Period (July – August 2015)

AC Transit provided one comment on the transit emphasis overlay during the second round: assume that Solano Avenue between San Pablo Avenue and the Alameda in Albany is part of the transit major corridor network. In further discussions, AC Transit explained that although it is a major corridor, since no major transit supportive improvements can be made due to the constrained right-of-way, and therefore, they deferred the modal priority to the local jurisdiction, which was already included in the modal priority.

A revised map of the transit emphasis overlay is provided in Appendix D.

Comments and Responses on Bicycle Emphasis

First Round Review Period (April – May 2015)

Bicycle emphasis overlay was developed by reviewing the existing bicycle facilities, *2012 Countywide Bicycle Plan* and the four trail types[2]. The Countywide Bicycle Plan defines five categories of Countywide significance: inter-jurisdictional network, access to transit, access to central business districts, inter-jurisdictional trails, and access to *Communities of Concern.*

Comments from eight cities across the County regarding the initial draft typology mapping have also led to many refinements to the bicycle emphasis overlay. To a great degree, this is reflective of the rapid changes that have been occurring at a national level regarding the planning and design of bicycle facilities since the adoption of the Countywide Bicycle Plan in 2012. Piedmont has only recently adopted a bicycle plan, Berkeley is currently doing a major update to their bicycle plan, and Oakland requested comprehensive refinements to their network in anticipation of planned improvement projects, future improvement projects and updates to their bicycle plan. The majority of these refinements will be made by either adding or revising bicycle facilities on Study Network streets or by providing "markers" on non-Study Network streets that can be used to identify them as parallel facilities to Study Network streets during the development of design options. These updates were facilitated by several cities providing updated GIS data regarding bicycle improvements. Some requested refinements were about bike trails that are not part of the Study Network. These updates were not made, as they do not directly influence the Modal Priority approach described below.

Second Round Review Period (July – August 2015)

City of Emeryville provided several comments on the bicycle emphasis overlay, the majority of comments requested additions to the Study Network, these changes were not incorporated because additions to the Study Network are not currently being considered for reasons previously specified. Emeryville did however provide a citywide bike network GIS file, which was incorporated into the bicycle emphasis overlay for Study Network segments. In addition to changes in Emeryville, Kato Road

[2] SF Bay Trail, East Bay Greenway, Iron Horse Trail and Inter-jurisdictional Trails.

in Fremont changed from a Class III to a Class II facility and Enterprise Drive in Newark changed to a Class II facility.

A revised map of the bicycle emphasis overlay is provided in Appendix E.

Comments and Responses on Pedestrian Emphasis

First Round Review Period (April – May 2015)

The mapping for the Pedestrian Emphasis, unlike the other transportation modes, is node- or area-based, instead of street network-based as pedestrian activity is driven by proximity to various uses, destinations, or by living in transit-dependent communities. This includes pedestrian facilities and planning areas of Countywide significance as defined in the *2012 Countywide Pedestrian Plan*. These are areas where higher volumes of pedestrians exist or are expected, as well as locations where walking serves an important transportation function, such as access to transit or schools. Pedestrian emphasis also includes central business districts, activity centers, inter-jurisdictional trails, and access within "communities of concern" as defined in the Alameda CTC's Community-Based Transportation Plans.

Several cities have commented that they have pedestrian-oriented main streets or commercial districts that were not emphasized to the degree that they would expect or desire, and adjustments to the Pedestrian Emphasis overlay have been made to correct for these comments. Several cities had comments regarding the desire to increase pedestrian emphasis on certain street segments to reflect either community center or downtown pedestrian activity, or levels of pedestrian activity on particular commercial streets or districts. The majority of these revisions have been made. In addition, Oakland had comments related to broader conditions in the city and numerous commercial main streets or districts, and Berkeley commented about pedestrian activity adjacent to narrow PDA corridors. Oakland, as part of its Complete Streets Plan that is underway, has proposed a more comprehensive refinement of the pedestrian scoring method. It includes increasing the score for commercial mixed use zoning component that relate to their pedestrian-oriented main streets, as well as adjustments to some transit access component. It added additional pedestrian emphasis score for areas within an eighth-mile buffer around the commercial main street zones. This additional score reflects the higher levels of pedestrian activity in areas around main streets both from patrons parking adjacent to the main street and from local residents and employees walking to the services on the main streets, such as areas around Piedmont Avenue, College Avenue, 4th Street, and other streets. Considering the reasonableness of this additional step in scoring method, it was incorporated into the Pedestrian Scoring method for the MAP. Additionally, these changes reflect similar comments made by other cities for manual changes to streets in downtowns or commercial main streets.

Second Round Review Period (July – August 2015)

A couple of second round comments on the pedestrian emphasis overlay were provided by Albany and Newark. Changes requested by either City would require additions to the Study Network segmentation or result in changes that do not impact modal priority determinations, therefore no changes to the pedestrian emphasis overlay were made during the second round review period.

A revised map of the pedestrian emphasis overlay is provided in Appendix F.

Comments and Responses on Goods Movement Emphasis

First Round Review Period (April – May 2015)

This multimodal overlay is coordinated with the *Countywide Goods Movement Plan* that has defined three tiers of goods movement routes – Tier 1 (interstate highways), which is not included in the Arterial Plan; Tier 2(state highways); and Tier 3 (designated arterials and collectors).

Few cities had specific comments about adding or increasing the level of Goods Movement emphasis designations on specific street segments and the majority of these refinements have been made. Some comments were made regarding streets that are not part of the Study Network, and these changes were not made. There was also some confusion regarding the tier levels of the Goods Movement emphasis, in relation to federal and state truck route designations. The tiers used in the MAP work are those that have been determined by the Countywide Goods Movement Plan, and this emphasis does not include the word "truck" and instead only refers directly to "goods movement." The Goods Movement Plan consultant team is evaluating the following three-tier goods movement network:

- Tier 1 network refers to state highways that are designated to handle a majority of the through truck traffic.
- Tier 2 network refers to other state highways and designated arterials that provide intra-County and intercity connectivity and last-mile connection to the Port of Oakland and Oakland International Airport.
- Tier 3 network refers to designated arterials and collectors that are used in a majority of local pickup and delivery.

Oakland had a general comment about the Goods Movement emphasis not aligning with where staff would expect to see more truck activity, and therefore had some methodological concerns. Following discussions with city staff, the general concerns were addressed and the result was changes in emphasis for specific street segments.

Second Round Review Period (July – August 2015)

Comments on the goods movement emphasis overlay were not provided by stakeholder agencies during the second round review period. The *Countywide Goods Movement Plan* consultant team did however add the following roadway segments to the three-tier goods movement network:

- Segments of Santa Rita Road and Valley Avenue in Pleasanton were added as Tier 3 routes.
- Segments of Industrial Parkway and Whipple Road in Hayward were added as Tier 3 routes.

The segments listed above were included in the goods movement emphasis overlay, a revised map is provided in Appendix G.

Modal Priority

First Round Review Period (April – May 2015)

As explained in the draft modal priority memorandum in Appendix A2, applying the base street types, land use context types, and multimodal overlays results in a nuanced set of modal priorities for street segments along the *Study Network*. Based on the comments received on the draft typology, the approach to identifying the modal priority remains unchanged except for the bicycle emphasis. However, many

specific comments were made to the identified modal priority reflecting the local priorities and local knowledge on the function of a particular street.

Regarding the modal priority approach, per recent legislative mandate (AB 1193 signed into law in September 2014) that added an additional class and provided emphasis for the protected bike lanes, enhanced class II and enhanced class III bicycle facilities that provide more protection for bicyclists over the other classes were also added to the highest emphasis for bicycles and have the same priority as Class I and IV. The redline changes to the modal priority approach are shown in Table 1 (on the following page) and the updated example on the following page shows the application of the revised modal priority on Mission Boulevard.

Regarding the specific modal priority changes for certain streets (segments), a majority of the comments have been incorporated by manually overwriting the draft modal priority list.

Second Round Review Period (July – August 2015)

Six jurisdictions (Alameda County, Albany, Dublin, Fremont, Newark and Oakland) requested modal priority changes during the second round review period and the majority of requested changes were made. The City of Oakland is in the process of developing their Citywide Complete Streets Plan and developed a separate methodology to identify modal priorities as part of that project. The modal priorities identified as part of the ongoing citywide plan were incorporated into the Countywide Multimodal Arterial Plan for the Study Network..

The attached (Appendix I) maps show the updated top modal priority for the Study Network. All maps presented in this memo, including the full modal priority list map, can be viewed online via the Fehr & Peers GIS Server site, access instructions are provided below:

- http://gis.fehrandpeers.com/AlamedaCTC/Typology/
- Username: AlamedaCMAP
- Password: fpgis_Alameda

A summary of complete stakeholder comments received on the modal priority methodology and the consultant team's responses were distributed to the stakeholders.

Table 1 MAP Modal Priorities – Specific		
Column 1	**Column 2**	**Column 3**
Land Use Context Types ▪ Downtown Mixed Use ▪ Town Center Mixed Use ▪ Corridor/Neighborhood Mixed Use ▪ Education/Public/Semi-Public ▪ Parks	**Land Use Context Types** ▪ Mixed Use ▪ Commercial ▪ Residential ▪ Rural/Open Space ▪ Other/Unknown	**Land Use Context Types** ▪ Industrial
Associated Modal Priorities 1. Transit: Major Corridors 2. Pedestrian: Tier 1 3. Bicycle: Class I, enhanced Class II, enhanced Class III or Class IV 4. Auto: Throughway 5. Goods Movement: Tier 2 6. Transit: Crosstown Routes 7. Pedestrian: Tier 2 8. Bicycle: Class II 9. Auto: County Connector 10. Pedestrian: Tier 3 11. Bicycle Class III 12. Transit: Local Routes 13. Goods Movement: Tier 3 14. Auto: Community Connector 15. Auto: Neighborhood Connector	**Associated Modal Priorities** 1. Transit: Major Corridors 2. Auto: Throughway 3. Goods Movement: Tier 2 4. Bicycle: Class I, enhanced Class II or enhanced Class III or Class IV 5. Pedestrian: Tier 1 6. Transit: Crosstown Routes 7. Auto: County Connector 8. Goods Movement: Tier 3 9. Bicycle: Class II 10. Pedestrian: Tier 2 11. Auto: Community Connector 12. Bicycle Class III 13. Pedestrian: Tier 3 14. Transit: Local Routes 15. Auto: Neighborhood Connector	**Associated Modal Priorities** 1. Transit: Major Corridors 2. Goods Movement: Tier 2 3. Auto: Throughway 4. Bicycle: Class I, enhanced Class II, enhanced Class III or Class IV 5. Pedestrian: Tier 1 6. Transit: Crosstown Routes 7. Goods Movement: Tier 3 8. Auto: County Connector 9. Bicycle: Class II 10. Pedestrian: Tier 2 11. Auto: Community Connector 12. Bicycle Class III 13. Pedestrian: Tier 3 14. Transit: Local Routes 15. Auto: Neighborhood Connector

The following illustrates an example of determining modal priority for a street segment, Mission Boulevard from Driscoll Road to I-680

Land use Context = Residential, Education, and Commercial (see column 2 of Table 2)

1.	Is it a Transit Major Corridor?	NO	
2.	Is it a Throughway?	YES	1st priority – Auto
3.	Is it part of the Tier 2 Goods Movement network?	YES	2nd priority – Truck
4.	Is it a Class I or Class IV Bicycle facility?	NO	
5.	Is it a part of the Pedestrian Tier 1 network?	NO	
6.	Is it a Transit Crosstown Route?	NO	
7.	Is it a County Connector?	NA	
8.	Is it part of the Tier 3 Goods Movement network?	NA	
9.	Is it a Class II Bicycle facility?	YES	3rd priority - Bicycle
10.	Is it part of the Tier 2 Pedestrian network?	NO	
11.	Is it a Community Connector?	NA	

12. Is it a Class III or Class III Enhanced Bicycle facility	NA	
13. Is it part of the Tier 3 Pedestrian network?	NO	
14. Is it a Transit Local Route?	YES	4th priority - Transit
15. Is it a Neighborhood Connector?	NA	
16. Does it have no Pedestrian emphasis?	YES	5th priority - Pedestrian

Next Steps

This memorandum describes how the project team had categorized the *Study Network* streets by land use context types, street types, and multimodal overlays, and reflects the first feedback loop of stakeholder review and comment as illustrated in Figure 2. The typology framework and initial mapping of the typologies and modal priorities were presented to the stakeholders for review in April – ACTAC on April 9, 2015; Planning Area meetings during April 20-22, 2015; and non-agency stakeholder meeting on April 20, 2015. The second draft mapping set of the typologies and modal priorities were presented to stakeholders for review at the PlanTAC meeting on July 21, 2015

This memorandum summarizes those comments that were incorporated into the final typology framework for the Study Network. The consultant team and Alameda CTC staff will present the typology framework and maps for final approval at the October 2015 ACTAC, PPLC and Commission meetings.

The typology for the MAP will inform the modal priority for the *Study Network* segments, which in turn will lead to identifying the modal needs on the *Study Network* in combination with the Performance Objectives.

Attachments:

Appendix A1 – April 2015 Draft Typology Memorandum – Attached to the October 2015 ACTAC Memorandum as Attachment C.
Appendix A2 - April 2015 Draft Modal Priority Memorandum - Attached to the October 2015 ACTAC Memorandum as Attachment D.
Appendix B – Updated Draft Land Use Context Type Maps
Appendix C – Updated Draft Base Street Type Maps
Appendix D – Updated Draft Transit Emphasis Maps
Appendix E – Updated Draft Bicycle Emphasis Maps
Appendix F – Updated Draft Pedestrian Emphasis Maps
Appendix G – Updated Draft Goods Movement Network Maps
Appendix H – Updated Draft Modal Priority Maps

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COMMUNITY DESIGN + ARCHITECTURE

Philip Erickson, Architect, AIA
Timothy Rood, AICP, LEED AP ND

MEMORANDUM

Date: April 15, 2015
To: Saravana Suthanthira, Alameda CTC
Cc: Matthew Ridgway and Francisco Martin, Fehr & Peers
From: Phil Erickson, Bharat Singh, and Warren Logan
Re: Alameda CTC Countywide Multimodal Arterial Plan: Draft Arterial Street Typology Framework Concepts

The Alameda CTC Multimodal Arterial Plan (MMAP) is developing a street typology framework to enhance the traditional arterial-collector-local functional classification system with a system that recognizes the importance of land use context and all the transportation modes. The development of a countywide typology framework is an unprecedented effort that identifies the characteristics of major streets across Alameda County. The MMAP will evaluate street performance as *multimodal complete streets*, and suggest potential improvements to streets that do not adequately serve their multimodal function within the countywide network.

Alameda CTC defines multimodal complete streets and their benefits as—

> Streets that are designed, built and maintained to be safe, convenient and inviting for all users of the roadway, including pedestrians, bicyclists, motorists, persons with disabilities, movers of commercial goods, users and operators of public transit, seniors, and children.
>
> Streets that are built for all users have multiple benefits, including increased safety, improved air quality through the reduction of auto traffic, improved health through increased physical activity, and greater cost effectiveness.[1]

Jurisdictions such as Alameda, Emeryville and Fremont have developed similar street typology systems unique to these communities' General Plans or Specific Plans. Alameda CTC's typology framework will consider these jurisdictions' adopted typology systems, and ensure that they nest within the MMAP street typology framework. Similarly, the typology framework is expected to inform or provide a base for any future effort to develop street typologies by other local jurisdictions in Alameda County as a part of their implementation of their complete streets policies.

Introduction

Definition of the MMAP Typology Framework

This memorandum describes the street typology framework for the MMAP. The typology framework consists of three components: a set of land use context types, a set of base street types defined by vehicular functionality, and a set of multimodal emphasis overlays.

[1] From the Alameda CTC's Complete Streets web page: http://www.alamedactc.org/app_pages/view/8563

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The following are characteristics that street typology address, and therefore are the key components of the typology framework:

- **Land Use Context Types –** These define the context of built and natural environments that the streets pass through. Land use types have a relationship to specific street cross section elements, such as parking and loading lanes, and the desired width and use of different zones of the sidewalk.

- **Base Street Types –** Base street types are defined by their role in carrying sub-regional and local traffic along the *Study Network's*[2] streets. If a street is serving a high volume of vehicles that are traveling a longer distance, through movement is likely more important to those driving along the street than access to local destinations.

- **Multimodal Transportation Overlays –** While the base street types focus primarily on vehicular function, overlays define the priority given to other transportation modes: transit, bicycle, pedestrian, and goods movement. The multimodal transportation overlays identify levels of multimodal emphasis for segments of the *Study Network*.

At a minimum, all street segments will have a land use context and a street type, and some will have one or more multimodal transportation overlays. A map of the *Study Network* streets and the PDA place types and SCS land use is provided in Appendix B to illustrate the relationship between land use context and the network.

Further detail about how the land use and street types and multimodal overlays were determined, and examples of streets throughout Alameda County are described in this memorandum, along with mapping in appendices.

How the Typology Framework will be used in the MMAP effort

Traditional functional classification - the arterial, collector, and local functional classification system - is based only on vehicular mobility and access characteristics and fails to consider other street characteristics. Typologies diversify the consideration of the street to include land use context and other modes. For the MMAP, street typologies and multimodal overlays will inform modal priorities of each street. The street types and multimodal overlays will also help identify *arterials of countywide significance* that make upthe *Arterial Network*[3].

This process is illustrated in Figure 1. Data collected from local jurisdictions, the ACTC Countywide model, MTC, ABAG, transit agencies, and other sources were used to identify land use context and base street types and to develop the multimodal overlays. This information is used to define the multimodal demands of the network and determine the modal priorities of each segment of the countywide network. Modal priorities are discussed further in a forthcoming memorandum.

The typology framework will not only inform modal priorities, but in subsequent phases of the MMAP effort, it will be critical for defining desirable street design attributes, particularly using the land use

[2] The *Study Network* consists of the arterials and collectors that are part of the California Road System (CRS) which was sent to all Alameda County jurisdictions for review, and to support data collection in December 2014.
[3] The *Arterial Network* is a subset of the *Study Network* consisting of those streets which satisfy the criteria for countywide significance that have been defined in a separate MMAP memorandum.

context. For example, a pedestrian priority street along a commercial corridor would have a wider desired sidewalk than a pedestrian priority street in a residential corridor. Thus, street typologies are a critical component of the MMAP development, as a particular street segment's land use type, street type, and multimodal overlays will directly inform the design solutions.

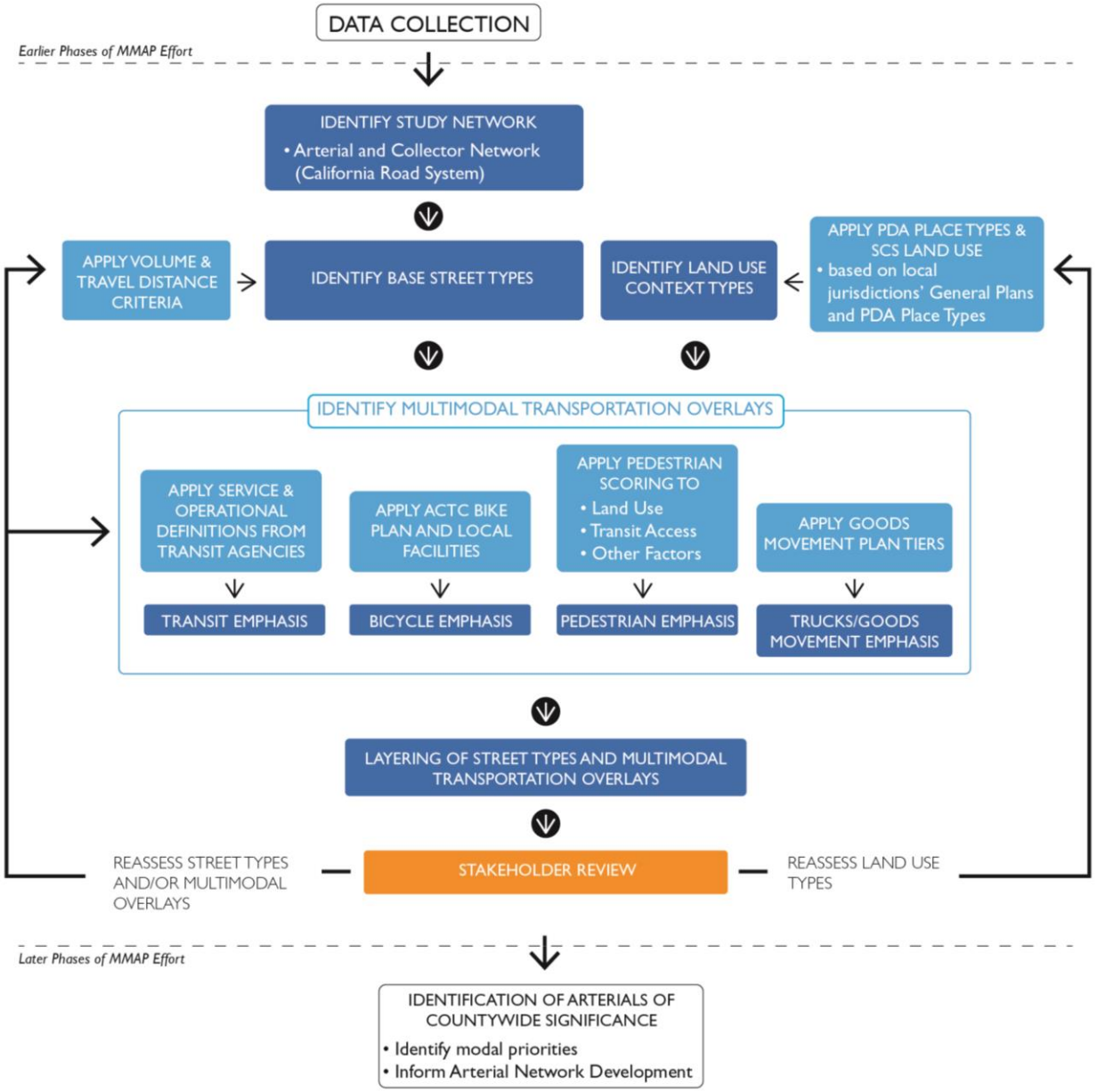

Figure 1: Multimodal Arterial Plan Typology Framework Process Diagram

A series of initial maps of the land use types, street types, and multimodal overlays were presented to ACTAC on April 9, 2015 and will be distributed prior to Planning Area meetings taking place during the week of April 20, 2015. A description of the methodologies used in generating the various mappings is included in the detailed discussion of the land use types, street types, and multimodal overlays. In

addition, jurisdictions will be given access to the online GIS Server maintained by Fehr & Peers to review the typology mapping and provide comments as necessary.

Land Use Context Types

A key element of the typology framework is the land use context types, which define the physical context of streets. The land use types relate to desired design and operational characteristics, such as a priority for on-street parking and loading and a wider sidewalk frontage zone for window shopping and outdoor seating where the land use context is more intensive commercial or mixed use. The land use types are defined by a combination of Priority Development Area (PDA) place types and the land use types developed for the Alameda County version of the Plan Bay Area Sustainable Community Strategy (SCS), which was used in the adopted *2012 Countywide Transportation Plan*. Both intensity and mix of land use are important to consider in terms of defining context for major streets because the context has a relationship to the mix of transportation modes and the priorities amongst modes. For example, industrial warehousing areas tend to have lower pedestrian activity and high levels of goods movement, while intensive mixed use areas have a mix of modes with an emphasis on pedestrian and transit activity. In addition, land use context affects specific street cross section elements, such as parking and loading lanes and the desired width and use of the sidewalk. Two types of land use classifications provide the starting point for developing land use context types for the MMAP:

ABAG - PDA place types defined by ABAG that exist in Alameda County[4]:

- **Regional Center –** PDAs located in the most urbanized centers of the region's major cities, and are assumed under Plan Bay Area to accommodate high volumes of housing growth in the coming decades. ABAG suggests density ranges of 75-300 dwelling units per acre for housing and a 5.0 floor area ratio for employment.
- **City Center –** PDAs in already-established secondary cities in the Bay Area. ABAG suggests density ranges of 50-150 dwelling units per acre for housing and a 2.5 floor area ratio for employment.
- **Suburban Center –**PDAs with mixed-use character surrounding existing or planned transit stations, and typically have densities similar to City Centers but featuring more recent development. ABAG suggests density ranges of 35-100 dwelling units per acre for housing and a 4.0 floor area ratio for employment.
- **Transit Town Center –** PDAs with mixed-use areas that offer relatively robust transit services within urban areas, but serve a more localized population of residents and workers, rather than attracting significant patronage from beyond the local area. ABAG suggests density ranges of 20-75 dwelling units per acre for housing and a 2.0 floor area ratio for employment.
- **Urban Neighborhood –** PDAs with moderate- to high-density residential uses that also feature supportive retail and employment centers, rather than being primarily commercial areas. Transit is present but not necessarily a focal point of the neighborhoods. ABAG suggests density ranges of 40-100 dwelling units per acre for housing and a 1.0 floor area ratio for employment.
- **Transit Neighborhood –** PDAs that are primarily residential areas, well served by transit, but with existing low- to moderate densities. ABAG suggests density ranges of 20-50 dwelling units per acre for housing and a 1.0 floor area ratio for employment.
- **Mixed-Use Corridor** –linear PDAs served by transit lines, and typically feature commercial development extended along a major surface roadway with residential neighborhoods flanking

[4] PDA place type definitions are from PDA Readiness Assessment Final Report, 3/29/13.

these commercial strips. ABAG suggests density ranges of 25-60 dwelling units per acre for housing and a 2.0 floor area ratio for employment.

Alameda CTC SCS Land Use Types – These are the land use types developed in the SCS process that were part of the Alameda CTC's 2012 *Countywide Transportation Plan.* The land use types were developed in coordination with the local jurisdictions and are based on the jurisdictions' general plan designations. The land use types are:

- Mixed Use (Commercial & Industrial)
- Mixed Use (Commercial & Residential)
- Commercial
- Industrial
- Education/Public/Semi-Public
- Residential
- Parks/Open Space
- Rural Residential & Open Space
- Agriculture/Resource Extraction
- Other/Unknown

The PDA place type designations and the SCS land use types have been combined into a set of 11 land use types for the MMAP street typology system, as illustrated in Table 1. These were determined by considering which combinations of land use and density affect the function and design of the streets.

Table 1
MMAP Land Use Context Types

MMAP Land Use Types	Related PDA Place Types	Related SCS Land Use Designations
Downtown Mixed Use	▪ Regional Center ▪ City Center	▪ Mixed Use: Commercial & Industrial ▪ Mixed Use: Commercial & Residential ▪ Commercial ▪ Industrial ▪ Education/Public/Semi-Public ▪ Residential
Town Center Mixed Use	▪ Suburban Town Center ▪ Transit Town Center	▪ Mixed Use: Commercial & Industrial ▪ Mixed Use: Commercial & Residential ▪ Commercial ▪ Industrial ▪ Education/Public/Semi-Public ▪ Residential ▪ Agriculture/Resource Extraction
Corridor/Neighborhood Mixed Use	▪ Urban Neighborhood ▪ Transit Neighborhood ▪ Mixed-Use Corridor	▪ Mixed Use: Commercial & Industrial ▪ Mixed Use: Commercial & Residential ▪ Commercial ▪ Industrial ▪ Education/Public/Semi-Public ▪ Residential ▪ Agriculture/Resource Extraction
Mixed Use	N.A.	▪ Mixed Use: Commercial & Residential
Commercial	N.A.	▪ Commercial ▪ Mixed Use: Commercial & Industrial
Industrial	N.A.	▪ Industrial
Education/Public/Semi-Public	▪ All except City Center	▪ Education/Public/Semi-Public
Residential	N.A.	▪ Residential
Parks	▪ All	▪ Parks/Open Space

Table 1 MMAP Land Use Context Types		
MMAP Land Use Types	**Related PDA Place Types**	**Related SCS Land Use Designations**
Rural/Open Space	N.A.	▪ Rural Residential & Open Space ▪ Agriculture/Resource Extraction
Other/Unknown	N.A.	▪ Other/Unknown

A map of the *Study Network* overlaid on the land use context types is provided in Appendix B.

Base Street Types

The base street types define a streets' vehicular mobility and access functions. Table 2 outlines the functions and characteristics of the proposed *Base Street Types* and the expected degree to which each street type will be included in the MMAP *Arterial Network* as arterials of countywide significance. The final prioritized improvements for MMAP will focus on improvements to the *Arterial Network*.

The proposed base street type system consists of the following four classification types based on vehicular mobility functions:

1. *Throughway*
2. *County Connector*
3. *City* or *Community Connector*
4. *Neighborhood* or *District Connector*

This framework is similar to the street types developed by various cities in and outside of Alameda County. The City of Alameda's *General Plan* defines major streets as: Regional Arterial, Island Arterial, Transitional Arterial, Island Collector, and Transitional Collector. Another example is the Urban Corridor street types in Fremont's *Warm Springs/South Fremont Community Plan*, which are a combination of the three MMAP connector typologies as shown in Table 2. Fremont's *City Center Community Plan's* regional mobility corridors align with the MMAP's county connectors as shown in Table 2. The MMAP's street type system is also similar to the system used in the update to the City of Pasadena's *Mobility Element*, which defines the city's major streets as: *Connector City* and *Connector Neighborhood*.

Street Type Criteria

A set of planning area maps showing the initial network by applying the proposed *Base Street Types* is provided in Appendix C. Base street types are determined using two sets of criteria shown in Table 2, collectively called *Vehicular Mobility Criteria:*

- **Traffic volume measured by Average Daily Traffic (ADT).** An ADT threshold of 10,000 was used countywide to identify throughways and county connectors. The rationale for this volume threshold is that for a street with 10,000 ADT, typical peaking characteristics would result in it carrying between 800 and 1,200 vehicles during the peak hour of traffic (assuming 8 to 12 percent of daily trips occur in the peak hour) and about 480 to 720 peak hour, peak direction trips (assuming a 60/40 directional split). From a capacity perspective, a simple two-lane local or collector street could carry this volume, and therefore any street with a volume lower than 10,000 ADT would not meet the functional characteristics for being a throughway or county connector.
- **Travel distance** data generated by the Alameda Countywide Travel Demand Model for base year conditions is being used to identify street segments that meet the criteria listed in the table.

Sensitivity Analysis of Street Type Criteria

A sensitivity analysis was undertaken to determine the travel distance thresholds that are appropriate for the various street types. The analysis looked at applying various combinations of ADT volumes and percent trips by travel distance, and the results were reviewed for reasonableness to finalize the suitable thresholds for these criteria. For example, for *Throughways*, a combination of ADT volumes and percent trips by travel distance was selected to exclude any obvious *Neighborhood Connectors* or *City Connectors* while still resulting in a reasonable network of streets. The criteria for North and Central Alameda County are different than those for South and East County because the network connectivity and density of these areas differ. Because of the generally lower density and more dispersed land use patterns, and less interconnected street networks, the percentage of trips threshold is higher for South and East County as compared with North and Central County. Therefore, a higher percentage of longer distance trips generally occurs on collectors and arterials in the South and East County.

One issue that the sensitivity analysis and initial mapping of the street types has highlighted is that some streets that parallel freeways (e.g., Frontage Road parallel to I-80, Lewelling Boulevard parallel to I-238, and Pleasanton-Sunol Road parallel to I-680) are used as "reliever routes" when freeways are congested; as evidenced by observation of traffic patterns and driver behavior. Some of these parallel streets may be designated as throughways because of the traffic volume (ADT) criteria, but this may not be a desired function for the streets. This is something to address as the MMAP study proceeds and stakeholders are reviewing the initial mapping.

Table 2
Typology Framework Summary and Criteria

Base Street Type	Base Functions and Characteristics	Vehicular Mobility Criteria	Expected Extent Street Type included in Arterial Network[1]	Examples
Throughway	Primarily high speed, with at-grade intersections, little direct relationship to surrounding context, and in some cases segments of streets connecting to a freeway with a good portion of trips crossing through multiple cities.	**Countywide:** at least 10,000 ADT **South & East County:** at least 55% of total volume traveling 8+ miles **North & Central County:** at least 50% of total volume traveling 8+ miles	Part of Arterial Network	Portions of Hegenberger Road in Oakland, Hesperian Boulevard in Alameda County, and Stanley Boulevard in Pleasanton and Livermore.
County Connector	Generally moderate speed with a good portion of trips crossing through multiple cities/communities, and segments of streets connecting to a freeway. This will also be applied to multiuse and pedestrian trails that connect to adjacent counties.[2]	**Countywide:** at least 10,000 ADT **South & East County:** at least 50% of total volume traveling 6+ miles **North & Central County:** at least 45% of total volume traveling 6+ miles	Part of Arterial Network	Ashby Avenue in Berkeley, Washington Avenue in San Leandro, A Street in Hayward, Alvarado-Niles Road in Union City, Santa Rita Road in Pleasanton, and South Vasco Road in Livermore.
City or Community Connector	Streets and trails with a good portion of trips made by those traveling across a city/community or to an adjacent city/community. [2]	**Countywide:** at least 50% of total volume traveling 4+ miles	Many will be part of the Arterial Network	Colusa Avenue in Albany and Berkeley, Tilden Way in Alameda, Fruitvale Avenue in Oakland, and Central Parkway in Dublin.
Neighborhood or District Connector	Streets and trails where most trips by those traveling across a neighborhood/district and to an adjacent neighborhood / district.	**Countywide:** at least 50% of total volume traveling less than 4 miles	Many will not be part of the Arterial Network	Portions of Solano Avenue in Albany and Berkeley, Encinal Avenue in Alameda, portions of Logan Drive in Fremont, and Rosewood Drive in Pleasanton.

Notes:
1. Criteria for countywide significance that makes a street part of the *Arterial Network* are defined in a separate memorandum. The *Arterial Network* is a subset of the *Study Network*.
2. Trails will be mapped when the *Arterial Network* is developed.

Multimodal Transportation Overlays

Four multimodal transportation overlays are used to provide additional definition to the multimodal characteristics and function of the streets in the *Study Network.* The overlays are used in combination with the base street types and land use context types to define street segments with respect to the vehicular function, multimodal emphases, and land use context. The combined definition of street segments will be used to establish modal priorities that define the design and operational needs of the street; this is discussed further in a forthcoming memorandum on modal priorities.

At a minimum, all street segments will have a land use context type and a street type, and some will have one or multiple transportation overlays. The multimodal transportation overlays indicate if particular modes should have an emphasis in the function and design of a particular street segment, and include transit, bicycle, pedestrian, and truck route/goods movement emphases.

Transit Emphasis

The transit emphasis overlay will be used to identify transit priority street segments in addition to being part of the selection criteria for arterials of countywide significance for inclusion in the *Arterial Network.* Transit emphasis categories have been defined by the transit providers and consist of three tiers:

- **Major Corridors** for bus rapid transit (BRT) either with or without dedicated lanes as identified by AC Transit's "Priority Corridors," and Wheels Tri-Valley Rapid. These corridors will be part of the *Arterial Network*.
- **Crosstown Routes** for other high capacity transit service as identified by AC Transit as their "Cross Town" routes, and potential for similar routes to be identified by LAVTA and Union City Transit.
- **Local Routes** for other bus transit service on segments of the *Study Network* for AC Transit, LAVTA Wheels, and Union City Transit.

Maps of the proposed transit emphasis overlay are provided in Appendix D. MMAP transit overlay will coordinate with the proposed transit network from the *Countywide Transit Plan*, to the extent feasible from a timing standpoint. When the Transit Plan network becomes available, the MMAP transit overlay will be reviewed and adjusted if the network is available prior to the review of *Arterial Network* cross section recommendations. Similarly, AC Transit is preparing an updated Comprehensive Operational Analysis (COA) which could restructure some routes. To the extent that information from the COA and other studies that transit agencies may have underway is available within time to be incorporated into the MMAP (late spring), adjustment may be made to the transit emphasis overlay.

Bicycle Emphasis

Bicycle emphasis is developed by reviewing the existing bicycle facilities, *2012 Countywide Bicycle Plan* and the four trail types[5]. The Bicycle Plan defines five categories of countywide significance: inter-jurisdictional network, access to transit, access to central business districts, inter-jurisdictional trails, and access to *Communities of Concern*. This includes existing and planned bicycle facilities on streets that are part of the *Study Network*, as well as some facilities that are on parallel non-*Study Network* streets or multiuse paths that serve significant connectivity functions. For example, some communities in Alameda

[5] SF Bay Trail, East Bay Greenway, Iron Horse Trail and Inter-jurisdictional Trails.

County currently focus on placing primary bicycle facilities on non-arterial streets (e.g., Berkeley and Hayward).

The bicycle overlay types are shown below, from highest to lowest bicycle emphasis:

- Class I – bicycle and multiuse paths
- Class IV[6] – cycle tracks and similar protected bicycle facilities
- Class II – bicycle lanes, buffered bicycle lanes, and green bicycle lanes
- Class III enhanced – bike boulevards and similar enhanced bike routes
- Class III – bike routes, shared use arrows, shoulders, and curb lanes

A map of the bicycle emphasis overlay is provided in Appendix E.

Pedestrian Emphasis

The mapping for the Pedestrian Emphasis, unlike the other transportation modes, is node- or area-based, instead of street network-based as pedestrian activity is driven by proximity to various uses, destinations, or by living in public transit-dependent communities. This includes pedestrian facilities and planning areas of countywide significance as defined in the *2012 Countywide Pedestrian Plan*. These are areas where higher volumes of pedestrians exist or are expected, as well as locations where walking serves an important transportation function, such as access to transit or schools. Pedestrian emphasis also includes central business districts, activity centers, inter-jurisdictional trails, and access within "communities of concern" as defined in the Alameda CTC's Community-Based Transportation Plans. Portions of the *Study Network* that are not within the areas described above, but are within PDAs, have a lower level of pedestrian emphasis. A map of the pedestrian emphasis overlay is provided in Appendix F.

There are three levels of pedestrian emphasis designated by pedestrian priority "scoring," which combines scores given to street segments based on the following characteristics:

- **Priority Development Area (PDA) Place Type –** Each PDA type within the County was given a score with Regional Centers scoring the highest, and Suburban Centers scoring the lowest.
- **Commercial and Mixed Use Areas –** Commercial and Mixed Use areas as identified from the ABAG standardized Local Jurisdiction General Plan data. These were scored with downtown or city center and other mixed use types scoring higher than predominantly single use type commercial areas.
- **Census Tracts identified as Communities of Concern per MTC Equity Analysis –** Census tracts in the County were scored by MTC on eight categories wherein tracts over the score of 4 are considered as a Community of Concern. For mapping purposes, tracts with a MTC score of 6 are scored higher for pedestrian emphasis than ones with MTC scores between 4 and 6.
- **Employment Growth Opportunity Areas identified in ACTC 2012 CTP –** These areas were given an additional score.
- **Proximity to BART/ACE/Capitol Corridor stations –** half mile and quarter mile distances are scored.
- **Half-mile buffer off AC Transit's priority corridor –** half mile and quarter mile distances are scored.

[6] Class IV bike facilities is a new category that includes facilities that provide a higher level of cyclist separation from traffic than class II facilities.

- **Half-mile buffers around LAVTA Rapid stops –** half mile and quarter mile distances are scored.
- **Quarter mile buffers around local bus stops –** quarter mile distance is scored.
- **Quarter mile buffers around activity & education centers, and parks –** quarter mile distance is scored.

Appendix A provides the methodology for how these scores combine and the thresholds to determine the three levels of pedestrian emphasis:

- Tier 1: High Pedestrian Score
- Tier 2: Medium Pedestrian Score
- Tier 3: Low Pedestrian Score

The three levels of pedestrian emphasis define increasing levels of improvement to the pedestrian environment[7].

Truck Routes/Goods Movement Emphasis

This multimodal overlay is coordinated with the *Countywide Goods Movement Plan* that has initially defined three tiers of truck routes[8] (a map of the truck emphasis overlay is provided in Appendix G).

- Tier 1 consists of interstate and state highways that carry the majority of through truck traffic in the county; note this tier is listed for reference but *it is only designated to freeways and is not designated to any street segments that are part of the Study Network.*
- Tier 2 consists of state highways and designated arterial streets that provide intra-county and intercity connectivity.
- Tier 3 routes are designated arterials and collectors used for local truck traffic.

Next Steps

This memorandum describes how the project team had categorized the *Study Network* roadways by land use context types, street types, and multimodal overlays. This process and the feedback loop of stakeholder review and comment is illustrated in Figure 2. This typology framework and initial mapping of the typologies are being presented to the stakeholders for review in April – ACTAC on April 9, 2015; Planning Area meetings during April 20-22, 2015; and non-agency stakeholder meeting on April 20, 2015. Comments will be incorporated and the final typology addressing comments received will be presented for approval in June or July.

The typology for the MMAP is expected to inform the modal priority for the *Study Network* segments, which in turn will lead to identifying the modal needs on the *Study Network* in combination with the Performance Objectives. A separate memorandum on modal priorities will be presented at the Planning Area meetings.

[7] All streets should satisfy Americans with Disabilities Act (ADA) requirements and guidance.
[8] See the Alameda County Goods Movement Plan, Draft Technical Memorandum for Task 3c – Identify Gaps, Needs, Issues, and Deficiencies, pages 2-5 and 2-6.

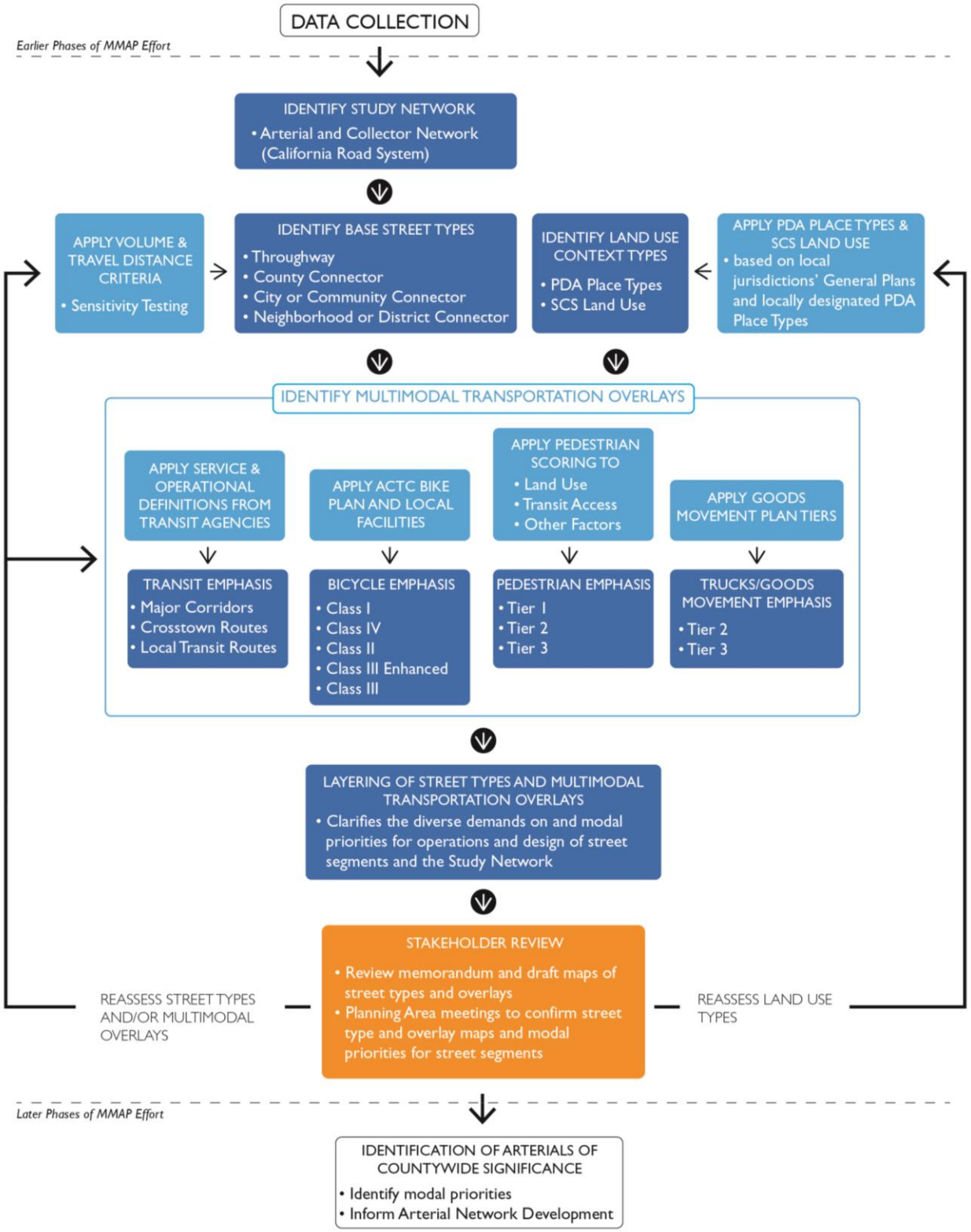

Figure 2: Multimodal Arterial Plan Typology Framework Detailed Process Diagram

APPENDIX A: Pedestrian Emphasis Scoring Methodology

The Pedestrian emphasis scoring was performed by layering the categories listed in Table 4 through GIS mapping. The overlaying individual scores were summed to create a pedestrian emphasis intensity map of the combined layers scores. Maps in Appendix F show the gradation of these scores.

The Transit scores range from .25 to 2 points based upon the existing and planned transit capacity on those routes. Hence, BART Stations, AC Transit Priority and LAVTA Rapid corridors have higher scores than local routes. Locations where multiple transit facilities overlap have higher cumulative scores.

The Land Use/Demographic category scoring is more variable, ranging from .25 to 4 points depending upon the characteristic being scored. This breadth of scoring occurs, because this category includes factors such as intensity of uses, high activity destinations, and demographic profiles through the scoring of MTC's *Community of Concern* assessment. Land use scoring includes PDA typologies with the highest score assigned to the highest PDA intensity type, a score of 4 for Regional Center. Many of the PDAs contain several types of high-activity uses (commercial and mixed use areas as defined in jurisdictions' general plans); therefore, those areas were assigned additional scores (ranging from .25 to 1) based upon the intended intensity of those specific uses. This additional scoring allows for gradation of pedestrian emphasis of streets within large PDAs. Areas identified as future employment zones in the County's RTP were given one point to highlight activity centers that aren't necessarily within transit corridors or PDAs, but would have a need for pedestrian improvements. Points were given to educational, cultural and government offices areas, as they bring additional pedestrian activity from employees, users, and visitors. Lastly, census tracts identified as Communities of Concern under the MTC equity analysis were scored (1 to 1.5) based upon whether more than four of the demographic factors identified in the MTC analysis were met. Tracts that met more than 6 factors were scored half a point higher.

Across categories, the scoring was scaled to relative expected level of pedestrian activity. For example, BART stations typically have a high level of pedestrian activity around them and a scored a 2. But those in city centers generally have even higher levels of activity, so a PDA place type score of 4 for a Regional Center or 3 for a City Center was added to the BART score. The relatively higher scoring for the PDA designation compared to the BART score is reflective of the pedestrian activity that occurs in these centers regardless of how a person travels to and from the center, such as an employee walking to get lunch or run errands.

Table 4: Pedestrian Priority Scores

PEDESTRIAN PRIORITY MEASURE	SCORE
TRANSIT (range of 0.25 to 2 point scores)	
1. BART STATIONS	
.25 Miles	2
.5 Miles	1
2. ACE STATIONS	
.25 Miles	0.75
.5 Miles	0.5
3. AMTRAK CAPITOL CORRIDOR	
.25 Miles	0.75
.5 Miles	0.5
4. AC TRANSIT PRIORITY CORRIDOR	
.25 Miles	2
.5 Miles	1
5. LAVTA CORRIDOR	
.25 Miles	1.75
.5 Miles	0.75
6. LOCAL BUS STOPS (AC/LAVTA/UCT)	
0.125 Miles	0.5
.25 Miles	0.25
LAND USE/DEMOGRAPHIC (range of 0.25 to 4 point scores)	
7. PRIORITY DEVELOPMENT AREAS	
Regional Center	4
City Center	3
Suburban Center	2
Transit Town Center	1.5
Urban Neighborhood	1
Transit Neighborhood	0.75
Mixed Use Corridor	1
8. EMPLOYMENT GOWTH OPPORTUNITY AREAS	**1**
9. COMMUNITIES OF CONCERN	
below 6	**1**
6 and above	1.5
10. ACTIVITY CENTERS	
.25 Miles	0.25
11. LAND USE	
ALAMEDA	
101 - Business Park or Office	0.25
101 - Community Commercial	0.25
101 - Island Auto Movie or Mariner Square	0.5
101 - Neighborhood Business or Northern Waterfront	0.5
ALAMEDA COUNTY	
199 - Mixed Use	0.5
ALBANY	
102 - Community Commercial	0.5
102 - General Commercial	0.25
102 - Research	0.25
102 - Commercial/Service/Light Industrial	0.25
102 - Medium Density Res./Recreational/Comm'l	0.5
102 - Planned Res./Commercial or Res./Commercial	0.5
BERKELEY	
103 - Avenue or Neighborhood Commercial	0.5
103 - Downtown	1
103 - Manufacturing Mixed Use	0.25
CASTRO VALLEY	
116 - GeneralRetail Commercial	0.25
116 - Office	0.25
116 - Restaurants & Entertainment	0.5
116 - Mixed Use	0.5
CHERRYLAND	
117 - General Commercial	0.25
117 - San Lorenzo Village	0.5
117 - Light Industrial and Research & Development/Office	0.25
117 - General Comm'l or Medium/ High Density Res.	0.5
117 - General Comm'l/Low-Medium Density Res. allowed	0.25
117 - General Comm'l/Medium & High Density Res. allowed	0.5
117 - General Comm'l/Medium Density Res. allowed	0.5
117 - High Density Res/General Commercial allowed	0.5
117 - Low-Medium Density Res/General Commercial	0.25
DUBLIN	
104 - Campus Office	0.25
104 - General or Neighborhood Commercial	0.25
104 - General Commercial/Campus Office	0.5
104 - Retail/Office	0.5
104 - Retail/Office and Automotive	0.25
104 - Mixed Use	0.5
FREMONT	
106 - Central Business District	1
106 - Community or Office Commercial	0.25
106 - Neighborhood Commercial	0.5
106 - Mixed Use-Neighborhood Commercial (Res. 15-18 d/a)	0.25
106 - Mixed Use-Neighborhood Commercial (Res. 18-23 d/a)	0.5
106 - Mixed Use-Neighborhood Commercial (Res. 23-27 d/a)	1
106 - Mixed Use-Neighborhood Commercial (Res. 27-35 d/a)	1
HAYWARD	
107 - City Center - Retail and Office Commercial	1
107 - General Commercial	0.25
107 - Retail and Office Commercial	0.5
107 - Commercial/High Density Residential	1
LIVERMORE	
108 - Community Serving General Commercial	0.25
108 - Neighborhood Commercial	0.5
108 - Office Commercial	0.25
108 - Mixed Use-Downtown Area SP	1
108 - Mixed Use-Neighborhood Medium Density	0.5
108 - Mixed Use-Neighborhood Low Density	0.25
NEWARK	
109 - Community or General Commercial	0.25
109 - Neighborhood Commercial	0.5
109 - Office Commercial	0.25
109 - Regional or Specialty Commercial	0.25
OAKLAND	
110 - Business Mix	0.5
110 - Central Business District	1
110 - Community Commercial	0.25
110 – Neighbor'd Ctr. Mixed Use or Hsg./Business Mix	0.5
PLEASANTON	
112 – Comm'l and Office (Retail/Highway/Service/Professional)	0.25
112 - Business Park (Industrial/Commercial and Office)	0.25
SAN LEANDRO	
113 - General Commercial or Office	0.25
113 - Neighborhood Commercial or Corridor Mixed Use	0.5
113 - Downtown Mixed Use	1
UNION CITY	
114 - Office Commercial or R&D Campus	0.25
114 - Retail Commercial	0.25
114 - Station Mixed-Use Commercial	1

MEMORANDUM

Date: April 16, 2015

To: Saravana Suthanthira, Alameda CTC

Cc: Matthew Ridgway and Francisco Martin, Fehr & Peers

From: Phil Erickson, Bharat Singh, and Warren Logan

Re: Alameda CTC Countywide Multimodal Arterial Plan (MMAP): Draft Modal Priority Approach

COMMUNITY DESIGN + ARCHITECTURE

Philip Erickson, Architect, AIA
Timothy Rood, AICP, LEED AP ND

The memorandum below presents information on how typologies inform modal priorities. Typologies are presented in the *Alameda CTC Countywide Multimodal Arterial Plan: Draft Arterial Street Typology Framework Concepts* memorandum (April 15, 2015). Together, these documents describe a technical process for using area character (land use context), street vehicular function (base street type), and modal networks (multimodal overlays) identified from on-going or recent plans (Alameda Countywide Transit, Goods Movement, Bicycle and Pedestrian Plans) to derive modal priorities for specific street segments. As this study progresses, there will be opportunities to adjust these recommendations:

- Consistent with the Vision statement, the Alameda Countywide Multimodal Arterial Plan will be sensitive to local context. If the technically generated modal priorities are inconsistent with local values, they will be modified in consultation with the local agencies.
- While the land use context includes information on aspirational (long term vision) land uses (SCS, PDAs, etc.), the base street types derive from current functions. To the extent that local agencies have aspirations to change the function of streets, the Multimodal Arterial Plan can reflect aspirations for the 2040 planning horizon.
- For analysis purposes, the Study Network is segmented based on CMP segmentation, PDA boundaries, changes in street cross-section and other reasons. Network analysis will be conducted after recommended improvements are generated to assure that segment-level improvements assemble into continuous and connected networks that supports system efficiency. Continuity analysis will include a review of user experience such that the comfort of bicycle improvements is consistent over the length of a corridor and transit improvements knit together into a cohesive/consistent alignment.
- Ultimately, the most important part of the MMAP will be a set of recommendations that enhance multimodal mobility in Alameda County while meeting the MMAP's goals; and doing this through an efficient investment strategy. Capital and operating cost estimates will be used in combination with other performance measures to prioritize those improvements that provide the greatest cost-benefit ratio.

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Land use context types and base street types of the MMAP's street typology framework inform the modal priority for streets. For example, the throughway street type has the highest level of auto mobility emphasis in most land use contexts. But a throughway in a Downtown Mixed Use land use context will prioritize pedestrians, bicycles, and transit because of the intensity of activity for these modes in the dense mixed use environment of a downtown.

Multimodal transportation overlays that represent priority networks for specific modes – transit, bicycle, pedestrian and goods movement, modify modal priorities. Applying the street types, land use context types, and multimodal overlays results in a nuanced set of modal priorities for street segments in the *Study Network*. Considering the above points, to facilitate the process of identifying modal priority, three types of priority order were developed based on the land use context as shown in Table 1.

Table 1
MMAP Modal Priorities – General

Land Use Context Types ▪ Downtown Mixed Use ▪ Town Center Mixed Use ▪ Corridor/Neighborhood Mixed Use ▪ Education/Public/Semi-Public ▪ Parks	**Land Use Context Types** ▪ Mixed Use ▪ Commercial ▪ Residential ▪ Rural/Open Space ▪ Other/Unknown	**Land Use Context Types** ▪ Industrial
Associated Modal Priorities 1. Transit 2. Pedestrian 3. Bicycle 4. Auto 5. Goods Movement/Truck	**Associated Modal Priorities** 1. Transit 2. Auto 3. Goods Movement/Truck 4. Bicycle 5. Pedestrian	**Associated Modal Priorities** 1. Transit 2. Goods Movement/Truck 3. Auto 4. Bicycle 5. Pedestrian

This order iterates through the first highest order facilities for each mode; then the next highest order, and third highest order. For example, for transit, the highest order facilities are the Major Transit Corridors and the second highest are the Crosstown routes. This approach intends to balance autos as the dominant form of transportation in Alameda County with State, regional and local policies related to reducing greenhouse gas emissions that focus on directing local development to creates and enhances activity nodes that support transit, walking and bicycling. It also provides an implementation tool for continuous and connected multimodal networks to facilitate travel by all modes. Table 2 displays the resulting priorities.

Table 2 MMAP Modal Priorities – Specific		
Column 1	**Column 2**	**Column 3**
Land Use Context Types ▪ Downtown Mixed Use ▪ Town Center Mixed Use ▪ Corridor/Neighborhood Mixed Use ▪ Education/Public/Semi-Public ▪ Parks	**Land Use Context Types** ▪ Mixed Use ▪ Commercial ▪ Residential ▪ Rural/Open Space ▪ Other/Unknown	**Land Use Context Types** ▪ Industrial
Associated Modal Priorities 1. Transit: Major Corridors 2. Pedestrian: Tier 1 3. Bicycle: Class I or Class IV 4. Auto: Throughway 5. Goods Movement: Tier 2 6. Transit: Crosstown Routes 7. Pedestrian: Tier 2 8. Bicycle: Class II 9. Auto: County Connector 10. Pedestrian: Tier 3 11. Bicycle Class III or Class III Enhanced 12. Transit: Local Routes 13. Goods Movement: Tier 3 14. Auto: Community Connector 15. Auto: Neighborhood Connector	**Associated Modal Priorities** 1. Transit: Major Corridors 2. Auto: Throughway 3. Goods Movement: Tier 2 4. Bicycle: Class I or Class IV 5. Pedestrian: Tier 1 6. Transit: Crosstown Routes 7. Auto: County Connector 8. Goods Movement: Tier 3 9. Bicycle: Class II 10. Pedestrian: Tier 2 11. Auto: Community Connector 12. Bicycle Class III or Class III Enhanced 13. Pedestrian: Tier 3 14. Transit: Local Routes 15. Auto: Neighborhood Connector	**Associated Modal Priorities** 1. Transit: Major Corridors 2. Goods Movement: Tier 2 3. Auto: Throughway 4. Bicycle: Class I or Class IV 5. Pedestrian: Tier 1 6. Transit: Crosstown Routes 7. Goods Movement: Tier 3 8. Auto: County Connector 9. Bicycle: Class II 10. Pedestrian: Tier 2 11. Auto: Community Connector 12. Bicycle Class III or Class III Enhanced 13. Pedestrian: Tier 3 14. Transit: Local Routes 15. Auto: Neighborhood Connector

By way of example, Table 3 highlights some example streets by Planning Area, listing their land use context and base street types, and multimodal transportation overlays. The final column shows their modal priorities (in ranked order). Walking through the first example – Hegenberger Road, the stepwise process proceeds as follows:

Hegenberger Road from San Leandro Street to International Boulevard

Land use Context = Town Center Mixed Use (see column 1 of Table 2)

1.	Is it a Transit Major Corridor?	NO	
2.	Is it a part of the Pedestrian Tier 1 network?	NO	
3.	Is it a Class I or Class IV Bicycle facility?	NO	
4.	Is it a Throughway?	YES	1st priority – Auto
5.	Is it part of the Tier 2 Goods Movement network?	NO	
6.	Is it a Transit Crosstown Route?	YES	2nd priority - Transit
7.	Is it part of the Tier 2 Pedestrian network?	YES	3rd priority - Pedestrian
8.	Is it a Class II Bicycle facility?	YES	4th priority - Bicycle

9. Is it a County Connector?	NA	
10. Is it part of the Tier 2 Pedestrian network?	NA	
11. Is it a Class III or Class III Enhanced Bicycle facility	NA	
12. Is it a Transit Local Route?	NA	
13. Is it part of the Tier 3 Goods Movement network?	YES	5th priority – Truck
14. Is it a Community Connector?	NA	
15. Is it a Neighborhood Connector?	NA	

NA (not applicable) occurs when a question relates to a mode that is a priority based on a prior question. As an example, the response to "Is it a County Connector?" - a question that could result in the facility being designated as auto priority- is NA because the facility was already designated as auto priority from the question – "Is it a Throughway?"

In a few cases, the land use context of a segment includes categories within multiple columns of Table 2, such as with Foothill Boulevard between Castro Valley Boulevard and Grove Way. In these cases, the predominant land use contexts are used. In the case of Foothill Boulevard, column 2 of Table 2 is used as the predominant land uses are Mixed Use and Residential.

Table 3 Example Streets with Street Type and Overlay Designations								
Planning Area	**Street Segment**	**Land Use Context Overlay**	**Street Type**	**Transit Overlay**	**Bicycle Overlay**	**Pedestrian Overlay**	**Truck Overlay**	**Modal Priority (in order)**
NORTH COUNTY	**Hegenberger Rd** *(San Leandro St to International Blvd)*	Town Center Mixed Use	**Throughway**	Crosstown	Class II	***Tier 2 - (4.1-9.0 score)*** ▪ Transit Town Center PDA. ▪ Partially within 1/2 mile of BART station. ▪ Partially within 1/2 mile of ACT Priority Corridor. ▪ Partially within 1/2 mile of Capitol Corridor station. ▪ Community of Concern Tract.	Tier 3	Auto Transit Pedestrian Bicycle Truck
	Telegraph Ave *(40th to 51st St)*	Corridor/ Neighborhood Mixed Use	**Neighborhood Connector**	Major Corridor	Class II	***Tier 2 - (4.1-9.0 score)*** ▪ Neighborhood Mixed Use PDA ▪ On AC Transit Priority Corridor. ▪ Within 1/4 mile of local bus stops. ▪ Community of Concern Tract.	None	Transit Bicycle Pedestrian Auto Truck
	Sacramento St *(Dwight Way to Ashby Ave)*	Commercial and Residential	**Neighborhood Connector**	Crosstown	None	***Tier 3 - (1.1-4.0 score)*** ▪ Within 1/2 Mile of ACT Priority Corridor. ▪ Within 1/4 mile of local bus stops. ▪ Community of Concern Tract.	None	Transit Pedestrian Auto Bicycle Truck

Table 3 Example Streets with Street Type and Overlay Designations								
Planning Area	**Street Segment**	**Land Use Context Overlay**	**Street Type**	**Transit Overlay**	**Bicycle Overlay**	**Pedestrian Overlay**	**Truck Overlay**	**Modal Priority (in order)**
CENTRAL COUNTY	**Foothill Blvd** *(Castro Valley Blvd to Grove Way)*	Mix-use (Comm. & Res.) and Residential	**Throughway**	Local (on part of segment)	None	***Tier 3 - (1.1-4.0 score)*** ▪ Within 1/2 Mile of ACT Priority Corridor. ▪ Partially within 1/4 mile of local bus stops	Tier 2	Auto Truck Pedestrian Transit Bicycle
	D Street *(Mission Blvd to 1st Street)*	Town Center Mixed Use	**Neighborhood Connector**	Local (on part of segment)	Class II	***Tier 1 - (>9.0 score)*** ▪ City Center PDA. ▪ Within 1/4 mile of ACT Priority Corridor. ▪ Within 1/4 mile of BART station. ▪ Community of Concern Tract.	None	Pedestrian Bicycle Transit Auto Truck
	Watkins St *(A St to B St)*	Town Center Mixed Use	**Neighborhood Connector**	Local	None	***Tier 1 - (>9.0 score)*** ▪ City Center PDA. ▪ Within 1/4 mile of ACT Priority Corridor. ▪ Within 1/4 mile of BART station. ▪ Community of Concern Tract.	None	Pedestrian Transit Auto Bicycle Truck

Table 3 Example Streets with Street Type and Overlay Designations								
Planning Area	**Street Segment**	**Land Use Context Overlay**	**Street Type**	**Transit Overlay**	**Bicycle Overlay**	**Pedestrian Overlay**	**Truck Overlay**	**Modal Priority (in order)**
SOUTH COUNTY	**Mission Blvd** *(Driscoll Rd to I-680)*	Residential, Education, and Commercial	**Throughway**	Local	Class II	***Pedestrian Emphasis not considered***	Tier 2	Auto Truck Bicycle Transit Pedestrian
	Thornton Ave *(Paseo Padre Parkway to Fremont Ave)*	Corridor/ Neighborhood Mixed Use	**Community Connector**	Local	Class II	***Tier 2- (4.1-9.0 score)*** ▪ Transit Neighborhood PDA. ▪ On ACT Priority Corridor. ▪ Partially within 1/2 mile of Capitol Corridor/ACE station	Tier 3	Pedestrian Bicycle Transit Truck Auto
	Fremont Blvd *(Nicolet Ave to Thornton Ave)*	Corridor/ Neighborhood Mixed Use	**County Connector**	Major Corridor	Class II	***Tier 2- (4.1-9.0 score)*** ▪ Transit Neighborhood PDA. ▪ On ACT Priority Corridor. ▪ Partially within 1/2 mile of Capitol Corridor/ACE station.	None	Transit Auto Pedestrian Bicycle Truck

Table 3 Example Streets with Street Type and Overlay Designations								
Planning Area	Street Segment	Land Use Context Overlay	Street Type	Transit Overlay	Bicycle Overlay	Pedestrian Overlay	Truck Overlay	Modal Priority (in order)
EAST COUNTY	**Stanley Blvd** *(Bernal Ave to Isabel St)*	Rural/Open Space	**Throughway**	None	Class II	***Pedestrian Emphasis not considered***	Tier 2	Auto Truck Bicycle Pedestrian Transit
	Dublin Blvd *(Arnold Rd to Hacienda Dr)*	Commercial	**County Connector**	Major Corridor	Class II	***Tier 3 - (1.1-4.0 score)*** ▪ On LAVTA Rapid Corridor. ▪ Within Commercial Land use	Tier 3	Transit Auto Truck Bicycle Pedestrian
	Central Pkwy *(Grafton St to Lockhart St)*	Mixed Use	**Community Connector**	None	Class II	***Tier 3 - (1.1-4.0 score)*** ▪ Within 1/2 Mile of LAVTA Rapid stops. ▪ Suburban PDA.	None	Auto Bicycle Pedestrian Truck Transit

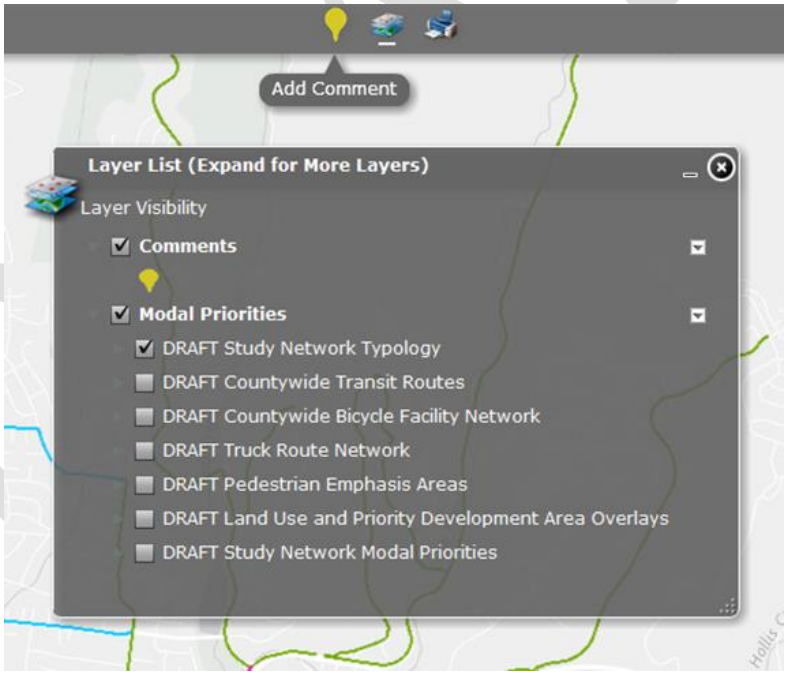
Next Steps

Local jurisdictions are requested to review the technically derived modal priorities applying the process explained in this memorandum and provide comments. Comments can be made on any of the underlying analyses elements (land use context types, base street types and multimodal overlays), which will influence the technically derived modal priorities.. There are data layers available for each of these elements and each layer contains a function allowing comments to be added. The segmentation of the GIS network may be more fine-grained than is necessary for comments, in which case agency staff should comment on any segment with a note about the limits to which the comment applies. As an example, a comment from the City of Oakland on the first segment in Table 3 – Hegenberger Road between San Leandro Street and International Boulevard – could potentially note that the comment applies to the segment between Foothill/Macarthur Boulevard and I-880 rather than the smaller segment of San Leandro Street to International Boulevard contained within.

All typology, modal overlays, and modal priority maps are available for review online via the Fehr & Peers GIS Server. Access the maps by going to the following link:

- http://gis.fehrandpeers.com/AlamedaCTC/Typology
- Username: AlamedaCMAP
- Password: fpgis_Alameda

To view specific maps, turn on the appropriate GIS data layer by clicking the box as shown in the screen capture below.



To add a comment, ensure that the comment layer is turned on and click on the yellow "Add Comment" icon at the top of the screen, then click on the roadway segment you wish to comment on and type your comments in the provided text box. Please include your name and agency in the comment field.

Comments Due

We request that your review and comments of proposed modal priorities be completed by May 8, 2015. If you have any issues accessing the GIS Server site, please contact Francisco Martin at 510-587-9422.

DATE:	October 5, 2015
SUBJECT:	Alameda Countywide Transit Plan Draft Network Recommendations, Evaluation Methodology, and Performance Measures
RECOMMENDATION:	Approve the Countywide Transit Plan draft network recommendations, evaluation methodology, and performance measures.

Summary

The first ever Alameda Countywide Transit Plan will identify a 2040 vision of a comprehensive countywide transit network designed to support Alameda County's future needs and enable Alameda County's jurisdictions and transit providers to better align transit planning with local development and improved transit services. Combined, these efforts provide opportunities for greater ridership and accessibility throughout the county.

The Transit Plan will include a set of *Network Recommendations* that will provide the basis for a 2040 vision of a comprehensive transit network. The Network Recommendations will address how existing transit services can be improved to grow ridership, achieve fiscal sustainability, and improve access across Alameda County.

Significant work has been done for the development of the Countywide Transit Plan, including:

- *Baseline Assessment*: included identifying the existing conditions of the transit network and creating the Vision and Goals of the Transit Plan which were adopted in March 2015.
- *Network Development:* performed an analysis of travel patterns and transit travel markets in 2040 and developed a set of *Draft Network Recommendations* designed to meet these future needs (See Attachment A, Technical Memorandum #5).
- *Evaluation Methodology:* included developing a set of *Performance Measures* which will be used to evaluate the Draft Network Recommendations (see Attachment B) and the comprehensive Vision Network against 2040 and 2010 baseline conditions.

The proposed *Draft Network Recommendations* includes outcomes from close coordination with transit stakeholders. An initial meeting was held with transit operator staff in March 2015 to review and comment on the Network Development methodology and approach.

The consultant team then held a series of meetings in June 2015 with transit operator and local jurisdiction staff where feedback was solicited on the methodology and proposed network recommendations.

The evaluation methodology and performance measures presented in Attachment B were developed in consultation with transit operators and closely coordinated with the AC Transit Major Corridors Study. Attachment C provides additional detail on the proposed modeling approaches that will be used to evaluate individual network recommendations and the comprehensive transit network vision using the performance measures detailed in Attachment B.

Staff is recommending that the Commission approve the *Draft Network Recommendations,* the *Evaluation Methodology*, and the *Performance Measures* at this time. Based on this approval, the consultant team will use the adopted evaluation methodology and performance measures to evaluate the draft transit network recommendations and the overall vision network and recommend refinements as well as priorities for implementation and phasing.

Future tasks, not included as part of this recommendation, but which will come to the Commission in early 2016, include the development of final near- and long-term network recommendations, a complementary paratransit strategy, strategies for better agency coordination, technology and customer service considerations, design guidelines and transit-oriented development infrastructure improvements, and a financial plan.

Background

The Countywide Transit Plan builds on recent transit planning efforts led by the Metropolitan Transportation Commission as part of the Transit Sustainability Project, and is being closely coordinated with planning efforts currently underway by individual transit operators, including AC Transit's Major Corridors Study which will develop, analyze and rank capital improvements for AC Transit's major corridors, and a Comprehensive Operations Analysis currently in progress for LAVTA/Wheels in the Tri-Valley. In addition, the Transit Plan recognizes that there are many other transit studies underway, including some in environmental phases of development, such as ACE Forward and the BART to Livermore/ACE project. In addition, Capital Corridor released its long-term vision in late 2014, and MTC is leading the Transbay Core Capacity Study with BART, AC Transit and Muni. The transit plan will acknowledge these additional planning efforts; however, it will not make recommendations on these specific studies since they are doing more detailed analyses of specific corridors than what this plan was scoped to perform.

Draft Transit Network Recommendations

Technical Memorandum #5 (Attachment A) describes the Draft Transit Network Recommendations developed to help Alameda County realize its vision to "Create an efficient and effective transit network that enhances the economy and the environment and improves quality of life." This technical memorandum focuses on the identification of draft recommendations for changes to the existing transit network for incorporation into the

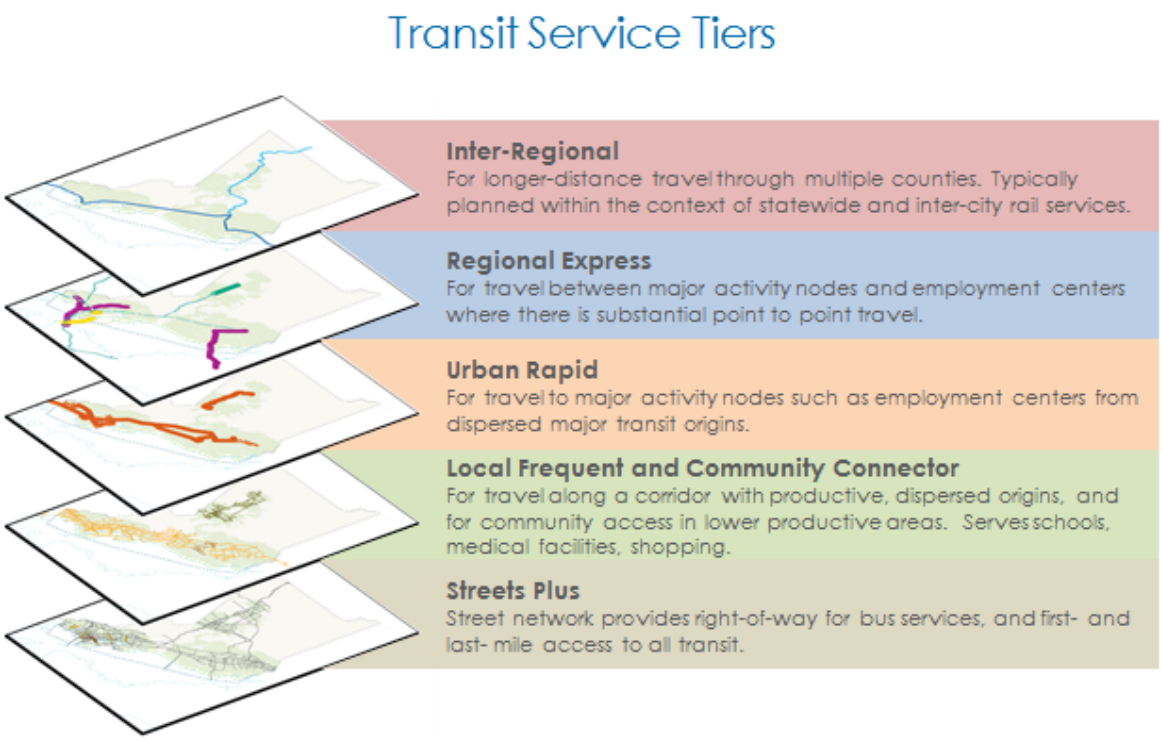
Countywide Transit Plan. It also presents a conceptual framework in the form of transit service tiers to clarify the differing elements of the demand for and provision of transit service in the county.

The Draft Transit Network Recommendations resulted from an in-depth analysis of future (year 2040) travel and land use forecasts and were refined in consultation with staff from the transit operators serving Alameda County and local jurisdictions. This analysis enabled the consultant team to identify areas where travel and land use patterns as well as employment and population densities indicated that there would be a strong market demand for fast, frequent transit service. In other words, there would likely be high enough transit ridership to support the more significant capital and operating investments typically required to provide transit service that is fast and frequent. Conversely, providing fast, frequent transit service in these areas would be most likely to result in the greatest number of people using transit.

While the focus of the Draft Transit Network Recommendations is on identifying areas where implementing fast, frequent transit service could not only significantly increase transit ridership but also substantially enhance the functionality and efficiency of our transit network, the final Countywide Transit Plan will provide a comprehensive set of recommendations for better integrating all tiers of transit service into a fully functional, effective and efficient transit network. To facilitate that effort, Technical Memorandum #5 also discusses the existing studies and plans currently being undertaken by AC Transit, Capitol Corridor, the Altamont Corridor Express (ACE), the Water Emergency Transportation Authority (WETA), and BART and how they relate to the specific recommendations made as part of the Countywide Transit Plan.

A transit tier structure is used as an organizational tool to help frame the discussion of the existing array of transit services and the potential for additional services that will foster a more efficient and seamless transit system. It is important to note that the tier structure does not imply a hierarchy of importance among the transit services or tiers. The purpose of the transit tier structure is to facilitate the understanding of different transit markets, service operations and operational characteristics, how they relate to the proposed network improvements, and how they combine together to create a comprehensive transit network. Each geographic transit tier is fundamentally connected to the rest, and the strength (or weakness) of each tier strengthens (or weakens) the entire transit network. Figure 1 provides an overview of the transit tier structure developed for the Countywide Transit Plan, which is described in more detail in Attachment A.

Figure 1



The Countywide Transit Plan will ultimately address all of the tiers of the transit network outlined in Figure 1. However, the focus of the Draft Network Recommendations is on the Regional Express and Urban Rapid tiers for the following reasons:

- Transit services within the Regional Express and Urban Rapid tiers carry the great majority of transit trips within, to and from Alameda County.
- Capital and operating investments that improve the capacity and operating effectiveness (in terms of travel time, frequency and reliability) of transit services within the Regional Express and Urban Rapid tiers are likely to have the greatest effect on increasing transit ridership, improving transit efficiency and sustainability, and achieving the Transit Plan's adopted vision and goals.
- To date, transit service in the Urban Rapid tier is significantly under developed. As a result, the level of transit mode share is significantly lower than would be expected given the very strong transit travel markets within Alameda County.
- While transit service in the Regional Express tier already meets the service objectives of being fast, frequent and reliable, it is at or over capacity, and additional service is needed to meet the demand both now and especially in the future.
- Alameda CTC, in partnership with local jurisdictions, transit operators, and regional agencies, can play an active role in facilitating significant improvements in transit services in the Regional Express and Urban Rapid tiers through capital and operating investments.

The Draft Transit Network Recommendations are detailed in Attachment A. It is important to note that all of the Draft Transit Network Recommendations are conceptual. In other words, specific routing and alignments have not been determined, and subsequent studies and environmental analyses will be required to determine specific alignments, routing, and capital and operating costs.

Evaluation Methodology and Performance Measures

Performance measures will be used for two types of evaluations, which will be performed based on Commission approval of performance measures:

- **Network:** This evaluation will quantify the anticipated benefits cumulatively resulting from the draft recommendations with respect to each identified goal. Performance measures will be applied to the existing (2010) and future (2040) baseline alternatives as well as the "Vision" network in order to gauge the relative effect of each network alternative.
- **Project:** The assessment will consider the costs and benefits of both capital and operating activities associated with each draft recommendation or proposed project. General assumptions will be made regarding capital and operating costs for each proposed network recommendation. (Those projects that are already in the project development or environmental phase will not be evaluated.) These cost assumptions will be used only for comparative purposes and are intended to provide information that can be used in prioritizing and/or phasing of project implementation.
    - **Capital:** This evaluation will allow Alameda CTC to do a comparative assessment of capital projects with respect to each identified goal.
    - **Operations:** A significant portion of the county's funds will continue to support operations and maintenance of transit services. The operating performance varies significantly across transit operators. This evaluation will allow Alameda CTC to evaluate operations practices of transit operators.

Both quantitative and qualitative performance measures have been identified for network and project evaluation. These are described below. Results from the evaluation of the draft recommendations using quantitative and qualitative performance measures will be presented in a matrix format. The transit vision network will also be evaluated against existing conditions and baseline conditions networks. For each performance measure, results will be presented on a three-point scale (low, medium, high). Each performance measure will be assigned weights determined through discussions with Alameda CTC. The performance evaluation outcomes will be presented to the Commission in early 2016.

Quantitative Performance Measures

Quantitative performance measures for each goal are summarized in Table 2 and are described in the following section.

Table 2: Quantitative Performance Measures

#	Goals	Performance Measures		
		Network-Level	Project-Level Capital	Project-Level Operating
1	Increase transit mode share	Per capita daily transit ridership	Net new riders	
		Percentage of intra-county trips on transit		
2	Increase effectiveness (including inter-regional travel)	Passenger trips per revenue vehicle mile		Passenger trips per revenue vehicle mile
		Miles of dedicated right-of-way (proxy for travel time reliability)	Miles of dedicated right-of-way (proxy for travel time reliability)	
		Daily transit trips (unlinked)	Daily transit trips (unlinked)	
			Reduction in transit travel time (peak/off-peak)	
		Number of transit hubs served, including inter-regional hubs		
3	Increase cost efficiency		Capital cost per net new rider	
		Operating cost per boarding		Operating cost per boarding
4	Improve access	Number of HH/jobs within half-mile of transit stops within each service tier	Number of HH/jobs within half-mile of transit stops	
		Number of Communities of Concern affected		
5	Reduce emissions	GHG emissions	Zero emission vehicles	
6	State of good repair		Cost of mid-life overhaul and/or replacements before 2045 to be included in cost estimates	

The definitions for the quantitative performance measures are as follows:

- **Per capita daily transit ridership**: This measure will be used to compare transit usage normalized with population over time (2010 vs. 2040). For evaluation of networks, ridership and population data will be taken from the travel demand estimation process (using both the Alameda County Travel Demand Model as well incremental approaches to ridership forecasting as detailed in the Appendix of Attachment B). For evaluation of operations, ridership data reported by transit agencies and population estimates/projections prepared by state or regional agencies will be used.
- **Percentage of intra-county trips on transit**: This measure will be used to track progress towards increasing transit mode share for intra-county trips. For evaluation of networks, intra-county ridership data will be taken from the travel demand estimation process (using both the Alameda County Travel Demand Model as well incremental approaches to ridership forecasting as detailed in the Appendix of Attachment B).

- **Net new riders**: This measure will be used to compare the ability of a project to attract new riders to transit. This measure will be used for evaluation of projects only and will use estimates of net new riders from the travel demand estimate process.
- **Passenger trips per revenue vehicle mile**: This measure will be used to assess the utilization of service for both networks and projects. For network and project evaluations, the passenger trips will come from the travel demand estimation process, while the revenue vehicle mile data will be derived from proposed service levels.
- **Miles of dedicated right-of-way**: This measure is a proxy for the reliability of transit service under the assumption that exclusivity reduces schedule variability associated with intermittent general purpose traffic congestion. The measure will be used for both network and project evaluations. The data will come from each project definition.
- **Daily transit trips**: This measure will show the transit trips associated with the project and will be aggregated at the network level. This measure is being used in addition to net new riders to allow for comparison to other transit agencies and provide input to efficiency metrics such as passenger trips per revenue vehicle miles. This data will come from the travel demand estimation process.
- **Reduction in transit travel time**: Transit travel time improvements will be estimated based on the type of physical changes proposed for the corridor. This measure will be applied at the project level. This data will come from a combination of using the Alameda County Travel Demand Model as well incremental approaches to ridership forecasting as detailed in the Appendix of Attachment B.
- **Number of transit hubs served, including inter-regional hubs:** This measure will show the "interconnectivity" of a particular transit line. This data will come from project definition evaluated against the existing and planned transit hubs.
- **Capital cost per net new rider**: This measure will be applied at the network and project level. Capital costs will be estimated from data bases that have compiled costs for comparable types of improvements in Alameda County and in other regions.
- **Operating cost per boarding**: This measure will be applied at the network and project level. Operating costs will be estimated from current operating costs for comparable types of service in Alameda County and other regions.
- **Number of households (by income level) and jobs within half-mile of transit stop within each service tier**: This measure provides useful information related to the potential overall market and equity issues associated with proposed service changes. It will be applied at the network and project levels. It also, provides a measure that helps provide context for the comparison of proposed projects in Alameda County to similar transit projects implemented elsewhere in the US.
- **Number of Communities of Concern affected:** This measure will help to establish whether the proposed modification will have a positive impact on Communities of Concern, i.e. those communities that face particular transportation challenges, either because of affordability, disability, or because of age-related mobility limitations. These may also be defined as those areas covered by Community Based Transportation Plans. A qualitative assessment of the extent to which proposed transit improvements benefit these communities will also be performed.

- **GHG emissions:** This measure will be applied on the network-level only and is generated based on output from the travel forecasting process (using both the Alameda County Travel Demand Model as well incremental approaches to ridership forecasting as detailed in the Appendix of Attachment B).
- **Zero emission vehicles**: This measure will be applied at the project level as an indicator of relative fleet emission impacts associated with the proposed improvement. Information on the use of zero-emission vehicles will be obtained from individual transit operators.
- **Cost of mid-life overhaul and/or replacements before 2045:** In order to reflect the goal of state of good repair, project cost estimates will take into account the cost of a mid-life overhaul and capital replacement required before 2045 as appropriate depending on asset type. This information will be obtained from individual transit operators as well as from the consultant team's database of relevant transit capital projects.

Qualitative Performance Measures

In addition to the quantitative measures listed above, the projects will also be evaluated using a set of qualitative performance measures to capture those benefits that cannot be readily modeled or forecasted so as to provide a quantitative metric. Qualitative measures include:

- **Support TOD strategy:** Linking transit investment with supportive land use patterns is critical to the success of transit. This performance measure will assess the characteristics of land uses adjacent to the proposed transit project to assess the potential for transit success by addressing the following questions:
    - *Density* – Are high density development and housing affordability requirements in place for development near transit stations/stops?
    - *Mix of Uses* – Does the local jurisdiction have policies that encourage mixed-use development, such as zoning codes that allow a mix of uses, form-based development codes (which generally facilitate mixed use development or co-location of different uses better than conventional zoning approaches), innovative jobs/housing balance policies and programs, shared parking allowances or requirements?
    - *Parking Management Policies* – Does the local jurisdiction have progressive parking policies, such as value or demand priced parking, reduced parking requirements in areas served by transit, parking maximums, shared parking policy, reduced parking for affordable housing units, provision of free or reduced-cost transit passes, and a tracking system to monitor these programs?
- **Number of existing or planned major activity nodes served:** Major activity nodes with high levels of transit demand serve as anchors for transit routes. Generally, major activity nodes are locations where there are a concentrated number of trip destinations and/or origins, such as colleges or universities, downtown central business districts, shopping centers, and large medical centers. The routes that are most productive not only have major anchors at each end of the route, but also have the potential to generate robust transit demand along the route.

Proposed projects will be evaluated in terms of how well they serve multiple existing or planned major activity nodes (including active PDA's).

- **Intermodal connectivity**: Projects will be evaluated in terms of how effectively they connect different types of transit services within the transit network. This will be evaluated by assessing the number of transit service tiers served and the ease of access between different transit modes.
- **Customer experience:** Customers' expectations evolve as amenities and services become available to them. Most transit agencies in Alameda County have carried out customer satisfaction surveys to identify factors that affect customer decision-making related to using transit. Most agencies have also adopted performance measures to track customer satisfaction over time. A qualitative assessment will be made of each project's impact to the rider's experience based on factors such as: service reliability, ease of transfers, ease of access to transit information and whether or not the proposed project has the potential to improve customer satisfaction.
- **Compatibility with Arterials Plan recommendations**: Coordination with the Arterials Plan typologies will ensure consistency between both plans.

Fiscal Impact: There is no fiscal impact.

Attachments

A. Countywide Transit Plan Technical Memo #5 Draft Network Recommendations
B. Countywide Transit Plan Technical Memo #6 Evaluation Methodology and Performance Measures

Staff Contacts

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Mollie Cohen-Rosenthal, Assistant Transportation Planner

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4.2A

Draft Transit Network Recommendations

Countywide Transit Plan

DRAFT Technical Memo #5

ALAMEDA County Transportation Commission

Prepared for:
Alameda County Transportation Commission

Prepared by:
Parsons Brinckerhoff

With

Cambridge Systematics
Community Design & Architecture
Strategic Economics

October 2015

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Introduction

This technical memorandum describes the Draft Transit Network Recommendations developed to help Alameda County realize its vision to "Create an efficient and effective transit network that enhances the economy and the environment and improves quality of life."[1] As an early step in the development of a transit network vision for Alameda County, this technical memorandum focuses on the identification of draft recommendations for changes to the existing transit network for incorporation into the Countywide Transit Plan. It also presents a conceptual framework in the form of service tiers to clarify the differing elements of the demand for and provision of transit service. In future stages of plan development, the proposed recommendations identified in this memorandum will be evaluated, revised, and combined with existing service and other planned improvements to form an integrated vision for future transit service in Alameda County.

The Draft Transit Network Recommendations resulted from an in-depth analysis of future (year 2040) travel and land use forecasts and were refined in consultation with staff from the transit operators serving Alameda County and local jurisdictions. This analysis enabled the consultant team to identify areas where travel and land use patterns as well as employment and population densities indicated that there would be a strong market demand for fast, frequent transit service. In other words, there would likely be high enough transit ridership to support the more significant capital and operating investments typically required to provide transit service that is fast and frequent. Conversely, providing fast, frequent transit service in these areas would be most likely to result in the greatest number of people using transit instead of private automobiles, since fast, frequent transit service could provide a more effective means of transportation in terms of travel time and cost.

While the focus of the Draft Transit Network Recommendations is on identifying areas where implementing fast, frequent transit service could not only significantly increase transit ridership but also substantially enhance the functionality of our transit network, the final Countywide Transit Plan will provide a comprehensive set of recommendations for better integrating all tiers of transit service into a fully functional, effective and efficient transit network. To facilitate that effort, this memorandum also discusses the existing studies and plans currently being undertaken by AC Transit, Capitol Corridor, the Altamont Corridor Express (ACE), the Water Emergency Transportation Authority

1 Alameda CTC Countywide Transit Plan Vision and Goals adopted March 26, 2015.

(WETA), and BART and how they relate to the specific recommendations made as part of the Countywide Transit Plan.

Overview of Opportunities and Challenges

Alameda County has both conditions supportive of higher transit ridership and at the same time many obstacles to overcome. The key opportunities and challenges that were discussed in detail in Technical Memorandum #2 are summarized below.

Opportunities – Alameda County has a Strong Overall Transit Market

Overall, Alameda County has strong markets for transit, both now and in the future as demonstrated by current and future technical analyses which focused on transit market opportunities. This means that the majority of communties in Alameda County have favorable land use characteristics and population and employment growth projections that point toward an increasing demand for transit use. This market strength was identified in the transit market assessment conducted and documented in Technical Memorandum #2 using a Transit Competitiveness Index (TCI) tool to evaluate competitive transit markets in the county, and is briefly summarized here.[2]

The TCI is a tool to identify which transit markets are most competitive for transit. An individual transit market is an origin and destination pair with a unique set of travel characteristics. Consider the following two trips: A downtown Oakland origin to a San Francisco Embarcadero destination compared to a Fremont residential origin to a Livermore office park destination. These two transit markets have different characteristics which describe the origins and destination, including streescape quality, parking availability, roadway congestion, and population and employment density.

Some individual transit markets have characteristics that make a particular origin-destination pair more competitive for transit, making it more likely that transit is the travel mode chosen for this trip. Common attributes of the most competitive transit markets include medium to high density land uses often with a mix of uses (where there is a more concentrated are for people to collect to use transit services); limits on free parking; and congested roadways that slow auto travel. Conversely, some *travel markets* have disadvantages, making the use of transit as a mode of travel less competitive. These include low density land uses (which make it more challenging to

[2] TCI analysis conducted by Cambridge Systematics, 2015.

concentrate people in a single area to use transit), plentiful free parking, and an unpleasant pedestrian environment.[3]

An overall transit market aggregates individual transit markets within a geographic area.The TCI assessment of all of Alameda County's *travel markets* shows a overall transit-competitive market for travel within, into and out of Alameda County.[4] In the 2010 baseline, almost 54% of all Alameda County trips and 43% of the work trips were in transit competitive markets.

By 2040, the overall transit market is forecasted to show 58% of all trips and 48% of work trips being made in transit competitive markets. The analysis further showed that a significant number of the existing transit routes in Alameda County operate in strong transit markets, but that the ridership on these routes does not always reflect the high potential for transit use.

Capturing the trips in these underperforming transit markets is critical to increasing transit ridership in the county.

Challenges – Strong Transit Markets Don't Necessarily Result in High Tranist Ridership

While Alameda County has conditions supportive of increasing transit ridership, there are significant obstacles to overcome. The following facts provide evidence that improvements systemwide are necessary:

- **Low transit mode share**: Despite the high overall transit competitive markets shown by the TCI scores,[5] transit currently only captures approximately 14% of the commute trips in the county.
- **Transit ridership growth for intra-county buses is flat:** Despite the presence of good market conditions for transit in Alameda County,[6] bus ridership declined between 2006 and 2012 and then remained relatively flat until 2014, the most recent year for which data was collected. This may be linked to service cuts and poor on-time performance of bus operators throughout the countywide network. [7] Where transit markets are strong **and** transit service is frequent, reliable, and highly competitive with vehicle travel times, such as the East Bay-San Francisco transbay corridor, transit ridership has grown significantly.

[3] Metropolitan Transportation Commission, Transit Sustainability Project. *TCI Draft Primer*. n.d. http://www.mtc.ca.gov/planning/tsp/TCI-DRAFT-PRIMER.pdf.
[4] The analysis was based on the 2014 update of the Alameda Countywide Travel Demand Model, which uses 2010 as a base year.
[5] TCI analysis conducted by Cambridge Systematics, 2015.
[6] TCI analysis conducted by Cambridge Systematics, 2015.
[7] Alameda CTC 2014 Performance Report.

- **Systemwide operating costs are increasing faster than ridership:** This points towards a lack of sustainability for operators. Improving transit's share in the overal transportation market is a key element in the county's ability to accommodate new residents, supportenvironmental goals and meet Alameda County's vision of increasing transit mode share.
- **Poor on-time performance and declining bus operating speeds:** This affects both ridership as well as the financial sustainability of our bus transit systems. Slow operating speeds require additional vehicles and drivers just to maintain current frequencies. This reduces the resources available to expand service frequencies and realize potential ridership gains that are likely to result from more frequent, reliable service. Close coordination between local jurisdiction and transit operators is critical to address this challenge.

In addition to the existing transit challenges, population and employment are forecasted to continue their growth by more than 30% by 2040.[8] Improving transit's share in the overal transportation market is a fundamental component that will be needed to accommodate increases in population and mobility needs.

The Countywide Transit Plan focuses on how Alameda CTC can help to improve the transit system and service for the future by focusing investments in those areas that have the greatest potential to increase transit ridership. Although specific proposed changes will be discussed in detail later in this technical memorandum, the main areas that provide opportunities to improve transit performance and increase transit ridership include:

- **Speed, Frequency and Reliability**—Poor on-time performance and variable transit travel times currently experienced on many bus routes can be addressed through transit-related improvements to roadway elements (e.g. queue jumps, bus bulbs, transit priority lanes, transit signal priority, etc.) which will need to be coordinated closely with local jurisdictions and Caltrans, as applicable.
- **Transit integration—**For a transit system to be successful, it needs to have both physical and institutional integration that allows the customer to experience a seamless trip by transit. In Alameda County and throughout the Bay Area, the lack of full integration between transit providers is reflected in poor connectivity, multiple fare structures and ticketing, and poorly integrated transit information. Though the Clipper Card has resulted in improvements for transit riders, it has yet to be fully integrated and accessible (it is not yet availabile on all transit operators), and transfers between operators still require additional fares. This

[8] Plan Bay Area, Metropolitan Transportation Commission, 2013. Alameda County population is expected to increase by 32 % and employment by 36% between 2010 and 2040.

lack of seamless transition between operators discourages transit use for those that have alternative choices and makes transit travel less convenient and more costly for those who are transit dependent.[9]

- **Gaps in service coverage**—While transit service coverage is generally high in Alameda County, gaps in hours of operation, frequency of service, and in route capacity can deter transit riders. Capacity constraints are a particularly acute problem in the Transbay corridor to San Francisco.

Organization of this Technical Memorandum

This technical memorandum is organized to lead the reader through the process used in developing the recommended transit improvements. A brief summary of each of the following sections is provided below.

The **Transit Tier Structur**e describes the five tiers that form the transit network and how these tiers are integrated to form a complete transit system for Alameda County. It also describes the agency roles for each transit tier and what the focus of investment is for Alameda County to achieve the best transit future. Tiers are not intended to denote priorities, rather they are used to describe distinct characteristics of types of transit service.

The **Network Development Methodology** section describes the market analysis that was conducted to identify the most highly competitive transit markets in Alameda County. It describes the approach that was used to identify the major centers of concentrated activity in Alameda County, determine the strongest transit markets linking the activity centers, and develop the draft recommendations for transit infrastructure and service improvements based on the greatest potential for capturing new transit riders.

The **Draft Network Recommendations** section lays out the proposed transit improvements by tier and includes a brief description of each draft recommendation.

[9] Seamless Transit, How to make Bay Area public transit function like one rational, easy-to-use system, April 2015, SPUR.

Transit Tier Structure

This section of the memorandum describes the transit tier structure that forms the framework for the Draft Transit Network Recommendations that follow. A transit tier structure was selected as an organizational tool to help frame the discussion of the existing array of transit services, the methodology used to identify future needs, and the draft recommendations.

It is important to note that the tier structure does **not** imply a hierarchy of importance among the transit services or tiers. The purpose of the transit tier structure is to facilitate the understanding of different transit markets, service operations and operational characteristics, how they relate to the proposed network improvements, and how they combine together to create a comprehensive transit network. Each geographic transit tier is fundamentally connected to the rest, and the strength (or weakness) of each tier strengthens (or weakens) the entire transit network.

Why Create Transit Tiers?

To be effective, an urban transit system must function at several different levels, serving different markets and modes and weaving together the services that are provided by multiple operators. This is a particular challenge in the Bay Area, which has so many different transit service providers. A well-functioning transit system will have a means of not only delivering different types of service, but also of connecting the different service levels so that a trip on transit, particularly one requiring transfers, is as seamless as possible for the transit rider.

This technical memorandum uses a transit service tier structure as an organizing principle to explain how the Alameda County transit system functions today and to present the potential improvements to the transit network. Separation of transit services into tiers allows for a more nuanced discussion of the differing aspects of transit service including:

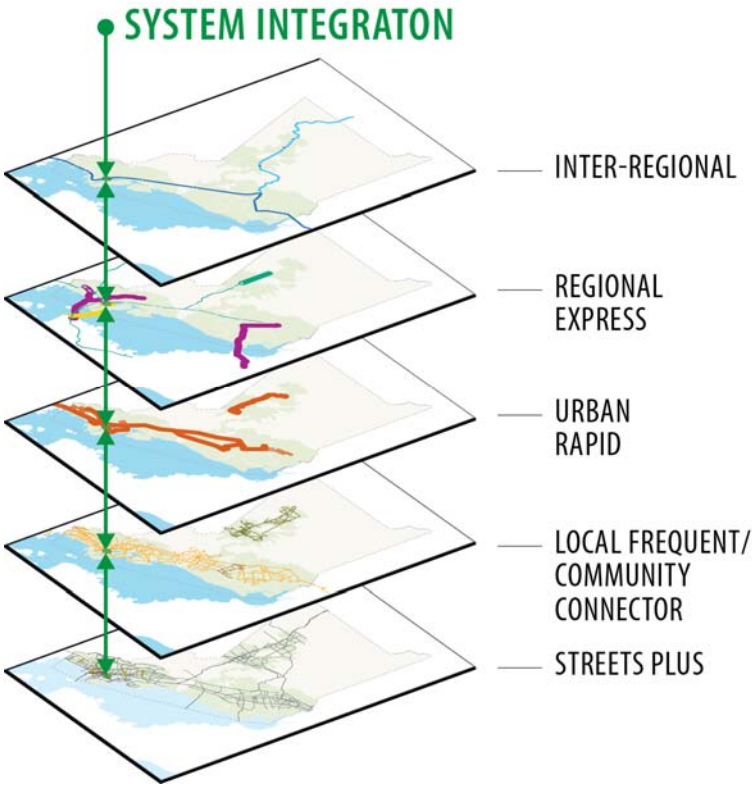
- Transit markets and operating environments
- Distribution of trip purposes and traveler profiles
- Service operating characteristics
- Volume of passengers and levels of investments required

Categorizing transit into separate tiers also facilitates the discussion of the inter-relationships between service providers and how connectivity between the transit tiers can be accomplished. Connectivity is provided in two ways: 1) physically, by bringing the various tiers of transit together at major transit hubs or activity centers where quick and easy transfers between modes or operators can be made and 2) institutionally by integrating transit information, transit fares, and fare collection systems.

The following section describes the attributes and existing conditions for each tier in the Alameda County transit network. The tiers were developed by surveying transit operators. A more detailed description of the approach to development of the tiers is provided in Appendix A.

Figure 1 provides an overview of the Transit Tier Structure. Each of the five transit tiers and the underlying street network all serve important functions in the delivery of transit services. However, Alameda CTC has the greatest potential to affect transformative changes to transit at the Regional Express and Urban Rapid tiers. By investing in fast, reliable, and high capacity transit services throughout the county, transit becomes a more attractive and convenient choice for a broader spectrum of travel.

Figure 1. Transit Tier Structure



System Integration

Critical elements of a successful transit system include physical integration (i.e. how the street network functions) in conjunction with the transit network and institutional integration (i.e. how services and information are coordinated) both affect the transit customer experience. The physical integration includes how different transit services provide connectivity and the role of activity nodes and transit hubs in facilitating those connections. Institutional integration includes coordination on those elements that support transit services such as fare payments, transfer policies, and transit information.

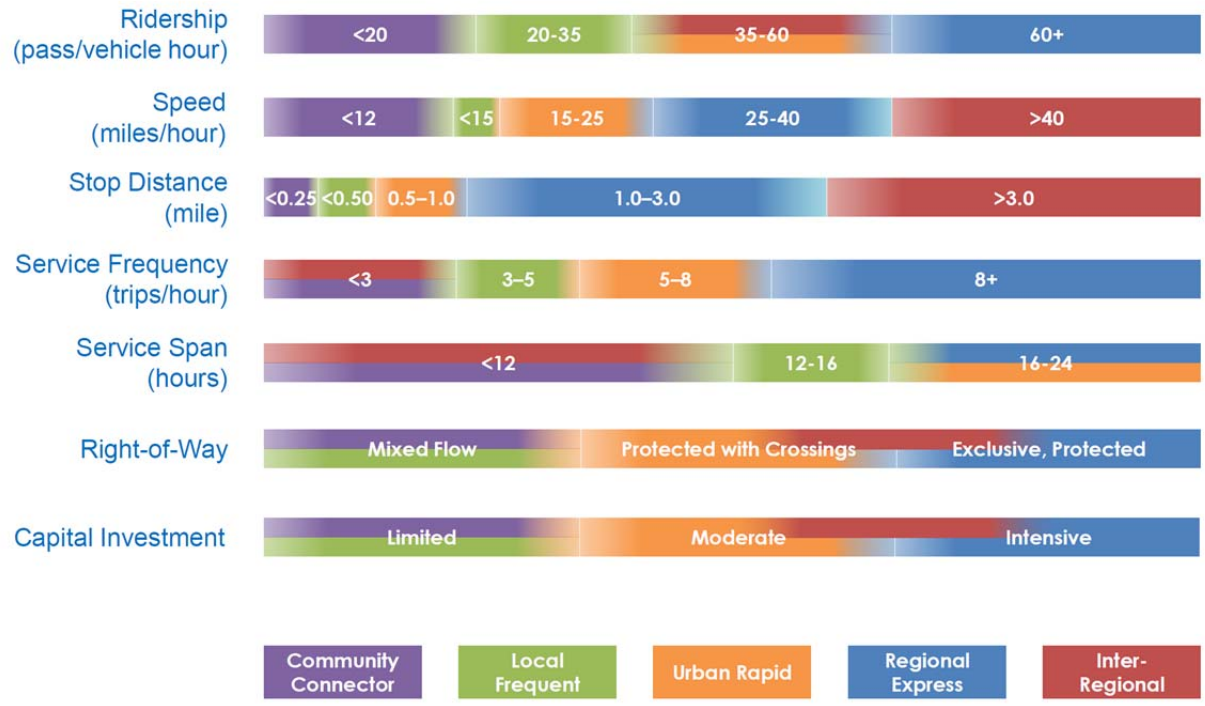
Providing an integrated transit system depends on the cooperation and willingness of all levels of government and the private sector to play a role in improving transit services.

Source: Parsons Brinckerhoff, 2015

Service Characteristics of Transit Tiers

Each of the tiers serves a different travel market and has different service characteristics. Figure 2 presents the general spectrum of characteristics for each type of service with the exception of Inter-regional service and the Streets Plus tier. As shown in Figure 2, there is some overlap of service characteristics at the boundaries of each service tier.

Figure 2. Transit Tier Characteristics



Source: Arup and Parsons Brinckerhoff, 2015

Because the trips served are generally longer distance trips that connect to major employment and other activity centers, the Regional Express tier provides the highest level of service in terms of capacity, speed, frequency and span of service. Regional Express services are often operating in exclusive or protected rights-of-way with limited stops and require extensive capital investments, such as BART.

Urban Rapid services, which provide fast, frequent, reliable transit service for intra-county trips, may have dedicated lanes on surface streets with transit signal priority at intersections and provide more frequent stops than Regional Express services, but limit

stops to provide faster service to final destinations. Depending on the type of service provided, captial investments can be significant (as in the case of bus rapid transit with dedicated transit lanes, level boarding, proof of payment systems, and stations) or more moderate (for example, rapid services may include some but not all of the elements of a full bus rapid transit line).

Local Frequent services provide frequent service along productive (in terms of ridership) corridors, but with more dispersed origins and destinations and therefore don't warrant the same level of intense investment service as Urban Rapid corridors. Services in the Local Frequent tier also provide important cross-town connectivity between Urban Rapid services. The Community Connector services provide a basic level of community coverage for access to critical community facilities and shopping and to connect to other transit service tiers. Both of these services have less freqent (as compared to Urban Rapid services) and lower overall passenger capacity, but are critical in providing mobility within a community and connectivity to more rapid higher tier services.

The characteristics of Inter-regional rail service (Capitol Corridor and ACE) fall on a somewhat different scale than those that are presented for the four tiers summarized in Figure 2. On one end of the specturm, inter-regional travel generally serves trips that are longer-distance (greater than 40 miles), at higher speeds (greater than 40 miles per hour), and with limited stops (greater than 3.0 miles apart). Inter-regional services usually operate on exclusive rail rights-of-way (ROW), but often share the ROW with freight operations, which can impact their services. Capital investments tend to be significant, but may be lower than investments in a system such as BART depending on the type of service provided. On the opposite end of the spectrum, the service frequency and span of service tends to be more limited, generally falling into peak periods or running at frequencies of one hour or greater.

The five transit tiers and the Streets Plus tier are described in more detail below.

Inter-Regional Tier


Altamont Corridor Express


Capitol Corridor

Distinguishing features of the Inter-regional tier

- Typically longer-distance lines than other tiers, usually greater than 40 miles.
- Service and passenger trips pass through multiple counties.
- Passenger rail service shares right-of-way with freight rail service.
- Typically framed and planned within the context of statewide and inter-city rail services.
- Trips tend to have dispersed origins arriving at the station via a variety of modes.
- Stations act as hubs for longer-distance travel and provide an opportunity for intermodal connections.
- Much of the service area is outside of Alameda County's sphere of influence.
- Combined ridership for all existing services in the inter-regional tier represents less than 1% of the total transit ridership in Alameda County.[10]

Service included in the Inter-regional tier

- Altamont Corridor Express (ACE)
- Capitol Corridor
- Amtrak San Joaquin

Service characteristics of the Inter-regional tier

- Higher speed (above 40 mph)
- Very limited stops (3 to 15 miles apart)
- Peak or hourly service frequency
- Exclusive, protected right-of-way (ROW)
- Capital intensive investment

Importance to overall network

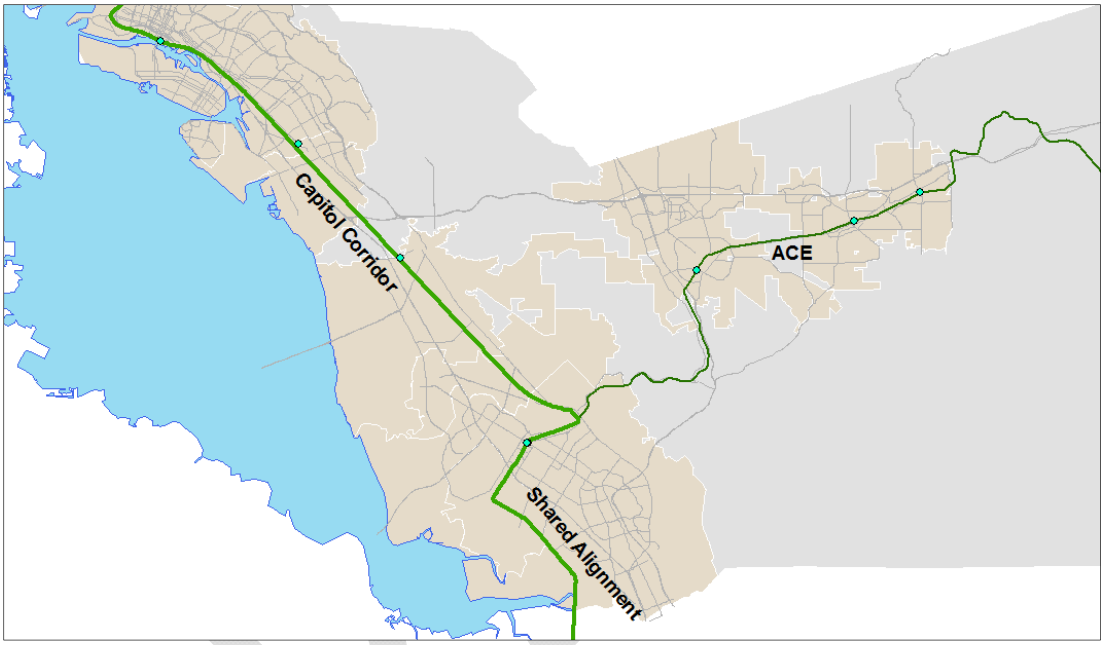
- Links Alameda County (and other Bay Area) origins and destinations with the regional and statewide passenger rail network.
- Relieves pressure on congested highways.
- Provides access to affordable housing outside of the urban core.
- Provides transportation network resiliency (provides redundancy to absorb disruptions to the other elements of the overall transportation system).

[10] Alameda Countywide Transit Plan, Technical Memorandum #2, Alameda CTC, June 2015.

Primary Responsibility for Service

- Statewide Focus - California Transportation Agency, California Transportation Commission (CTC), Regional Joint Powers Authorities
- The existing Inter-regional transit tier is shown in Figure 3.

Figure 3. Existing Inter-regional Tier



Source: Parsons Brinckerhoff, 2015

Regional Express Tier


AC Transit Transbay


BART

Dumbarton Express


WETA

Distinguishing features of the Regional Express tier

- Serves multiple counties and longer distance trips (e.g. Alameda to downtown San Francisco).
- Travel occurs between major nodes where there is substantial point to point travel. Provides access to major employment centers (e.g. downtown Oakland, Berkeley, and San Francisco).
- Transit stations act as hubs for intermodal connections and can serve as a catalyst for Transit Oriented Development (TOD).
- Carries a large portion of county's transit trips.[11]

Service included in the Regional Express tier

- Bay Area Rapid Transit (BART)
- Water Emergency Transportation Authority (WETA)
- Dumbarton Express
- Alameda-Contra Costa (AC) Transit Transbay Service
- LAVTA Express Lines
- County Connection Express Lines

Service characteristics of the Regional Express tier

- High speed (above 25 mph)
- Very limited stops (1 to 3 miles apart)
- High service frequency (greater than 8 trips/hour or headways of 8 minutes or less)
- Service span of 16 to 24 hours
- High ridership (more than 60 passengers/vehicle hour)

[11] Alameda Countywide Transit Plan, Technical Memorandum #2, Alameda CTC, June 2015.

- Exclusive, protected right-of-way (ROW) with the exception of express bus service
- Capital Intensive investment with the exception of express bus service

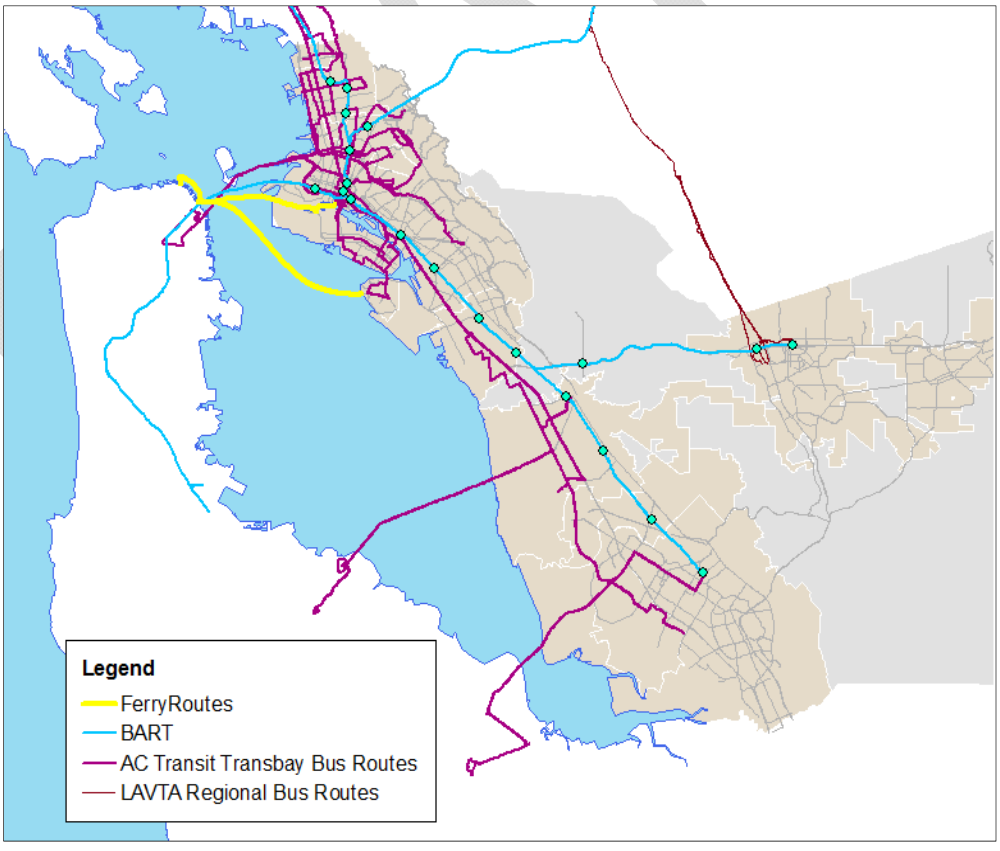
Importance to overall network

- Critical alternative to congested bridges and major highways.
- Links major employment and activity centers with housing.
- Transit stations serve as primary connection points between transit modes and operators.
- Provides transportation network resiliency.

Primary Responsibility for Service

- Regional Focus – Metropolitan Transportation Commission, BART, WETA, AC Transit
- The existing regional express transit tier is shown in Figure 4.

Figure 4. Existing Regional Express Tier



Source: Parsons Brinckerhoff, 2015

Urban Rapid Tier


East Bay BRT


AC Transit Route 1R

LAVTA Rapid Bus

Distinguishing features of the Urban Rapid tier

- Provides travel options between major nodes from productive major transit origins to concentrated destinations. Provides access to major employment centers, universities, and other high trip generators.
- Considered within the spectrum of BRT, but may or may not include complete exclusive ROW operations for the full length of the route.
- Rapid Bus services have been implemented in Alameda County, and the East Bay BRT service on International Boulevard will be the first Bus Rapid Transit (BRT) service in the East Bay.
- Serves trips primarily within Alameda County, but potential to combine or overlap with Transbay service.

Service included in the Urban Rapid tier

- AC Transit (Route 1R, 72R, and East Bay BRT - under construction)
- Livermore Amador Valley Transit Authority (Tri-Valley Rapid)

Service characteristics of the Urban Rapid tier

- Mid- speed (15 to 25 mph)
- Limited stops (0.3 to 1.0 miles depending on presence of underlying local service)
- High service frequency (5 to 8 trips/hour or headways of 12 minutes or less)
- Service span of 16 to 24 hours
- High ridership (35 to 60 passengers/vehicle hour)
- Exclusive, primarily surface operation, protected ROW with crossings
- Moderate capital investment

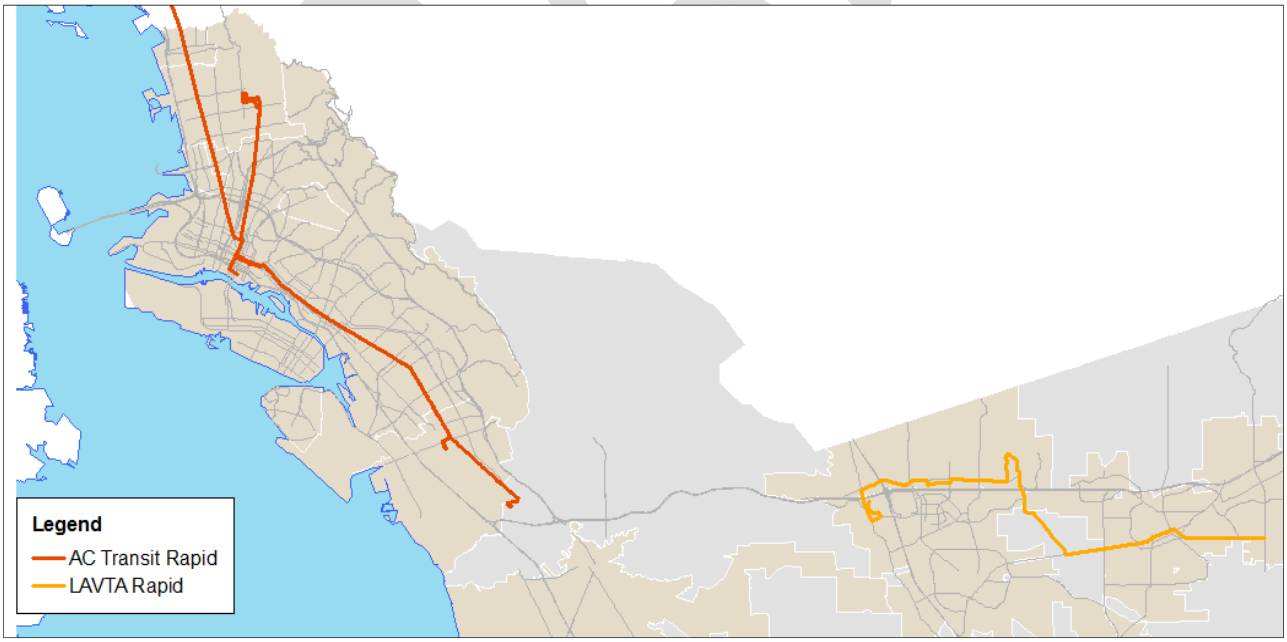
Importance to overall network

- Provides faster and more reliable bus service to complement rail service and primarily serves intra-county travel markets.
- Potential to improve ridership from existing transit service through:
    - Higher quality
    - Increased frequency and reliability
    - Decreased travel time
    - Ease of use
- Proven ability to increase transit ridership when properly implemented.
- Provides services to intermodal stations.

Primary Responsibility for Service

- Countywide Focus – Alameda CTC, Alameda County, Cities, AC Transit, LAVTA
- The Existing Urban Rapid transit tier is shown in Figure 5.

Figure 5. Existing Urban Rapid Tier



Source: Parsons Brinckerhoff, 2015

Local Frequent Tier

Distinguishing features of the Local Frequent tier

- Travels along a corridor with productive, dispersed origins and destinations.
- Serves local trips within Alameda County communities and cities.
- About 32% of the county's transit trips are carried by this tier of service.[12]

Service included in the Local Frequent tier

- AC Transit
- Oakland's Broadway Shuttle
- Emery-Go-Round
- LAVTA
- Union City Transit

Service characteristics of the Local Frequent tier

- Low-speed (below 15 mph)
- Frequent stops (less than 0.3 miles apart)
- Mid-service frequency (3 to 5 trips/hour or 15 to 20 minute headways)
- Service span of12 to 16 hours
- Moderate ridership (20 to 45 passengers/vehicle hour)[13]

Importance to overall network

- Provides service coverage for the county and interconnectivity between Regional and Urban Rapid tiers.
- Provides services to intermodal stations.
- Local community focus rather than longer distance trips.

Primary Responsibility for Service

- County and City Focus – Alameda County, Cities, AC Transit, LAVTA, Union City Transit

[12] Alameda Countywide Transit Plan, Technical Memorandum #2, Alameda CTC, June, 2015.
[13] Ibid. For AC Transit, a few lines exceed these ridership guidelines.

Community Connector Tier

Distinguishing features of the Community Connector tier

- Provides community access in less productive areas.
- Serves schools, medical facilities, shopping centers.
- Serves trips within Alameda County communities and cities.

Service included in the Community Connector tier

- AC Transit
- LAVTA
- Union City Transit
- First- and last-mile shuttle services, e.g. Kaiser Shuttle, Emery-Go-Round

Importance to overall network

- Critically important to those who are transit dependent
- Provides connections to other modes
- Local community focus rather than longer distance trips

Service characteristics of the Local Frequent tier

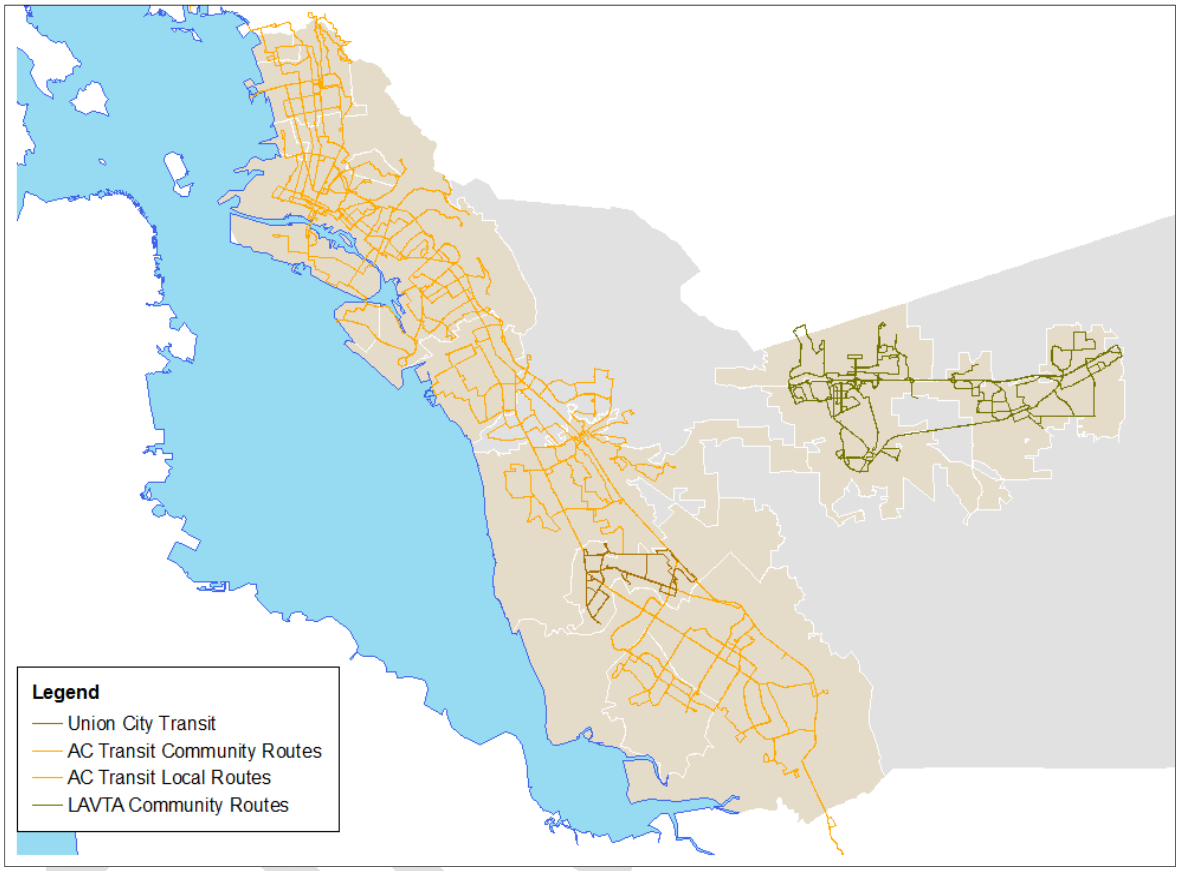
- Low-speed (less than 12 mph)
- Frequent stops (less than 0.25 miles apart)
- Mid-service frequency (less than 3 trips/hour or headways that are 20 minutes or greater)
- Service span of less than 16 hours
- Lower ridership (less than 35 passengers/vehicle hour)
- Surface operation in mixed-flow
- Limited opportunities for capital investment

Primary Responsibility for Service

- Community and City Focus – Alameda County, Cities, AC Transit, LAVTA, Private operators
- The existing combined Local Frequent and Community Connector transit tiers are shown in Figure 6 (with the exception of shuttle services). Because the focus of the Countywide Transit Plan is on those service tiers that require more intensive capital investment and serve multiple jurisdictions, subsequent

discussion of these two service tiers is combined. It is assumed that local jurisdictions and transit agencies will have primary responsibility for planning and implementing these services.

Figure 6. Existing Local/Community Tier



Source: Parsons Brinckerhoff, 2015

Streets Plus Tier

Distinguishing features of the Streets Plus tier

- The street network provides the right of way within which bus service operates and is therefore a critical component of creating an efficient and effective transit network.
- All transit trips in Alameda County start as walk, bicycle, or auto trips and use the street network for access to the transit system.
- Certain streets are particularly critical to maintaining and enhancing the functionality of the bus transit network either because of the number of bus

routes that converge or run on them or because they provide critical links in the surface transit network.

Service included in the Streets Plus tier

- Pedestrians
- Bicyclists
- Buses
- Automobiles and trucks

Importance to overall network

- Provides first and last-mile access to transit, whether by bus, shuttle bus, bicycle, or walking.
- For transit patrons, having a safe, clean, and pleasant experience on the street is critical to customer satisfaction.
- Provides vehicular access to park-and-ride and kiss-and-ride transit stations.

Primary Responsibility for Service

- Local – Alameda County and Cities

All of the tiers of the transit network need to function as a well-integrated system for transit to be successful. To realize the transit vision for Alameda County, investments in the transit network, transit service levels, and the supporting infrastructure and institutional framework are needed. Cooperation from all of the responsible parties identified above will be required to achieve that success.

The following sections describe how the recommendations for network and service improvements were developed and what improvements are recommended for further evaluation.

Network Development Methodology

This section describes the overall approach and methodology that was used to develop the Draft Transit Network Recommendations. Given the challenges identified earlier in this document and the expected growth in population and employment, the focus of the network development task was to identify strong transit travel markets and match them with appropriate transit facilities and services that will ultimately result in increased ridership and higher transit mode share within Alameda County.

Five transit service tiers were identified in the previous section of this technical memorandum. In developing draft recommendations for network improvements, the focus was on the core Regional Express and Urban Rapid markets. These are the markets that are served by BART, the ferries, AC Transit, and LAVTA. These markets are the ones that have the greatest potential to capture more transit riders by expanding capacity and service levels and by improving service frequency and reliability.

The Inter-regional service tier and its travel markets extend beyond the scope of Alameda County, and improvements to those services are planned within the context of the statewide rail system and greater Northern California region. Both Capitol Corridor and ACE are currently in the process of developing a future vision for their services in coordination with the communities that they serve. Consequently, this memorandum does not include specific recommendations for Inter-regional service. Instead, the Countywide Transit Plan will ultimately incorporate the outcomes of those ongoing planning efforts.

The Local Frequent and Community Connector services are focused on services that link to the Regional Express and Urban Rapid tiers and do not require the same level of capital investment to improve transit service. Rather than make specific recommendations for the numerous Local Frequent and Community Connector routes, the Countywide Transit Plan will highlight the role these service tiers play in creating a cohesive transit network.

Furthermore, it is important to note that the draft recommended network changes identified in this technical memorandum do not represent the final plan. Individual projects presented later in this document represent ideas worthy of further investigation based on a combination of factors including market demand, regional connections, ability to improve existing transit system constraints. Each potential change to the transit network will be evaluated against the adopted goals and performance measures in a future phase of this project.

Focus on Competitive Markets

Why Focus on Markets?

While most of Alameda County has competitive transit markets (as documented in Technical Memorandum #2), the methodology intentionally focuses the identification of potential new corridors for transit investment on areas showing the most highly competitive markets that would benefit from infrastructure improvements to facilitate the flow of transit on the busy street network. These are generally bus transit lines in the Urban Rapid tier – those that have potential for high ridership, but are experiencing poor on-time performance and reliability due to congestion and could be providing higher frequency service. The focus on these transit markets is critical to addressing one of the key challenges facing transit in Alameda County – the lack of growth in bus ridership, particularly on AC Transit routes.

Typical Factors that Contribute to Increased Transit Ridership:

- *Higher housing and employment density*
- *Increased employment*
- *Limited access to a car*
- *Higher gasoline prices*
- *Lower costs for transit*
- *Limited and costly parking*

Alameda County has a mature transit system with a robust local bus network in addition to inter-regional rail, BART and transbay buses and ferries. The key to increasing transit ridership and transit mode share in the county is to link the promising yet underperforming transit markets with an enhanced infrastructure and level of service that can capture more choice riders and better serve existing riders. When high levels of service are provided in robust transit markets, ridership increases, as evidenced by the surge in ridership on BART's and AC Transit's transbay services.

To identify the competitive markets for further evaluation, a tool called the Transit Competitive Index (TCI) was used. The TCI evaluates travel market conditions to determine the potential for transit success in a given area. The travel markets consist of all motorized modes of travel between identified nodes of activity – either where trips start (origins) or end (destinations). The TCI measures the conditions that have the greatest effect on the competitiveness of transit relative to auto travel and aggregates them into a single number.

For Alameda County, the conditions are taken from the mode choice module of the Alameda CTC travel demand model. The conditions evaluated include: land use density and diversity, roadway congestion, parking cost and search time, household characteristics, trip purpose, central business district characteristics, and tolls.

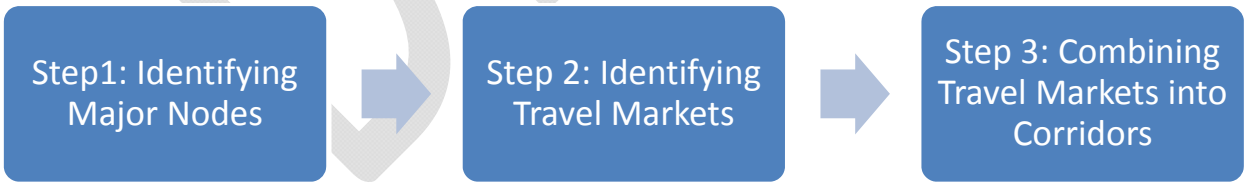
This section describes the methodological approach to identifying the most competitive transit markets and the process by which draft recommendations for infrastructure and service improvements were developed.

Analyzing the Transit Market

The analysis of transit markets relies on the 2040 projected travel patterns generated from the Alameda CTC travel demand model updated in 2014. The county travel demand model uses population and employment projections for 2040 based on anticipated population and employment growth from the most recently adopted *Plan Bay Area*. The Association of Bay Area Governments (ABAG) and MTC provide a common growth projection for the region, which is allocated to the counties and cities within the nine-county Bay Area region. The plan projected an increase of 1.1 million jobs, 2.1 million people, and 66,000 homes in the Bay Area between 2010 and 2040. Growth was distributed to communities with access to existing or planned transportation investments in line with the requirements from SB 375 to help achieve the regional greenhouse gas reduction targets and to house all of the region's projected population growth across income levels.[14,15]

The trip volumes generated from the travel demand model and used for the transit market analysis were based on the growth projections from *Plan Bay Area* that were allocated to Travel Analysis Zones (TAZs). Using the model data and the Transit Competitiveness Index (TCI) tool, an analysis was conducted to determine the potential viability of transit markets in Alameda County. Transit viability was based on the density of trips, housing, and jobs within each TAZ and confirmed against the TCI score for the TAZ. Once transit viability was confirmed, corridors were identified for transit investments (see Figure 7) based on trip density.[16]

Figure 7. Corridor Development Process



Source: Arup and Parsons Brinckerhoff

[14] Plan Bay Area, Strategy for a Sustainable Region, Metropolitan Transportation Commission, July 2013.
[15] Senate Bill 375 mandates a Sustainable Community Strategy (SCS) to be incorporated into the regional transportation plan.
[16] The Transit Competitiveness Index was developed by Cambridge Systematics (CS) and the market assessment was also conducted by CS.

The methodology had three main objectives:

- Identifying major activity nodes (locations with a large conecntration of trip origins or destinations) from the 2040 projections for trip origins and destinations by travel analysis zones (TAZs).
- Defining travel markets between the major origin and destination activity nodes according to their projected travel volumes in 2040.
- Analyzing the travel markets and identifying corridors for potential transit improvements.

Identifying Alameda County Activity Nodes

Seven separate analytical steps (described below in more detail) were used to identify major activity nodes. A more detailed discussion of the process is documented in Appendix B.

1. **Identifying trip origins and destinations for each of the 1,580 traffic analysis zones (TAZs) in Alameda County through the use of the regional travel forecasting model.** The TAZs were ranked in descending order based on the number of trip origins and destinations.

2. **Determining TAZ thresholds to identify competitive transit markets.** The ranked lists developed in Step 1 were classified in ArcGIS using the "natural breaks" method. The natural breaks method is a statistical method that uses data clustering to create distinct classifications of data and to maximize the variance between the classifications. It is a method for creating naturally occurring categories. For the transit plan, the approach was to create a break point that distinguished the most *highly* competitive transit markets in the county from the broader number of competitive markets that exist throughout Alameda County. The trip density break points that were developed using this methodology were:

    - Origin Nodes: 70,000 trips per square mile, and
    - Destination Nodes: 100,000 trips per square mile

3. **Validating TAZ population and employment densities through land use and market analysis.** To confirm that the TAZs selected as activity nodes were accurately capturing the most transit competitive areas of the county and where growth was most likely to occur, a check was made against independently produced population, housing, and job density maps that overlaid the county's Priority Development Areas (PDAs). The activity nodes were also compared to the most active residential and commercial areas using a market index tool as an

indicator of where growth was most likely to occur.[17,18] Minor inconsistencies between land use and trip densities were corrected.

4. **Refining the transit market by consolidating TAZs to create major activity nodes**. Activity nodes were consolidated to form major activity nodes. A 1/3 mile radius circle was drawn from the centroid of each activity node. If the 1/3 mile radius circle overlapped other activity nodes, the nodes were combined to form a major activity node and a new centroid was defined.[19] If the 1/3 mile radius circle did not overlap other activity nodes, then the activity node alone was identified as a major activity node.

5. **Final delineation of the major activity nodes.** For the next step in the creation of major activity nodes, a 1/2 mile radius buffer was created around each of the major node centroids described above. A 1/2 mile radius circle was drawn from the centroid of the newly defined major activity nodes. TAZs were once again combined if at least half of the TAZ fell within the 1/2 mile radius circle, the distance that is considered to be a reasonable walking distance to access transit. Applying the "natural breaks" methodology to these newly defined major activity nodes, a second tier of thresholds was established for these more broadly defined major activity nodes:

    - Origin Nodes: 50,000 trips per square mile, and
    - Destination Nodes: 80,000 trips per square mile.

    The final delineation of the major activity nodes included the most competitive activity nodes aggregated with those that that had a slightly lower trip density and a slightly higher potential walk distance. Nodes that qualified as both origin and destination major activity zones were identified as such.

6. **Validating the designation of major activity nodes through the application of the TCI score (a separate indicator of transit competitiveness).** As a final check on the methodology, the aggregate TCI scores were measured for each of the major activity zones. All of the major activity zones that were created had a TCI above 500, indicating that they were all strongly competitive transit markets.[20]

    The desired outcome of the systematic application of this methodology was to create a manageable number of major activity nodes that would not generate a

[17] April 10, 2015 Memorandum from CD&A: Identifying TAZ clusters as Activity Nodes for TCI Modeling.
[18] April 10, 2015 Memorandum from Strategic Economics, Market Index Technical Memorandum.
[19] The activity nodes were aggregated if the 1/3 mile radius circle encompassed at least ½ of an adjacent node.
[20] On the TCI scale, a score above 125 is strongly competitive for transit. To distinguish the best markets in Alameda County, it was necessary to set the bar at a higher level.

network too large for a feasible transit network, or too small that it excluded a major activity node. The application of the methodology for the existing and future timeframe yielded the following results:

- For 2010, 54 nodes were identified in Alameda County, where 26 nodes were designated major origins (O), 16 nodes as major destinations (D), and 12 as both a major origin and a major destination.
- For 2040, 71 nodes were identified in Alameda County, where 26 nodes were designated major origins, 16 nodes as major destinations, and 29 were designated both a major origin and a major destination.

The 71 nodes identified as a result of this analysis for the 2040 land use forecast is a reasonable number of nodes to use as the basis for identifying potential new corridors in the Regional Express and Urban Rapid transit network. Figure 8 shows the major origins and destinations identified in Alameda County.

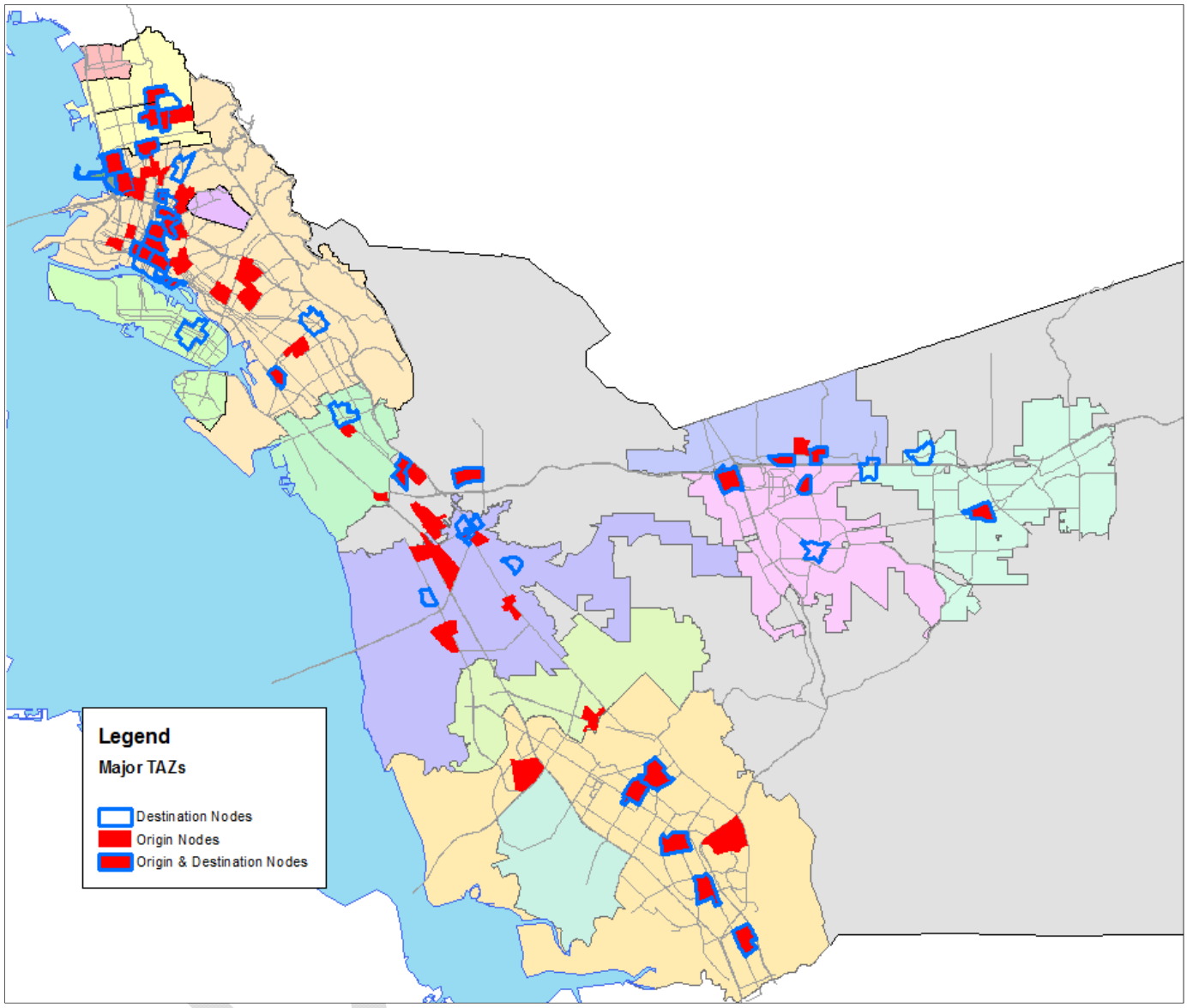
Identifying Alameda County Travel Markets

Once major origin and destination nodes were identified, travel markets (including all modes and trip types) were identified based on an analysis of the major activity node O-D pairs. The following steps were completed:

1. Examined travel volumes for travel between all of the major O-D nodes throughout Alameda County.
2. Produced a matrix with the origin and destination nodes that shows the total number of daily trips between each major activity node pair.
3. Created a “desire line” map using the results of this matrix showing the total number of daily trips occurring between a given major activity node O-D pair, or “travel market”. The minimum threshold for desire lines was set at 200 trips so only the more robust travel markets were identified. Figure 9 shows the desire lines between major O-D pairs within Alameda County.
4. Classified desire lines by trip volume. To facilitate the development of draft recommendations for the most viable transit corridors, the trip volumes were classified in three categories, as follows (refer to Figure 9):

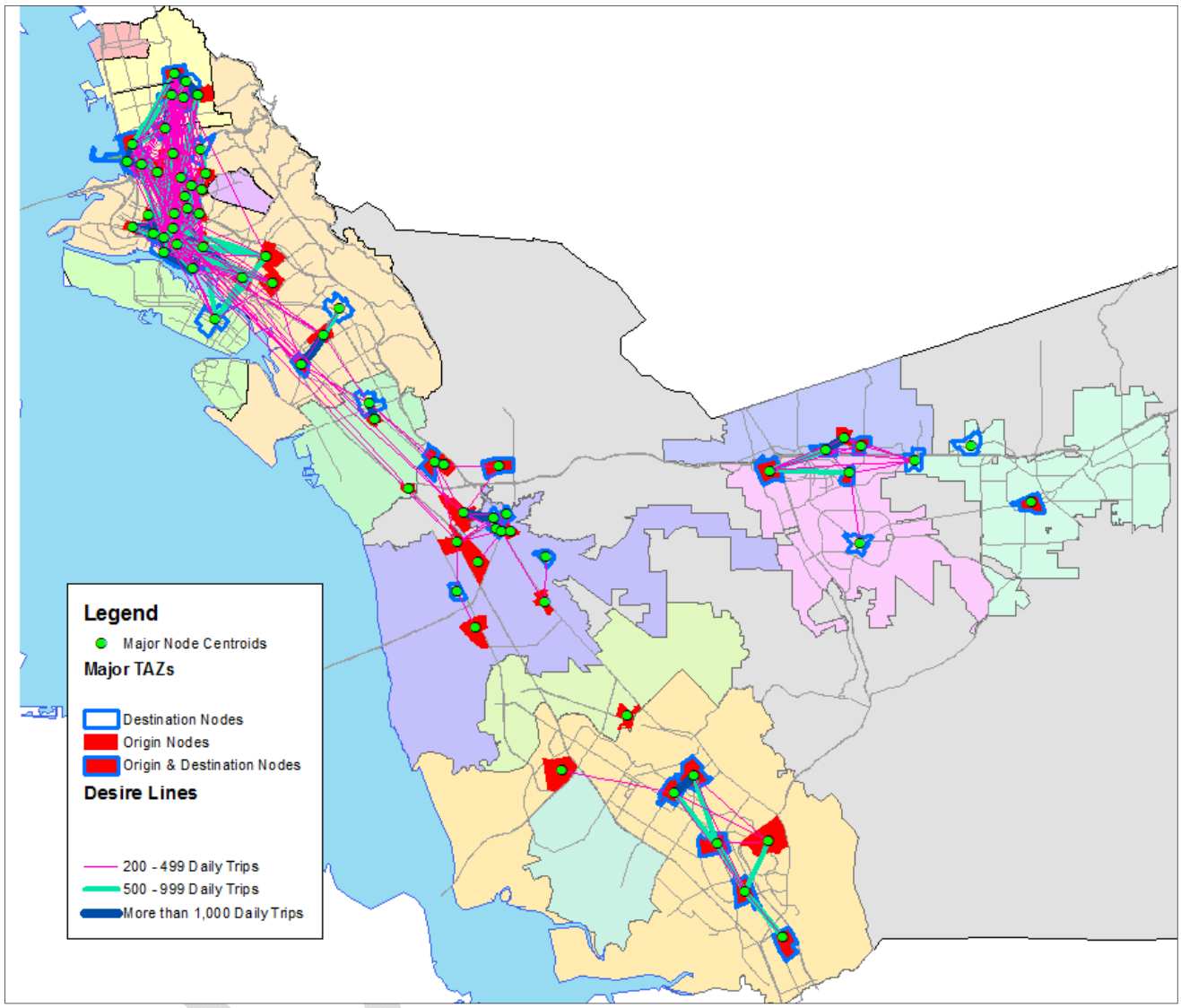
    - Minor travel market: 200 to 499 trips;
    - Moderate travel market: 500 to 999 trips; and
    - Major travel market: 1,000 or greater trips.

Figure 8. 2040 Major Origin-Destination Nodes within Alameda County



Source: Cambridge Systematics: TCI tool, density maps, market indices, and Alameda County Travel Demand Model, 2015

Figure 9. 2040 Daily Trips between Major Origin and Destination Nodes within Alameda County



Source: Cambridge Systematics: TCI tool, density maps, market indices, and Alameda County Travel Demand Model, 2015

As was done with the creation of major activity nodes, the methodology to identify travel markets was structured to result in a manageable number of major travel markets for transit corridor improvements, but not so few that significant travel markets were excluded.

Even with this methodological approach, a few of the identified major activity nodes were "stranded," that is they did not have enough travel to and from other major nodes to result in a desire line with more than 200 trips. This suggests that though these major activity nodes might be transit competitive based on density, overall trip volumes, and TCI scores, the trips are likely going to or from dispersed origins and destinations. These activity nodes then might be better served by services that include park-and-ride facilities or feeder bus services to provide a concentrated point of access for transit.

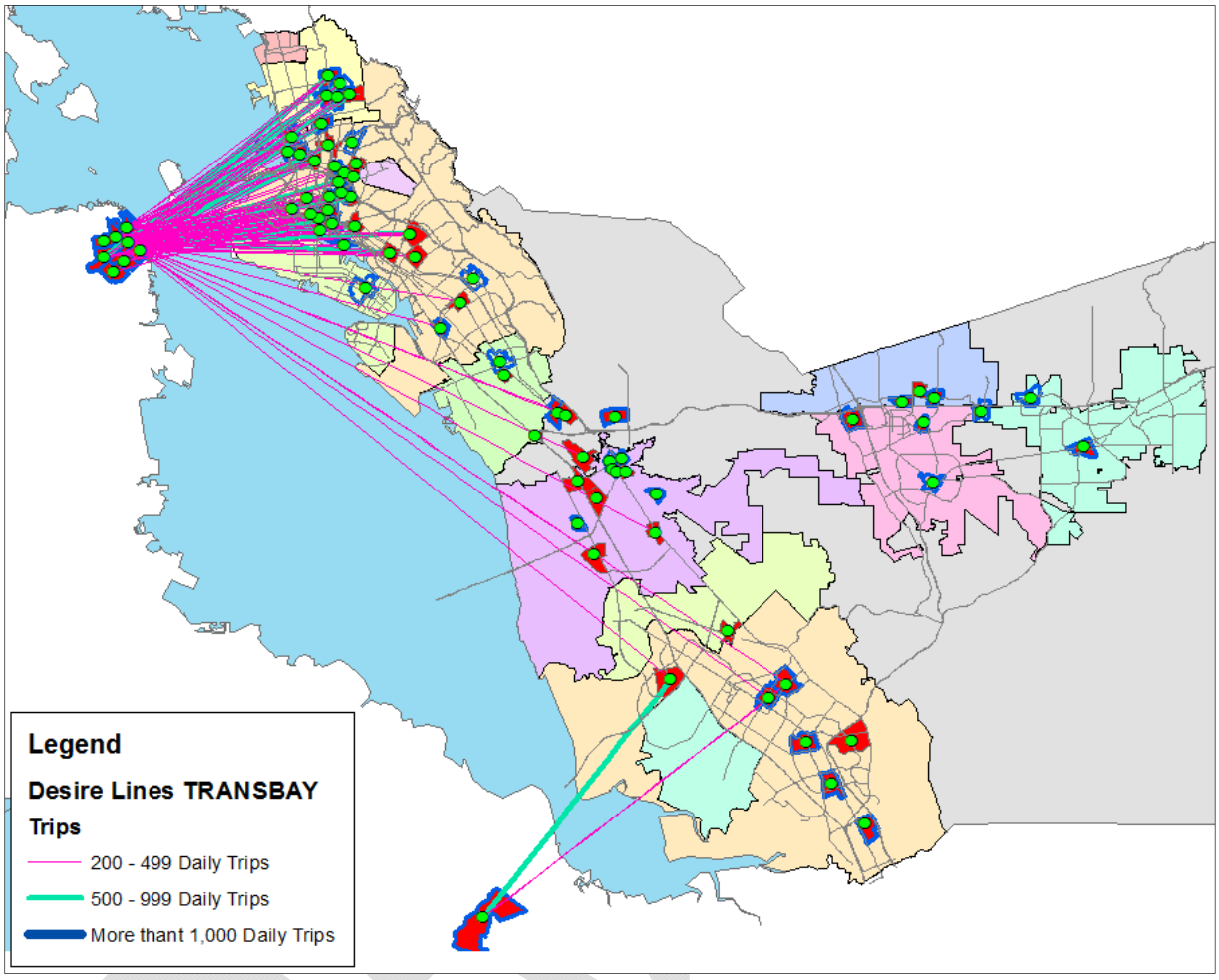
Identifying Regional Activity Nodes and Travel Markets

The identification of regional activity nodes and travel markets required a slightly modified approach to the one used within Alameda County. After assessing the results of the Alameda County analysis, an additional analysis was undertaken to identify the potential travel markets between Alameda County and other counties in the Bay Area.

Because the demand for regional types of services comes from a broader market, the trip origins and destinations tend to be more dispersed than those related to the demand for Urban Rapid core services. The regional services are accessed not only by walking, but also by feeder bus, park-and-ride, and kiss-and-ride so the service areas are significantly larger than those defined by a half-mile walking distance. As a result, different thresholds were used to identify major markets for inter-county trips (as noted in Appendix B).

For this regional analysis, the TCI threshold was lowered to 250. By lowering the TCI threshold to 250, major activity nodes in San Francisco as well as outside were highlighted. This analysis showed eight major activity nodes in San Francisco along Market Street, from The Embarcadero to Van Ness Avenue; one major activity node in downtown Palo Alto, and one major activity node in downtown San Jose. Figure 10 shows the inter-county desire lines between major O-D pairs in Alameda, San Francisco and San Mateo counties. A discussion of regional trips between San Joaquin and Alameda Counties is provided on page 32 of this memorandum in the section titled "Travel Demand Originating Outside the Bay Area".

Figure 10. Trips between Major Origin and Destination Nodes Transbay



Source: Cambridge Systematics: TCI tool, density maps, market indices, and Alameda County Travel Demand Model, 2015

Even with lowering the TCI threshold to 250, there were still a few existing markets that did not show a large demand for regional travel. For example, the City of Alameda contributes substantially to both ferry ridership and BART ridership, but does not appear as a major market between the island and San Francisco. This is also true of the major activity nodes in East County, where there is an established BART market that is not reflected in the identification of major transit markets. This likely represents a condition where the major activity nodes are not generating large volumes of travel to single points of activity. In other words, the origins and the destinations may be more dispersed or spread out than in other locations in the county. The transit solutions for these types of conditions need to be more focused on concentrating the access to transit by providing park-and-ride or transit feeder services.

Combining Travel Markets into Transit Corridors

The final step in developing the draft recommendations for transit corridor improvements is the combining of travel markets into transit corridors. This step requires not only a systematic approach, but an understanding of transit service planning and close coordination with the transit agencies.

The process that is outlined below focused on developing draft recommendations for enhancing transit service in the Regional Express and the Urban Rapid tiers. These tiers are emphasized because they provide the greatest opportunity for impacting transit ridership in Alameda County. Ridership on Regional Express services has been growing in recent years and additional capacity is needed to serve the county. The Urban Rapid service is intended to provide the infrastructure and service enhancements that will better serve bus transit patrons and reverse the decline in ridership that the bus operators have experienced over the past decade.

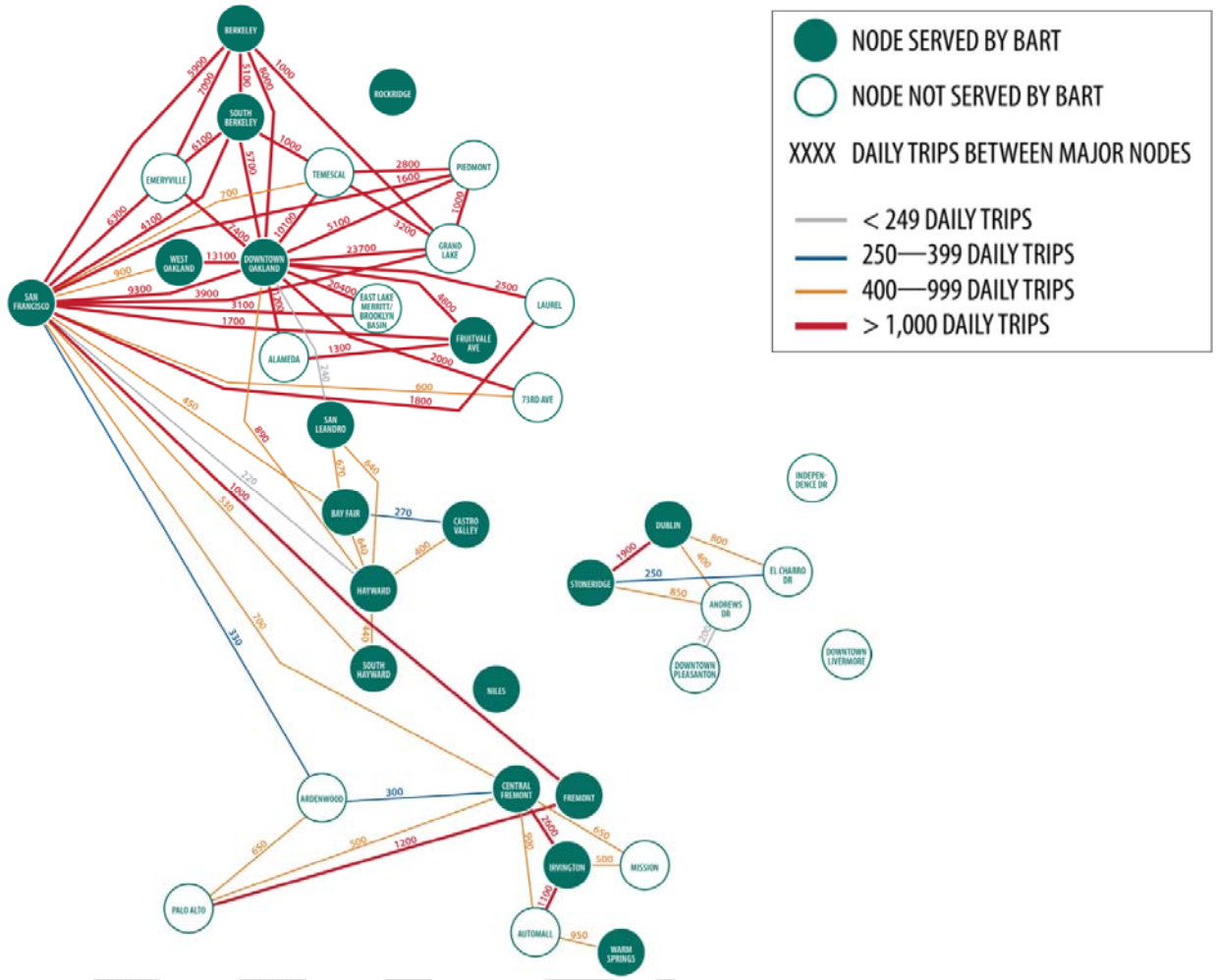
The transit corridors that are recommended for improvements were identified by applying the following criteria to the travel markets identified in the previous steps:

- Acknowledging the current structure of transit services;
- Acknowledging current and proposed plans and programs; and
- Identifying potential corridors that offer opportunities for transit priority treatments.

Figure 11 shows an abstract presentation of the O-D pairs and the 2040 forecasted daily trips between the identified major activity nodes that were identified in Figure 7 and Figure 8.

The travel links shown in Figure 11 were combined to create potential service corridors where service could be upgraded to a Regional or Urban Rapid tier in order to capture more transit riders out of the total travel market. Corridors were designed where possible to match existing service routes to reduce unnecessary change or to serve underserved markets where development is expected to occur or intensify between now and 2040, e.g. between Berkeley, Emeryville, and San Francisco. This effort was also coordinated with AC Transit to ensure consistency between the Major Corridors Study currently underway and the draft recommendations for the Countywide Transit Plan. Any findings or recommendations from LAVTA's Comprehensive Operations Analysis (COA), which was initiated in Fall 2015, will also be incorporated into the Countywide Transit Plan.

Figure 11. 2040 Trip Densities Between Major Origin-Destination Nodes



Source: Arup, 2015
Note: Diagram only includes trip levels greater than 250. Diagram is not to scale.

Travel Demand Originating Outside the Bay Area

Outside of the nine-county Bay Area region, San Joaquin is of particular interest to the development of a Countywide Plan as trips coming over the Altamont Pass have a significant impact on travel in the I-580 corridor. Transit solutions for this corridor are the subject of two separate studies. The ACE*forward* planning efforts, at the inter-regional level, are looking at increasing the number of daily trains coming over the Altamont Pass and increasing service to Alameda and Santa Clara counties. The proposed BART to ACE (originally BART to Livermore) project is evaluating the potential extension of BART service to Isabel Avenue and beyond, including a direct connection to ACE, to better serve the inter-regional trips and the Tri-Valley. The service improvements for the ACE train and the proposed BART extension provide an opportunity to ultimately provide a link between the inter-regional service and the regional service in the vicinity of Livermore and improve transit options for those commuting in the I-580 corridor.

Environmental review is underway on both of these projects. This plan acknowledges both of these studies (see the following section on draft recommendations), but does not presuppose the outcomes of the recommendations. Detailed ridership projections will be included as part of the published environmental documents for each project.

Draft Network Recommendations

The Countywide Transit Plan will ultimately address all of the tiers of the transit network described in this memorandum. However, the focus of the Draft Network Recommendations is on the Regional Express and Urban Rapid tiers for the following reasons:

- Transit services within the Regional Express and Urban Rapid tiers carry (and have the potential to carry) the majority of transit trips within, to and from Alameda County.
- Capital and operating investments that improve the capacity and operating effectiveness (in terms of travel time, frequency and reliability) of transit services within the Regional Express and Urban Rapid tiers are likely to have the greatest effect on increasing transit ridership, improving transit efficiency and sustainability, and achieving the Transit Plan's adopted vision and goals.
- To date, transit service in the Urban Rapid tier is significantly under developed. As a result, the level of transit mode share is significantly lower than would be expected given the very strong transit travel markets for trips made within Alameda County.
- While transit service in the Regional Express tier already meets the service objectives of being fast, frequent and reliable, it is at or over capacity, and additional service is needed to meet the demand both now and especially in the future.
- Alameda CTC, in partnership with local jurisdictions, transit operators, and regional agencies, can play an active role in facilitating significant improvements in transit services in the Regional Express and Urban Rapid tiers through capital and operating investments.

The travel market analysis described in the previous section of this memorandum yielded recommendations for the Regional Express and Urban Rapid tiers, primarily focusing on potential improvements to both transbay bus service and major trunk route bus services that would form the basis of a fast, frequent surface transit network within Alameda County. In addition to the recommendations for enhanced regional bus service, improvements included in the current Regional Transportation Plan (RTP) and proposed improvements that are under consideration as part of ongoing regional studies or are proposed as part of future developments are also included in this section, e.g. the introduction of new ferry service from Alameda Point or the potential for a second BART tube under the Bay connecting San Francisco with the East Bay. The

Countywide Transit Plan does not presuppose an outcome for these studies, but includes them as part of the context for the future transit network in Alameda County.

In addition to enhancing connectivity between major activity nodes, the Draft Transit Network Recommendations were developed based on a detailed understanding of transit operations and transit priority treatments that can lead to reduced travel times, improved on-time performance, better inter-modal integration, and ultimately higher ridership and customer satisfaction.

Recommendations for Inter-Regional, Frequent Local/Community and Streets Plus Tiers

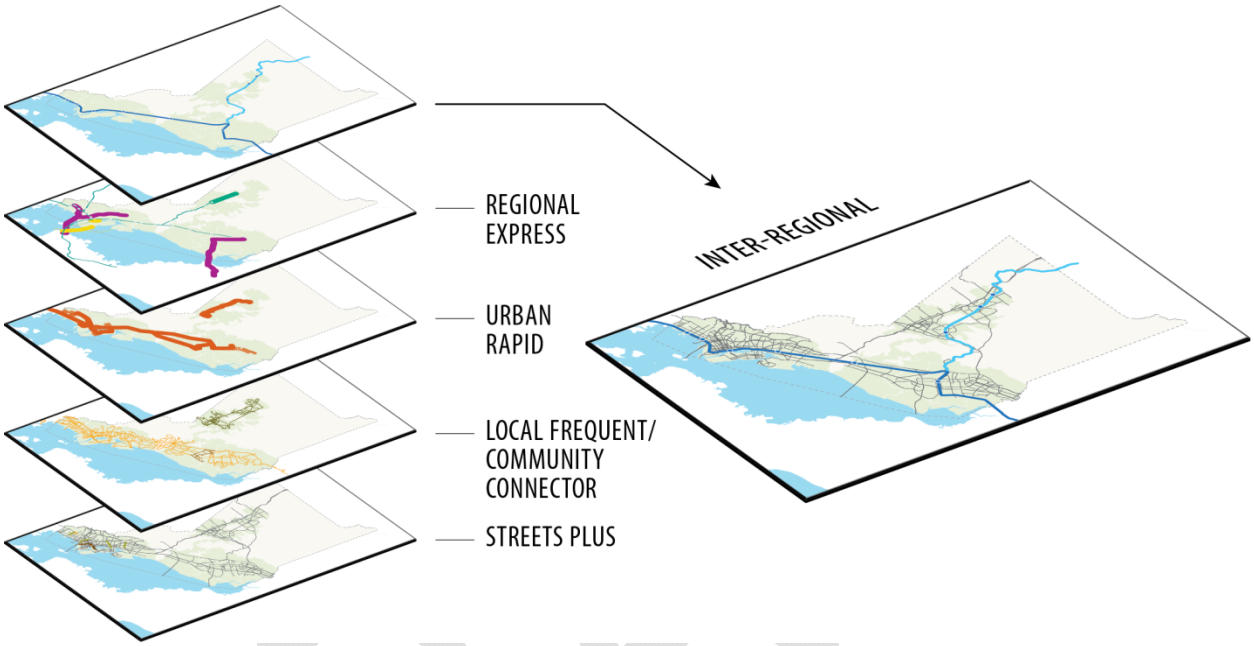
Inter-regional transit service is a key component of our transit network because it connects Alameda County to the greater Northern California mega-region and the state and provides a much needed transit alternative to congested roadways. Higher speed (125 miles per hour or faster) inter-city rail services could provide a new inter-city transportation option that currently does not exist in California. The two primary providers of inter-regional rail service, Capitol Corridor and ACE, are currently developing vision plans for future service improvements. Rather that presuppose the outcomes of these efforts, the Countywide Transit Plan will incorporate the recommendations that are ultimately adopted. Consequently, this memorandum describes the planning efforts currently underway and their relationship to other transit services in Alameda County.

The Local Frequent and Community Connector tiers generally do not require major infrastructure investments at stops or in the street right-of-way to deliver service. For this reason, this memorandum does not make specific recommendations for improvements to transit services within these tiers. Instead, the Countywide Transit Plan will describe the importance of these services in terms of the critical first- and last-mile connectivity they provide to Regional Express, Urban Rapid and Inter-Regional transit services and will incorporate these tiers into system and network integration recommendations made as part of the final plan.

The Streets Plus tier is the layer upon which all bus service operates – our roadways. Independent from the corridor transit improvements that are described in the Regional Express and Urban Rapid tiers, there are physical roadway improvements that would improve operations overall for transit which are described for the Streets Plus layer. The Draft Network Recommendations focus on key roadway segments that are of critical importance for Alameda County's surface transit network. In addition, the Countywide Transit Plan will also address best practices in street and urban design that facilitate transit operations and access.

Following is a discussion of potential improvements for each transit tier, with the focus of the Draft Network Recommendations being on the Regional and Urban Rapid tiers.

Inter-Regional Tier



As stated previously, the two primary providers of inter-regional rail service, Capitol Corridor and ACE, are currently developing vision plans for future service improvements. Rather that presuppose the outcomes of these efforts, the Countywide Transit Plan will incorporate the recommendations that are ultimately adopted. Consequently, this memorandum describes the planning efforts currently underway and their relationship to other transit services in Alameda County.

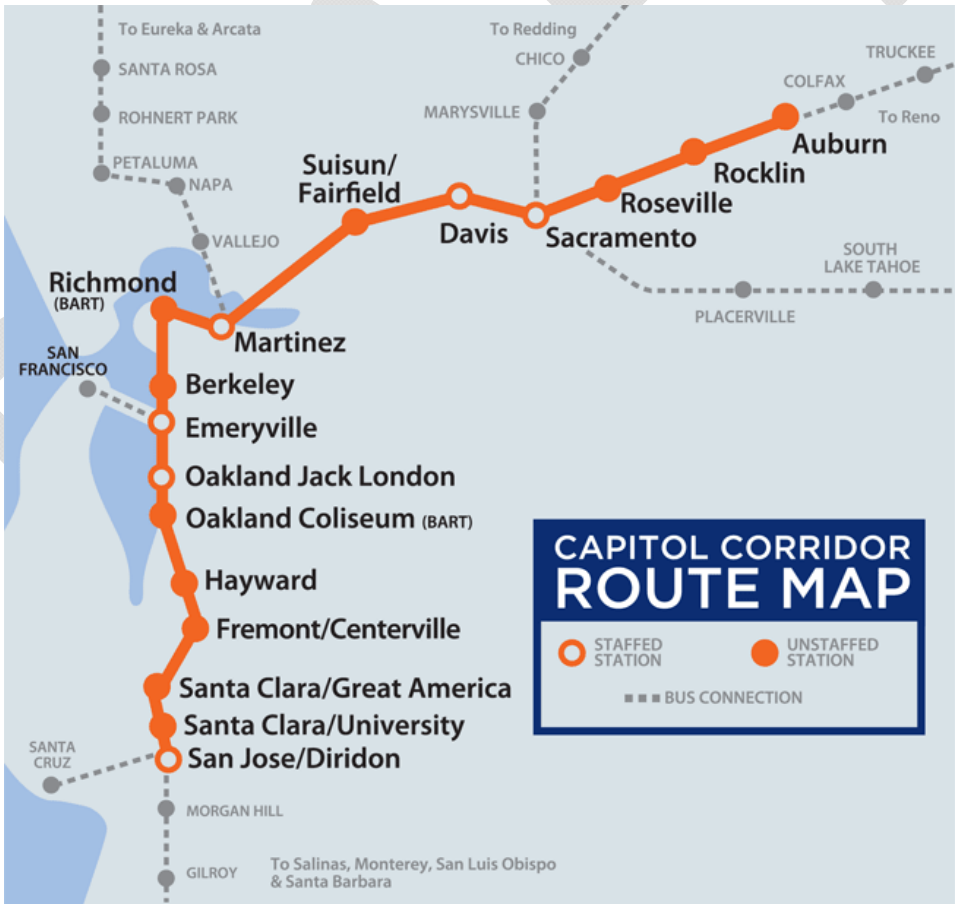
For both Capitol Corridor and ACE, one of the primary objectives for future planning efforts is to increase the frequency of service and reduce travel times. Another key consideration for both planning efforts is creating a direct connection to BART in Alameda County and thus connecting the Inter-Regional and Regional Express transit service tiers within the county. Currently, the Capitol Corridor station and BART station are co-located at the Coliseum stop in Oakland; however, passengers must walk several hundred feet and traverse several stairways to move between the two services. Currently, the only connection between ACE service and BART is via connecting bus or shuttle transit in the Tri-Valley or Fremont.

In addition to the lack of direct connections between Inter-Regional transit services and Regional Express services, the fact that both Capitol Corridor and ACE share rail right-of-way with Union Pacific freight operations is a significant limitation in the ability to expand service frequency. Union Pacific (UP) owns the right-of-way on which both Capitol Corridor and ACE operate, and the passenger rail operators purchase "slots" from UP during which they can operate passenger service. This shared operating environment also limits the amount of freight rail traffic that can traverse the right-of-way.

Capitol Corridor Vision Plan

In their 2014 update to the Capitol Corridor Vision Plan, the Capitol Corridor Joint Powers Authority identified short-term, mid-term, and long- term improvements for their service. Capitol Corridor is expected to complete its Vision Planning effort in 2016. Figure 12 shows the current Capitol Corridor route map.

Figure 12. Capitol Corridor Current Route Map



Source: Capitol Corridor

Short-term improvements are focused on increasing the number of daily round trips from 7 to 11 between Oakland and San Jose. This would require rail infrastructure improvements to allow the growth in passenger and freight rail service. A realignment of service south of the Oakland Coliseum is also under consideration to facilitate travel time savings and better operating patterns. This would affect service to the Hayward and Fremont stations.

Mid-term improvements would allow the expansion from 11 to 15 daily round-trip trains between Oakland and San Jose. The exact mix of infrastructure improvements have not been identified, but they would likely include double or triple-tracking the segment over the Alviso wetlands (Don Edwards San Francisco Bay National Wildlife Refuge).

For long-term improvements, multiple options for different alignments throughout Alameda County have been identified to address constraints on the system that result from the joint operation of freight and passenger service in the Union Pacific Railroad right of way (ROW). These long-term improvements, which would potentially include creating a dedicated ROW for passenger rail service, electrification, and operating speeds of 125 miles per hour or greater, would enable Capitol Corridor to achieve a travel time between Sacramento and Oakland of one hour and between Oakland to San Jose of 30 minutes and improve frequencies to every 15 minutes during peak periods.

The following potential improvements have been identified for the three segments of the Capitol Corridor rail in Alameda County.

Central Oakland to Richmond

Improvements in this section are focused on the creation of dedicated passenger tracks expanding the existing 100-foot ROW an additional 20 to 30 feet between Grand Avenue and 65th Street to separate passenger and freight operations. A grade-separated option was identified only for the southern sections with an underground alignment beneath Mandela Parkway in Oakland, with the potential to connect to a new BART transbay tube.

Central Oakland

The current surface rail operations in downtown Oakland are neither safe nor efficient and they impede access to Jack London Square. Options for improvements are limited by the Webster and Posey tubes that provide access to Alameda. Three potential grade-separated options have been identified for further exploration:

- Grade-separated passenger/freight tracks on the existing alignment would require closure of streets to facilitate the grade-separation of track and provide a

new parking facility with a pedestrian overpass connecting to Jack London Square.

- Fifth Street subway would realign rail service to Fifth Street just north of I-880 traveling in either a subway or elevated guideway and connecting to a new right-of-way along the BART alignment; connecting Capitol Corridor to the West Oakland BART station.
- Tunnel under downtown Oakland would construct a deep-bore tunnel 3 to 5 miles in length under downtown Oakland between the Lake Merritt Channel and I-580 in Emeryville. This would facilitate a connection with the 19th Street BART station.

Oakland Coliseum to San Jose

Speed and capacity are the key issues in this segment, as large sections of the alignment have only a single track, limiting maximum speeds, operational flexibility, and service frequencies. The service currently runs on the Coast Subdivision from San Jose to the Niles Cutoff in Fremont where it transitions to the Niles Subdivision to continue to Oakland. Long-term options for improving service include realignment to generate additional freight and passenger capacity. Three options have been identified thus far.

- Coast Alignment – This option would realign Capitol Corridor service to the Coast Subdivision along the bay shoreline from San Jose, rejoining the Niles Subdivision just south of the Oakland Coliseum. Portions of the Coast Subdivision would have to be reconstructed to account for sea level rise.
- Inland Alignment – This option would use the Warm Springs Subdivision transitioning to the Niles Subdivision in Newark between I-880 and I-680. It would stay on the Niles Subdivision to Jack London Square.
- Hybrid Alignment – This option would stay on the Coast Subdivision transitioning at the Niles Subdivision to the Oakland Subdivision where it would continue through to just north of the Oakland Coliseum. This option would facilitate the development of the Union City Intermodal Rail Station that is identified as a project in the RTP and the Measure BB Transportation Expenditure Plan (TEP).

Altamont Corridor Express

The San Joaquin Regional Rail Commission (SJRRC) has initiated the ACE*forward* Program (ACE*forward*) in an effort to modernize the existing rail service. The focus of ACE*forward* is on near-term improvements and the extension of the existing ACE service to increase the frequency of service, reduce travel times, and expand ACE to additional markets in the Central Valley. ACE*forward* is actively planning to increase service between Stockton and San Jose from the current 4 daily round trips to 6 daily round-trips by 2018 and 10 daily round-trips by 2022. This will require siding

improvements at multiple locations, grade separations, new track connections, and a maintenance facility expansion as well as new rolling stock.

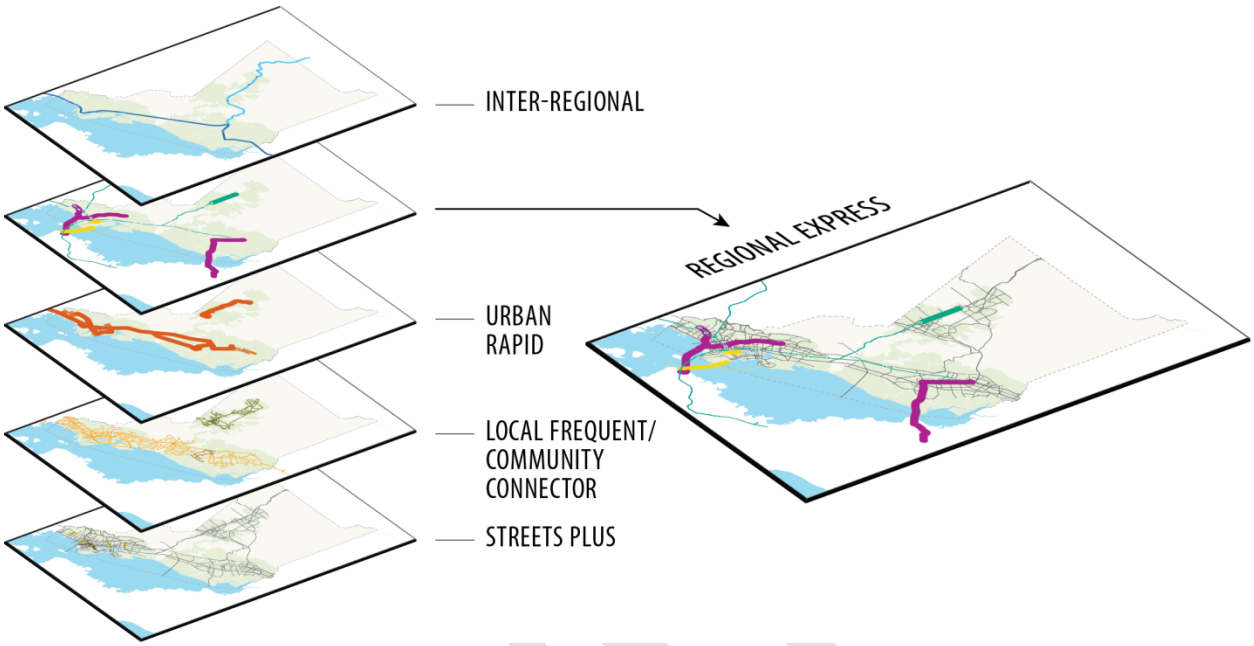
ACE also has plans to extend ACE service to the downtowns of Manteca, Modesto, Turlock, and Merced. Stations in downtown Tracy, Ripon, Livingston, Atwater, and a new Lathrop station at River Islands are also under consideration. The extension of ACE to Merced will provide a direct connection to the Initial Operating Segment of the California High-Speed Rail service. Figure 13 maps the potential improvements being considered as part of ACE*forward*.

Figure 13. 2040 ACE*forward* Map

Source: Altamont Corridor Express (ACE)

A separate white paper is being prepared in conjunction with the Goods Movement Plan to lay out an integrated strategy for Alameda CTC on the integration of goods movement and passenger rail service. The recommendations will be incorporated into the final Countywide Transit Plan.

Regional Express Tier



Although the services within the Regional Express tier extend beyond Alameda County, these services form the backbone of the transit system serving the county and carry a significant portion of the county's transit riders. The capacity of the existing BART system is severely stressed at the same time that major system expansion is underway. Investment in the core BART system has been identified as a critical need to serve the growing demand on the system and to support the planned expansions. These core capacity improvements, which include fleet replacement and expansion, upgrades to the Hayward Maintenance Facility, and train control modernization, are also the key to facilitating planned expansion of the BART system.

The market analysis that was conducted shows the strongest market for regional travel is from the Berkeley and Oakland areas to San Francisco, with additional strong markets in San Leandro, Hayward, and Fremont. A strong regional market was also identified between Fremont and Palo Alto. There is also an established market for BART services in East Alameda County; and it is assumed that this market will continue to be served by BART and improvements that are already planned.

The Draft Transit Network Recommendations include additional transbay BART capacity for the future. This additional capacity is contingent upon the ability to implement the core capacity improvements to BART outlined above. In the near-term,

the ferry system and regional express buses can provide additional capacity in Alameda County to meet this regional transit demand.

As in the Inter-regional service tier, there are multiple studies that have been completed or are underway that would impact Regional Express service in the future. The potential improvements that have been identified in Alameda County are briefly summarized below. As detailed studies for these projects have not yet been completed at the regional level, specific improvements are not recommended at this point. They are described here as context for the recommended Draft Transit Network Recommendations to the Regional Express service tier.

BART Sustainable Communities Operations Analysis Study

Similar to the approach for delivering transit in the Alameda Countywide Transit Plan, the BART Metro Core and Metro Commute Strategy outlined the strategies for BART service in the future in the BART Metro Core area, defined as the area between Daly City and Richmond, MacArthur, and Bay Fair stations. These are the segments of the BART system where transit can be competitive with driving for all types of trips throughout the day. The Metro Commute area was defined by BART as the area where transit would be competitive primarily for peak period trips into congested job centers.[21]

The Sustainable Communities Operations Analysis Study developed service strategies outlined in the BART Metro Core and Metro Commute Strategy and identified the capital improvements that were prerequisite to meet its objectives for quality of service and to meet the projected ridership increases in the Bay Area. As ridership grows, BART has identified the following investments that are prerequisite to their service plans for the Metro Core and Metro Commute system and service expansions to the Oakland Airport, Warm Springs and Berryessa, and eBART to Antioch:[22]

- Increase the BART fleet size;
- Improvements to the Hayward maintenance facility;
- Station improvements at Embarcadero, Montgomery, and possibly in downtown Oakland; and
- Modernized train control system.

Enhancement projects were identified to deliver more cost-effective and reliable service:

- New or upgraded crossovers at Daly City/Colma, 24th/Mission, Richmond, South Hayward, Lafayette, and Pleasant Hill;
- Tail track extensions at Millbrae and Dublin;

[21] BART Metro, www.bart.gov/about/projects/future/faq, September 6, 2015.
[22] BART Sustainable Communities Operations Analysis, June 2013, Nelson\Nygaard and Arup for BART.

- Highway Barrier Improvements on the Dublin line;
- Turnback facilities at Glen Park and Bayfair; and
- Maintenance facilities at Millbrae and Colma.

These improvements would result in the ability to provide peak period base headways initially at 15 minutes and ultimately to 10 minutes as transbay capacity improvements are made.

BART Vision Plan

The BART Vision Plan identified multiple potential improvements for the BART system in the future. Those that are proposed for Alameda County are summarized below.

Station Capacity Improvements

Potential station capacity improvements have been identified for the 12th and 19th Street stations in downtown Oakland. Union City Intermodal, Jack London Square, and Lakeshore Avenue are all identified as potential station expansion locations. The latter two would be considered in association with a potential new transbay tube.

Potential Infill Stations

Multiple locations have been identified for potential BART infill stations in Alameda County. A total of nine potential infill stations have been identified: Solano Avenue in Albany; West Oakland Intermodal, 51st/Children's Hospital, San Antonio District, 55th Avenue, and 98th Avenue in Oakland; Whipple Road in Union City; and Irvington and Shinn in Fremont. Most of these stations are located in areas that were identified as highly competitive transit markets.

Track Improvements

Two phases of track improvements are proposed:

- Dublin-I-580 high speed intrusion barrier (Phase 1)
- Dublin/Pleasanton tail track storage extension (Phase 1)
- Bayfair Connector (provides a southbound connection for trains between the Tri-Valley to Hayward and points south (Phase 2)

Capacity Expansion

In addition to a study of expanded transbay service discussed below, two additional potential capacity expansions have been identified for Alameda County:

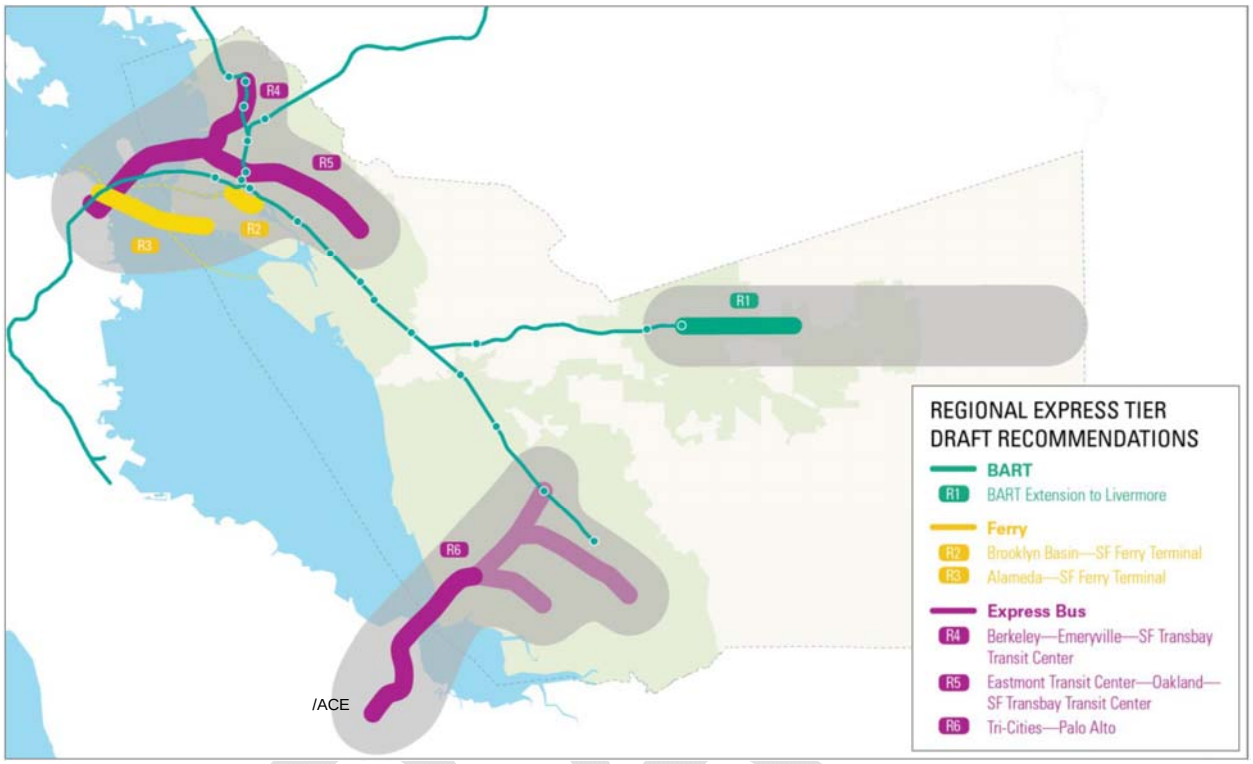
- BART to Livermore/ACE – The planned extension of BART to Livermore/ACE is currently in environmental review and is discussed in greater detail in the following pages.
- Eastshore Corridor – A potential new Eastshore Corridor would extend from West Contra Costa County (including an extension north of Richmond BART station) south to the Coliseum BART station. Though the specific alignment and technology have not been specified, it could potentially run along the East Bay shoreline, to the west of the current BART alignment.

MTC Core Capacity Study

This study, which was initiated by MTC in conjunction with BART, AC Transit, San Francisco Municipal Transportation Agency (SFMTA), and the San Francisco County Transportation Authority (SFCTA), is exploring the potential for a second tube under the Bay connecting Alameda County and downtown San Francisco. This study will also evaluate nearer term solutions such as additional transbay bus service, bus only lanes on the Bay Bridge, and improvements at the downtown San Francisco BART/Muni stations. The purpose of this study is to focus on solutions to alleviate the transit capacity constraints in the system.

As recommendations come forward from these studies, the proposals will be incorporated into the Countywide Transit Plan future updates. Given the timing and the regional nature of the studies, it is premature to recommend specific improvements for Alameda County at this time.

Regional Express Tier Draft Recommendations



It is important to note that all of the Draft Transit Network Recommendations presented here are conceptual. In other words, specific routing alignments and termini have not been determined, and subsequent studies and environmental analyses will be required to determine potential alignments, specific routing, and specific capital and operating improvements.

In addition to the potential regional transit improvements discussed above, regional transit investments for Alameda County were identified in the 2040 Regional Transportation Plan (RTP) *Plan Bay Area*. These improvements, summarized below, are assumed to be in place as part of the baseline Regional Express network in 2040:

- BART Extension to San Jose/Santa Clara (includes the extension to Warm Springs in Alameda County)
- New Transbay Transit Center
- Irvington BART Station
- Dumbarton Express Bus Frequency Improvements

- Ferry service between Berkeley and San Francisco[23]

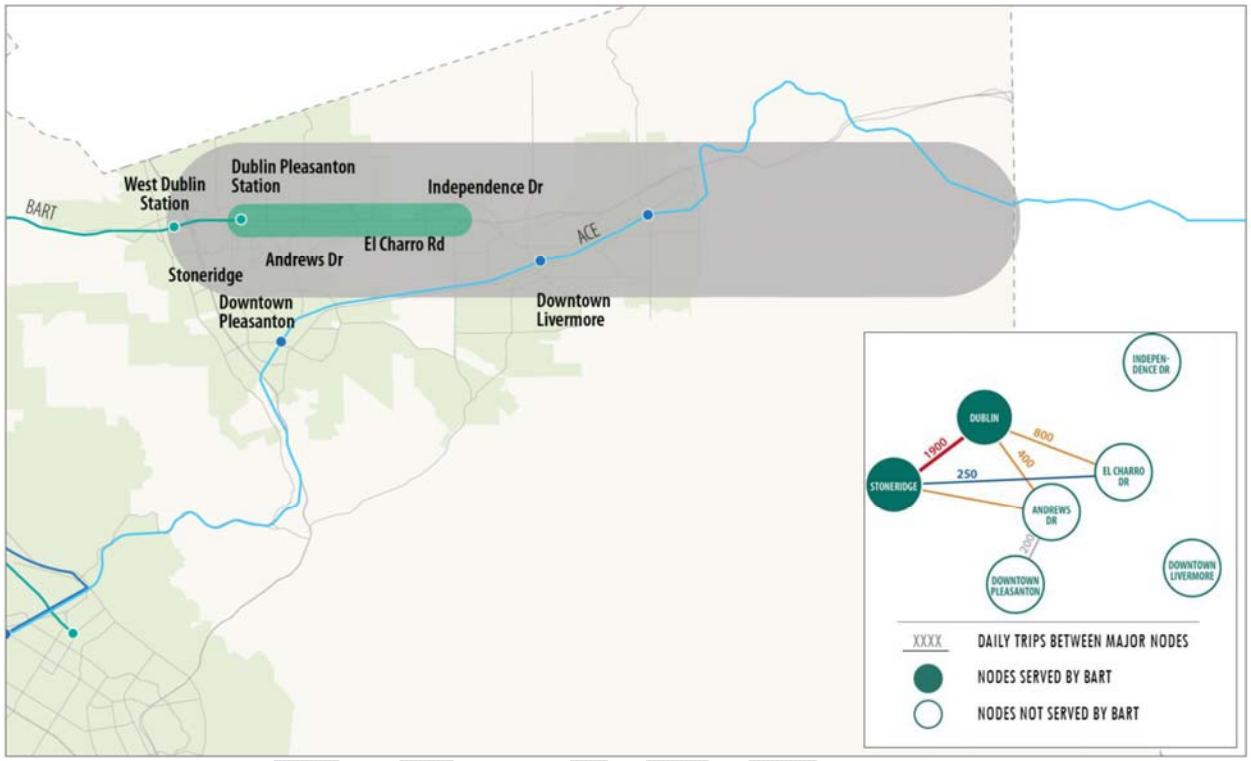
Measure BB identified two of the regional projects from the RTP to be funded through the Alameda County sales tax measure and identified funding for four additional BART projects that are focused on the core capacity improvements discussed above, as well as the BART to Livermore/ACE extension.

- Dumbarton Corridor Area Transportation Improvements
- Irvington BART Station
- BART to Livermore/ACE
- BART station upgrades and system improvements
- BART Metro Bayfair Connector Project
- BART station modernization

Five draft recommendations to the Regional Express tier were identified after review of travel demand markets and on-going regional planning efforts. These are described below.

[23] Operating and capital funds for implementing Berkeley Ferry service have not yet been fully secured.

R1 BART Extension to Livermore/ACE

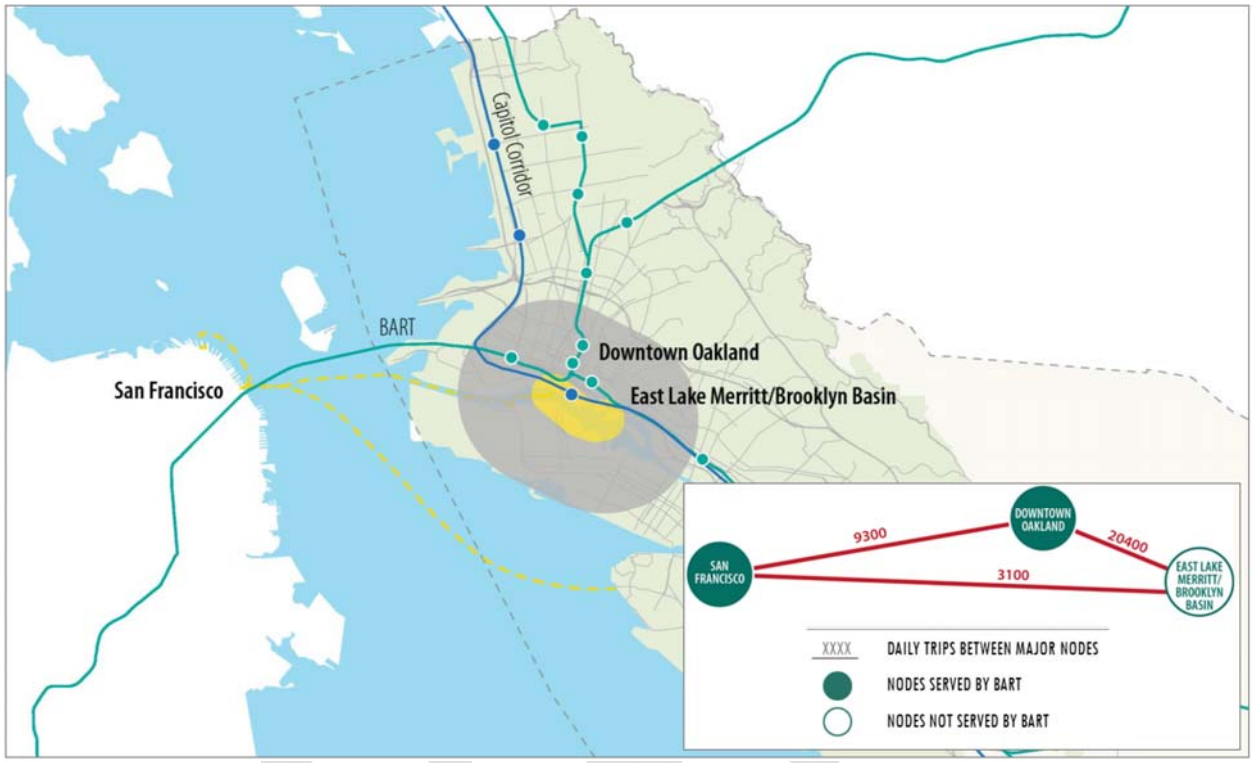


R1. BART Extension to Livermore/ ACE

This connection was identified as an inter-regional link in the San Francisco Bay Area Regional Rail Plan (2007). A draft Environmental Impact Report is currently being prepared for the extension to Livermore/ACE; therefore it is included as a potential network modification in this countywide transit plan. A potential intermodal connection with ACE is also under consideration. This project has the potential to improve mobility between the Tri-Valley and other parts of the region and the potential to provide an alternative to the severe congestion on I-580.

More precise definitions of alternatives, or additional alternatives, as well as more detailed analysis of the demand will be completed during preparation of the Draft EIR. Project alternatives currently under consideration include a No Build alternative, a Diesel Multiple Unit or Electric Multiple Unit (DMU/EMU) alternative, an Express Bus/Bus Rapid Transit (BRT) alternative, and an Enhanced Bus alternative. For the purposes of this network development task, the first phase of the BART rail extension to Isabel has been identified.

R2 Brooklyn Basin - SF Ferry Terminal



R2. Brooklyn Basin - SF Ferry Terminal

This regional project would provide ferry service between Brooklyn Basin and San Francisco Ferry terminals via Jack London Square. This project would build upon existing successful service currently operated by WETA from Jack London Square and Main Street Alameda to San Francisco and provide an alternative to the increasingly congested Bay Bridge and transbay BART tunnel for the travel demand anticipated between Brooklyn Basin and San Francisco. Intermodal connections are available near both terminals.

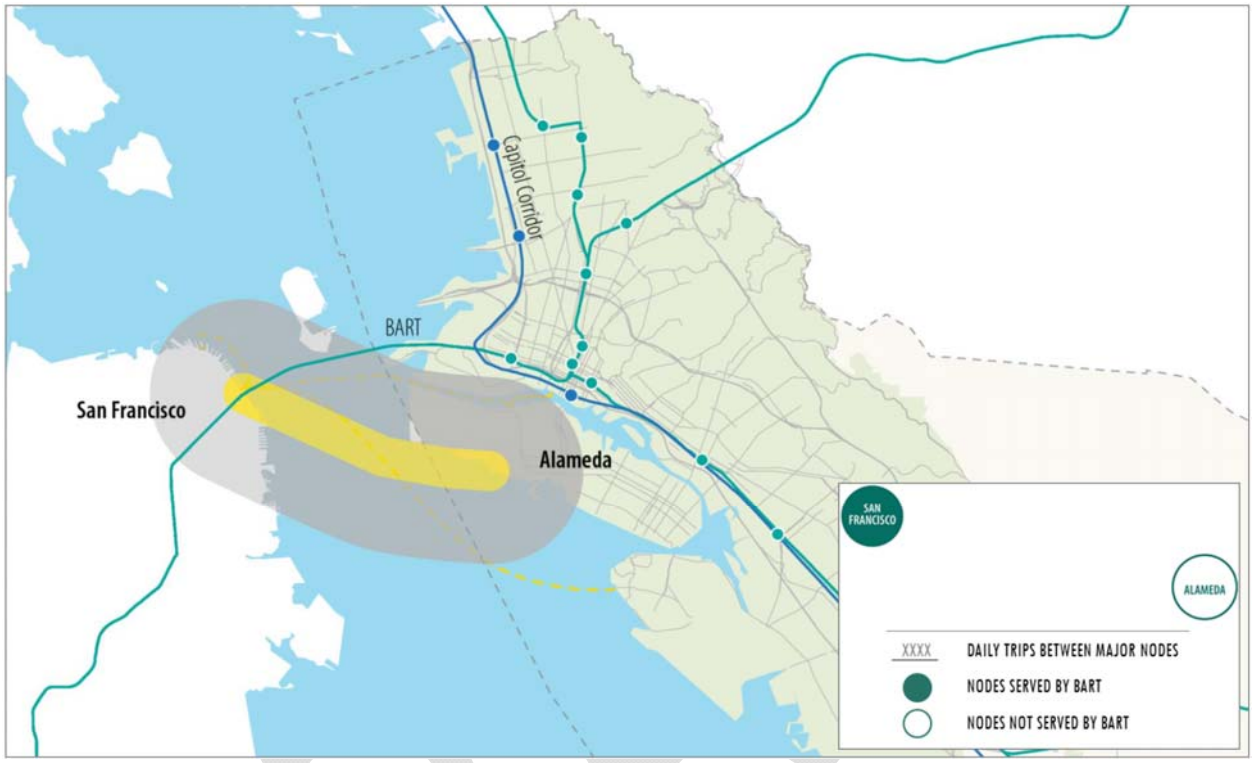
Draft recommended capital improvements include:

- New vessels
- New terminal facilities at Brooklyn Basin

Draft recommended service levels include:

- 15 hours of service
- 30 to 60 minute headways
- 40 to 45 minute trip time from Brooklyn Basin to San Francisco

R3 Alameda - SF Ferry Terminal



R3. Alameda - SF Ferry Terminal

This regional project would provide ferry service between a new ferry terminal at the Alameda Point development, and the San Francisco Ferry terminal, consistent with the adopted plans for Alameda Point. This project would provide an alternative to the increasingly congested Bay Bridge, Alameda Posey and Webster Street tubes, and Transbay BART tunnel. Service would need to be considered in light of other ferry services that are provided throughout the region, particularly the existing Harbor Bay ferry service.

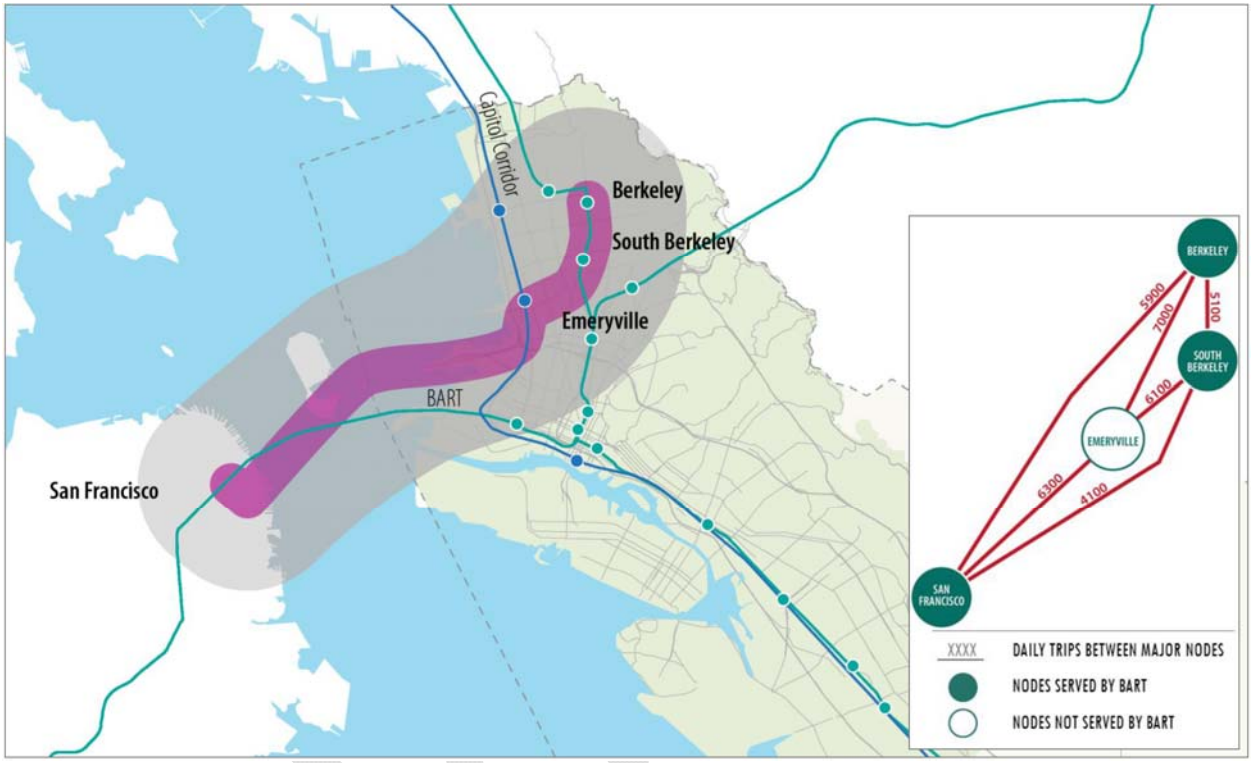
Draft recommended capital improvements include:

- New vessels
- New terminal facilities at Alameda Point

Draft recommended service levels include:

- 15 hours of service
- 30 to 60 minute headways
- 15 to 20 minutes trip time between Alameda Point and San Francisco

R4 Berkeley - Emeryville - SF Transbay Transit Center



R4. Berkeley - Emeryville - SF Transbay Transit Center

This project is an upgrade to the existing F-Line operated by AC Transit and would serve the northern transbay transit market between Berkeley, Emeryville and downtown San Francisco. It would also support local service between Berkeley and Emeryville.

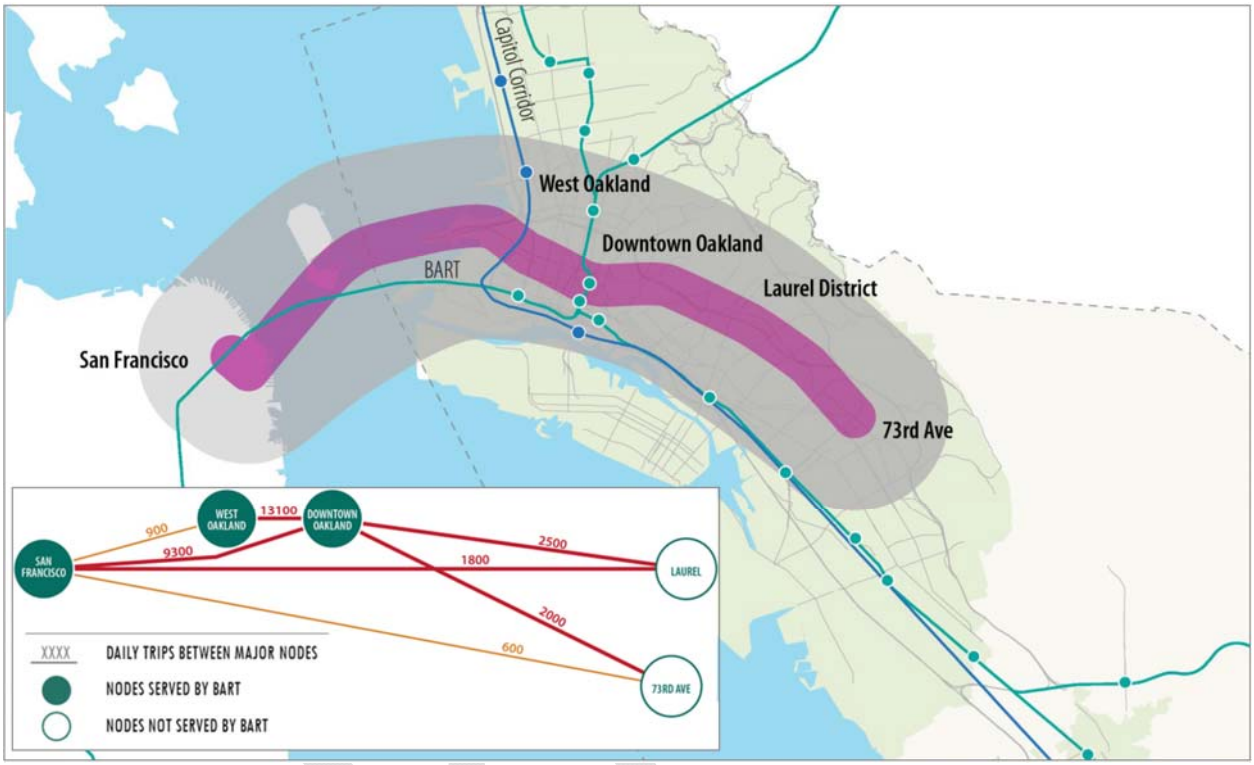
Draft recommended capital improvements include:

- Bus bulbs
- New buses
- Primarily dedicated transit lanes with some semi-exclusive, and mixed-flow lanes
- Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control
- Queue jumps

Draft recommended service levels include:

- 20 hours of service
- Transbay and local 10 minute headways
- 40 minutes trip time transbay

R5 Eastmont Transit Center - Oakland – SF Transbay Transit Center



R5. Eastmont Transit Center - Oakland - SF Transbay Transit Center

This project is an upgrade to the existing AC Transit route NL that operates along MacArthur Boulevard and serves Mills College and the Eastmont Transit Center. It also serves multiple local routes, including Line 57. The routes currently experiences relatively high ridership and relatively poor on-time performance - 64% for Line NL and 54% for Line 57. This project is consistent with recommendations in the AC Transit Major Corridors Study.

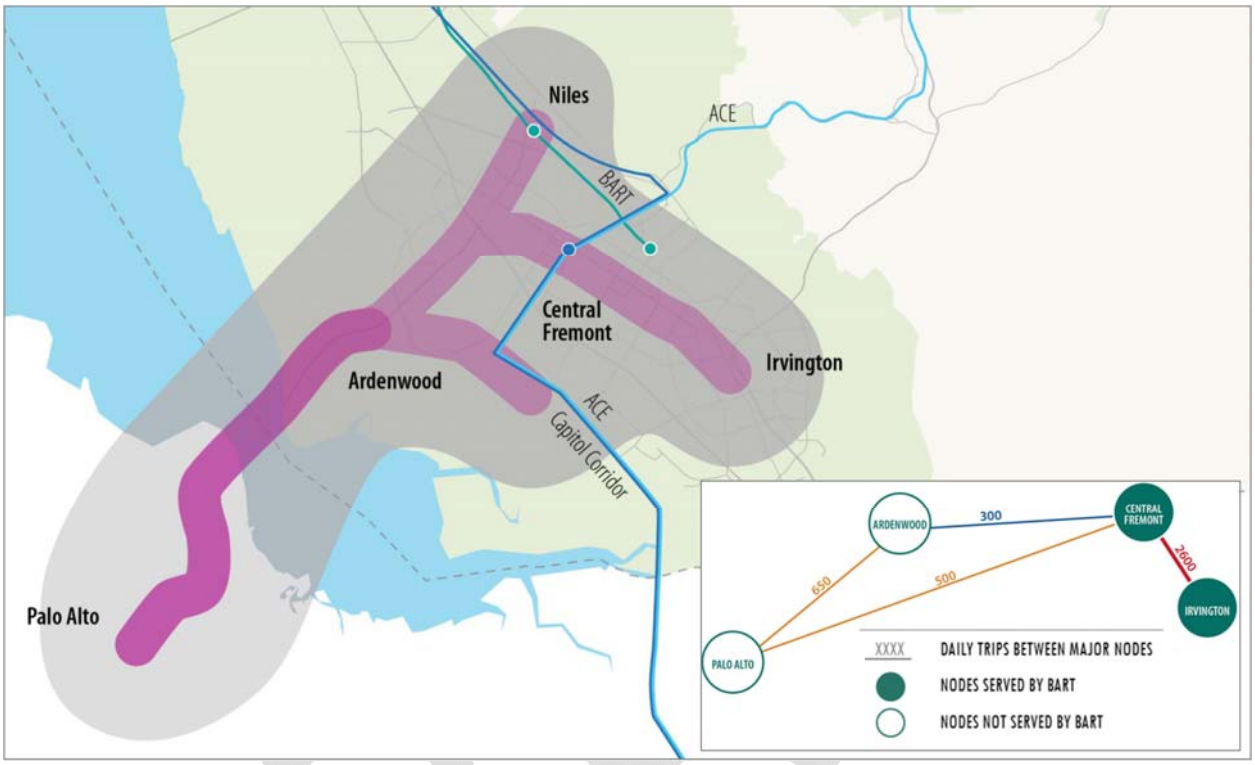
Draft recommended capital improvements include:

- New buses
- Portions of the route operating on dedicated or semi-exclusive lanes
- Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control

Draft recommended service levels include:

- 20 hours of service
- 10 minute headways
- 16 miles
- 45 minute trip time transbay

R6 Tri-Cities - Palo Alto



R6. Tri-Cities - Palo Alto

This project is an upgrade to the existing bus lines operating on the Dumbarton Bridge including the U, DB, and DB1 lines operated by AC Transit that serve the transbay market between the Tri-Cities area (Union City, Newark, and Fremont), Ardenwood, and Palo Alto. A study is planned to evaluate these services and determine the appropriate terminus points and types of improvements, which might include expanded park-and-ride facilities to capture more transit riders in Southern Alameda County. Recommendations for this corridor will be further and development and refined through future studies to define the Dumbarton Corridor Area Transportation Improvements.

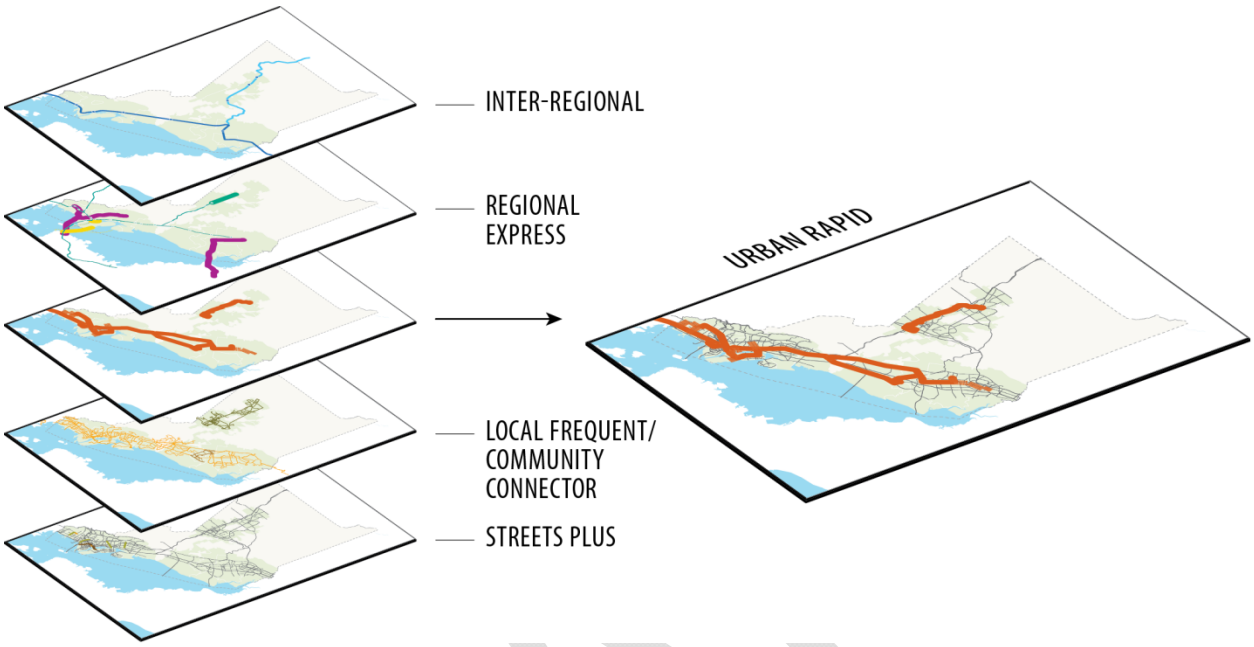
Draft recommended capital improvements include:

- New buses
- Portions of the route operating on dedicated bus lanes
- Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control
- Expanded park-and-ride facilities

Draft recommended minimum service levels include:

- 16 hours of service
- 15 minute headways
- 1 hour trip time

Urban Rapid Tier



Most of the proposed network modifications included in this technical memorandum fall into the Urban Rapid tier. Key characteristics of the urban rapid tier include frequent all-day service, transit signal priority (TSP), and roadside preferential treatments such as bus bulbs, queue jumps or transit priority lanes. Light Rail, Bus Rapid Transit (BRT), Rapid Bus, and Enhanced Bus services fall into this category. Often the routes are separately branded and have additional amenities at stops including high quality shelters, lighting, and next bus arrival displays.

Seven potential corridors have been identified for Urban Rapid improvements in Alameda County. The type of transit service envisioned has the potential to:

- Effectively improve the frequency and reliability of bus service when properly implemented (See Table 1 and Table 2 for a description of the type of priority treatment and expected levels of operational improvement.)

Table 1. Reported Benefits Associated with Transit Signal Priority

Location	Type of Priority	Reported Benefits
Los Angeles	Extension, Truncation	7% bus travel time reduction
Chicago	Priority, Pre-emption	12 to 23% bus travel time reduction
Bremerton, WA	Pre-emption	Average 10% bus travel time reduction
Portland, OR	Extension, Truncation	5 to 12% bus travel time reduction
Anne Arundel County, MD	Pre-emption	13 to 18% bus travel time reduction, 4 to 9% impact on other traffic

Source: Transit Capacity and Quality of Service Manual 2nd Edition

Table 2. Roadway and Stop Treatments Associated with Urban Rapid Tier

Treatment	Bus Travel Time Improvements	Vehicle Delay Impacts	Additional Considerations
Bus-activated signal phases	up to 10%	Minimal	Applications may include special bus detection technologies that distinguish buses from general traffic.
Bus signal priority	3-15% of overall travel time, up to 75% of signal delay	Minimal to significant, highly dependent on the strategy and location	Travel time improvements are a function of the existing signal delay.
Bus signal preemption	Up to 20%, up to 90% of signal delay	Potentially significant	Potential disruptions to signal coordination and transportation capacity
Dedicated Bus Lanes (Business Access and Transit Lanes)	5-25% reduction in travel time through the segment	Depends on level demand on roadway and implementation	Can be implemented during peak periods or all-day. Can be combined with peak period parking restrictions to avoid taking a lane of travel.
Special bus turn provisions	Depends on route	Minimal	Safety concerns may require changes to signalization for bus-only movement.
Queue Jump 5	5-25%	None, if using existing turn lane	Advance green at the intersection may facilitate exit from queue jump lane.
Curb Extensions	Not enough data	Potentially significant	Potential impacts to general traffic.
Boarding Islands	Not enough data	Potentially significant	Potential impacts to general traffic.
Stop Consolidation	3-20% of overall run time, up to 75% of dwell time	None	Accessibility to transit service is reduced.

Source: Transit Capacity and Quality of Service Manual 2nd Edition

- Address gaps identified in Technical Memorandum # 2 and the need to better serve strong transit markets.
- Increase ridership with an appropriate level of service
- Be flexible allowing customization for each unique market
- Be adaptable to unique characteristics of each corridor – key destinations, intermodal hubs, roadway network, etc.
- Be cost effective when compared to other modes (e.g. light rail)

What Changes can be Expected from Creating a Robust Urban Rapid Service Tier?

In recent years, other transit operators have faced similar speed and reliability challenges to those experienced by the bus operators in Alameda County. The idea of making bus travel more attractive and making physical infrastructure improvements to give priority to buses is not only becoming more common, but it is yielding positive results by increasing transit ridership.

Case Study – King County Metro Rapid-Ride

In the late 1990s Metro Transit was faced with degrading transit speed and reliability on routes that served several main corridors in their service area. In response, the agency decided to modify some of the high ridership routes on the most congested corridors to Urban Rapid characteristics.

Identification and Selection of Corridors

Sixteen initial corridors were identified for potential implementation. The list was screened down to three promising corridors based on addressing the following questions:

- *Would the service compete with regional rail projects?*
- *What is the ridership potential along the corridor?*
- *Would the BRT service provide significant connections for the riders?*
- *What is the potential for improvement in speed and reliability?*

After identifying the candidate corridors, Metro developed a Request for Proposals (RFP) for the jurisdictions along each of the identified routes and created a competition where jurisdiction had to respond to specific questions and commit to contributions such as implementing traffic operations changes, implement transit signal priority (TSP), expedite technical review and permitting, etc.

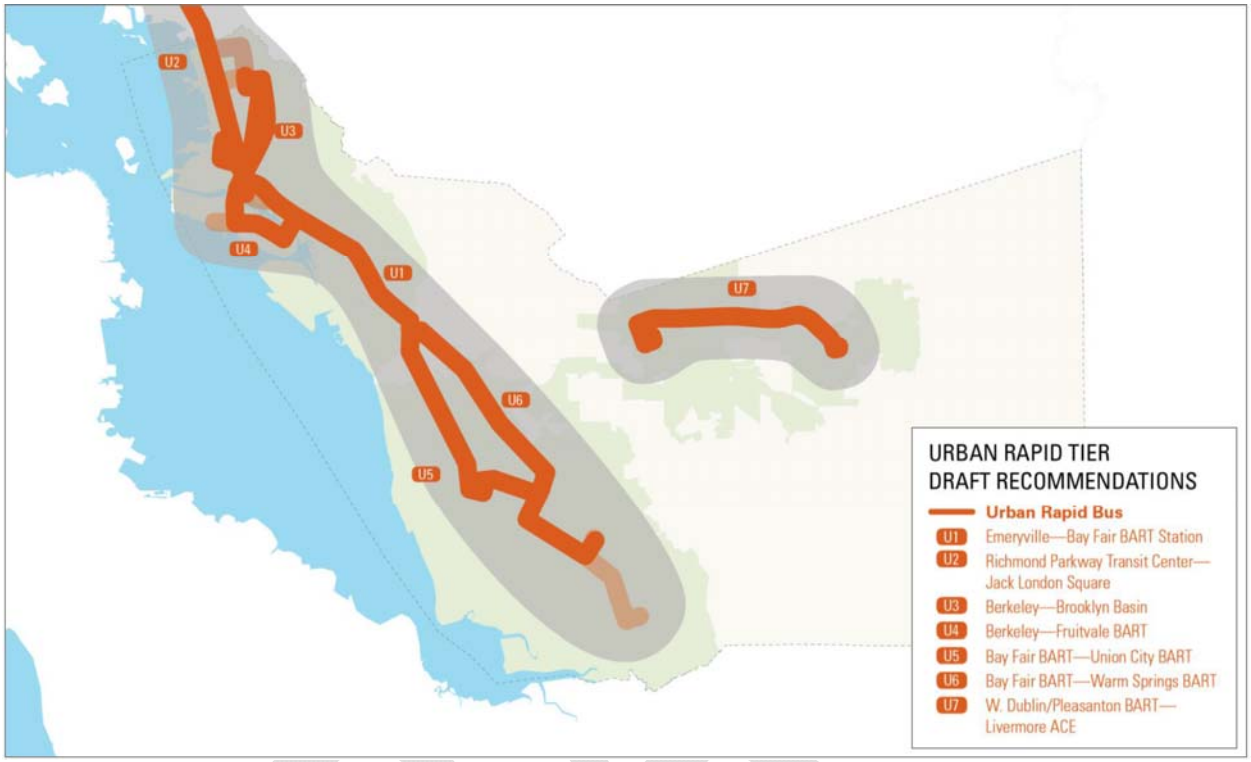
Results

The six King County Metro RapidRide corridors that went into operation between 2010 and 2014 (3 original corridors and 3 additional corridors) were successful in both improving operating performance and attracting new riders. Highlights of the program include:

- *Reliability – headway adherence ranges from 78% to 87%*
- *Ridership – ridership increases ranged from 20% to 81% from the start of service (2010 through 2014 depending on the route) to December 2014.*
- *Travel Time Reduction – Depending on the route the travel time decreased from 3% to 19% compared to previous operations.*

Additional information is available in Appendix C

Urban Rapid Tier Draft Recommendations



It is important to note that all of the Draft Transit Network Recommendations presented here are conceptual. In other words, specific routing alignments and termini have not been determined, and subsequent studies and environmental analyses will be required to determine potential alignments, specific routing, and specific capital and operating improvements.

In addition to the Urban Rapid transit improvements discussed above, major transit investments for Alameda County were identified in the 2040 Regional Transportation Plan (RTP) *Plan Bay Area*. These improvements, identified below, were assumed to be part of the baseline Urban Rapid network in 2040:

- East Bay BRT
- Grand-MacArthur BRT
- Alameda-Oakland BRT
- Dumbarton Express Bus Frequency Improvements

Measure BB identified similar projects for transit investment:

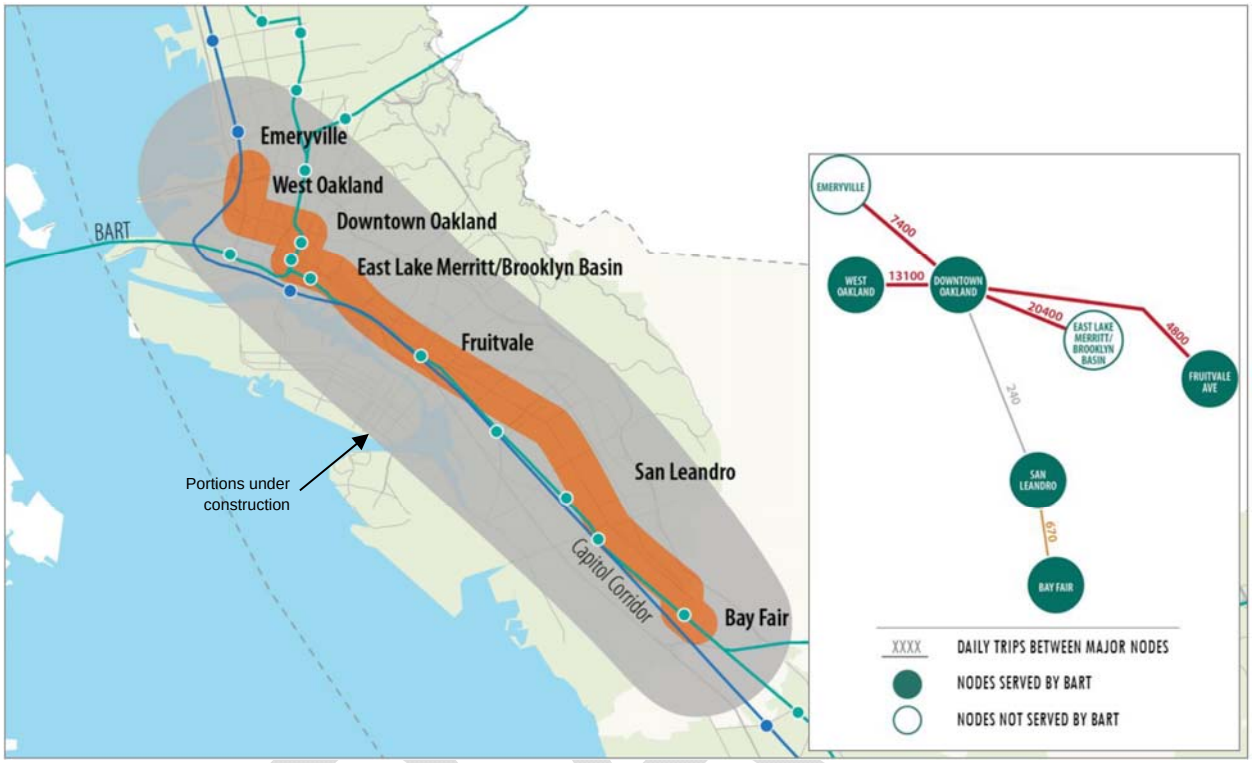
- Telegraph Avenue/East 14th/International Boulevard BRT (the segment from downtown Oakland to San Leandro is currently in construction)
- College/Broadway Corridor Transit Priority (currently in construction)
- Grand/MacArthur BRT
- Alameda to Fruitvale BRT

These recommendations are consistent with those included in this memorandum.

AC Transit is currently developing recommendations for transit investments as part of the Major Corridors Study. This study is looking at investments in multiple corridors in the East Bay, and the recommendations for the Countywide Transit Plan have been refined to be consistent with the recommendations that are being developed in the Major Corridor Study. Service levels are currently being assessed by both AC Transit and LAVTA as part of operational studies. The recommendations for these studies will be integrated with these studies to the extent possible.

The following recommendations for the Urban Rapid tier were identified through the market analysis and working in cooperation with the transit operators and local jurisdictions. These recommendations also include high ridership routes and routes that have already been included in the RTP, but have not yet been clearly defined, such as the Grand-MacArthur and the Alameda-Oakland BRT lines.

U1 Emeryville – Bayfair BART Station



U1. Emeryville - Bay Fair BART Station

This project links the East Bay BRT improvements on International Boulevard with a potential extension to Emeryville to serve emerging markets. AC Transit routes 1 and 1R are two of the most highly used routes in the system. They are also two of the worst performing routes in terms of on-time performance meeting their goal only 55% of the time. The route serves the north-south intra-county market in Oakland and Emeryville. This proposed modification overlaps with the East Bay BRT, which will extend from downtown Oakland to Downtown San Leandro.

Draft recommended capital improvements include:

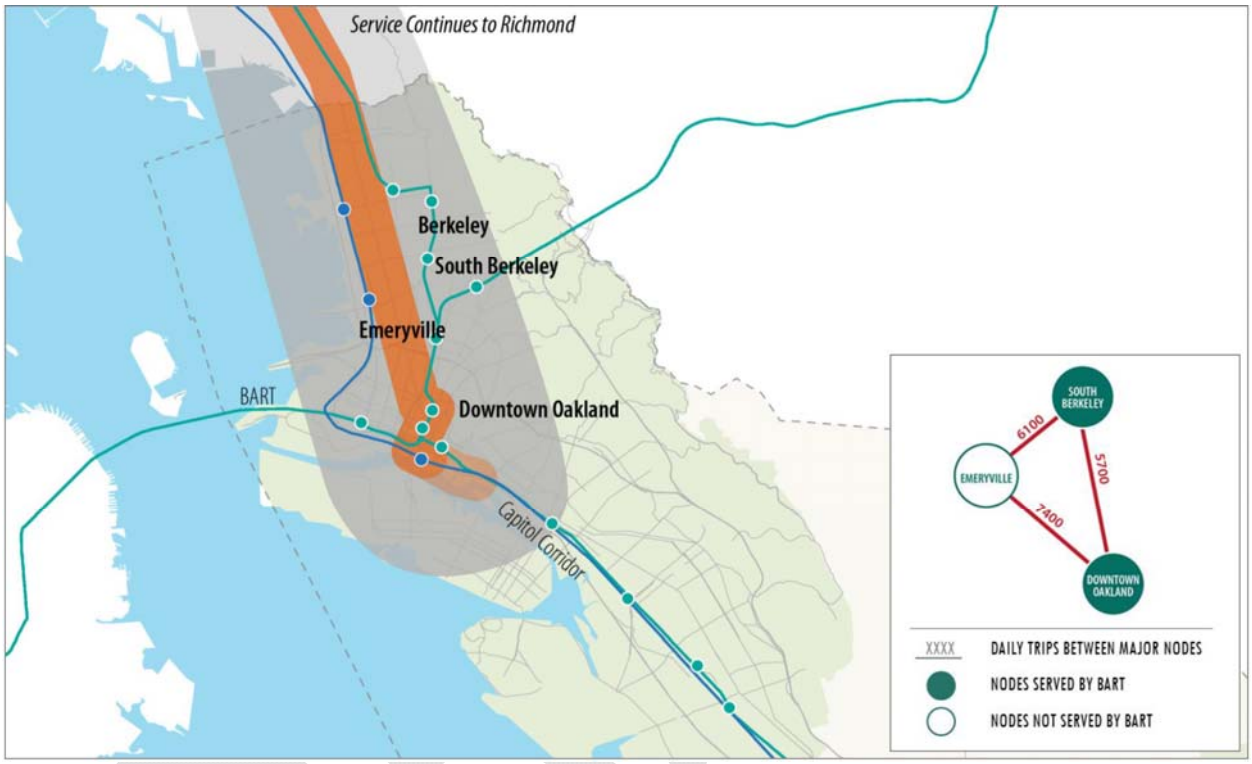
- New buses
- Large portions of the route operating on dedicated bus lanes
- Bus Bulbs
- Queue Jumps
- Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control

Draft recommended service levels include:

- 24 hours of service

- 5 minute headways
- 14 miles
- 36 minute trip time

U2 Richmond Parkway Transit Center – Jack London Square



U2. Richmond Parkway Transit Center - Jack London Square

This project is an upgrade to the existing AC Transit routes 72, 72M, and 72R, three of the more highly used routes in the system. They are also some of the worst performing routes in terms of on-time performance varying between 55% and 63% depending on the route. Service on this route extends into Contra Costa County to the Richmond Parkway Transit center. The line could terminate in Downtown Oakland or could be extended to serve Brooklyn Basin.

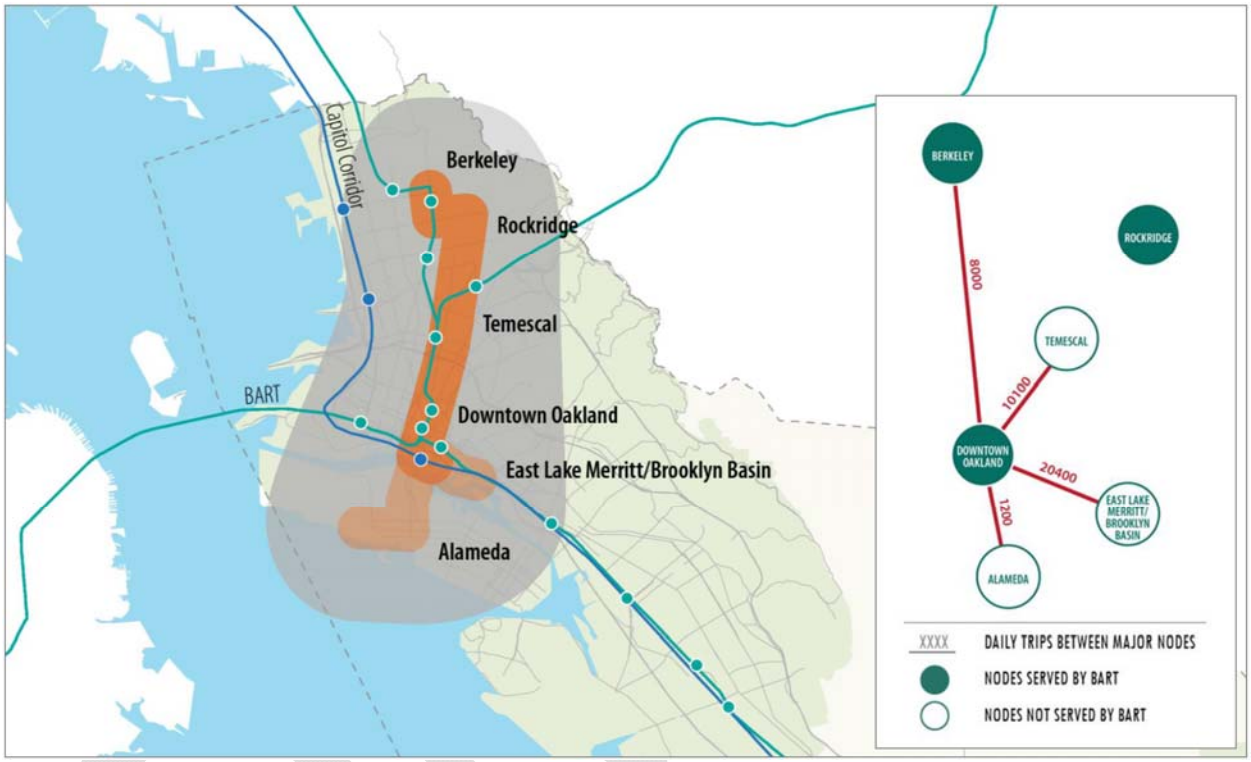
Draft recommended capital improvements include:

- New buses
- Bus Bulbs
- Portions of the route operating on dedicated or semi-exclusive lanes
- Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control

Draft recommended service levels include:

- 24 hours of service
- 5 minute headways
- 14 miles
- 38 minute trip time

U3 Berkeley – Brooklyn Basin



U3. Berkeley – Brooklyn Basin

This project is an upgrade to the existing AC Transit routes 1 and 1R that run on Telegraph Avenue and are two of the most highly utilized routes in the system. They are also two of the worst performing routes in terms of on-time performance meeting their goal only 55% of the time. The proposed project includes portions of the existing East Bay BRT and could potentially include an extension to Brooklyn Basin to accommodate the anticipated growth in this area, or an extension and incorporation of the proposed Alameda BRT.

Draft recommended capital improvements include:

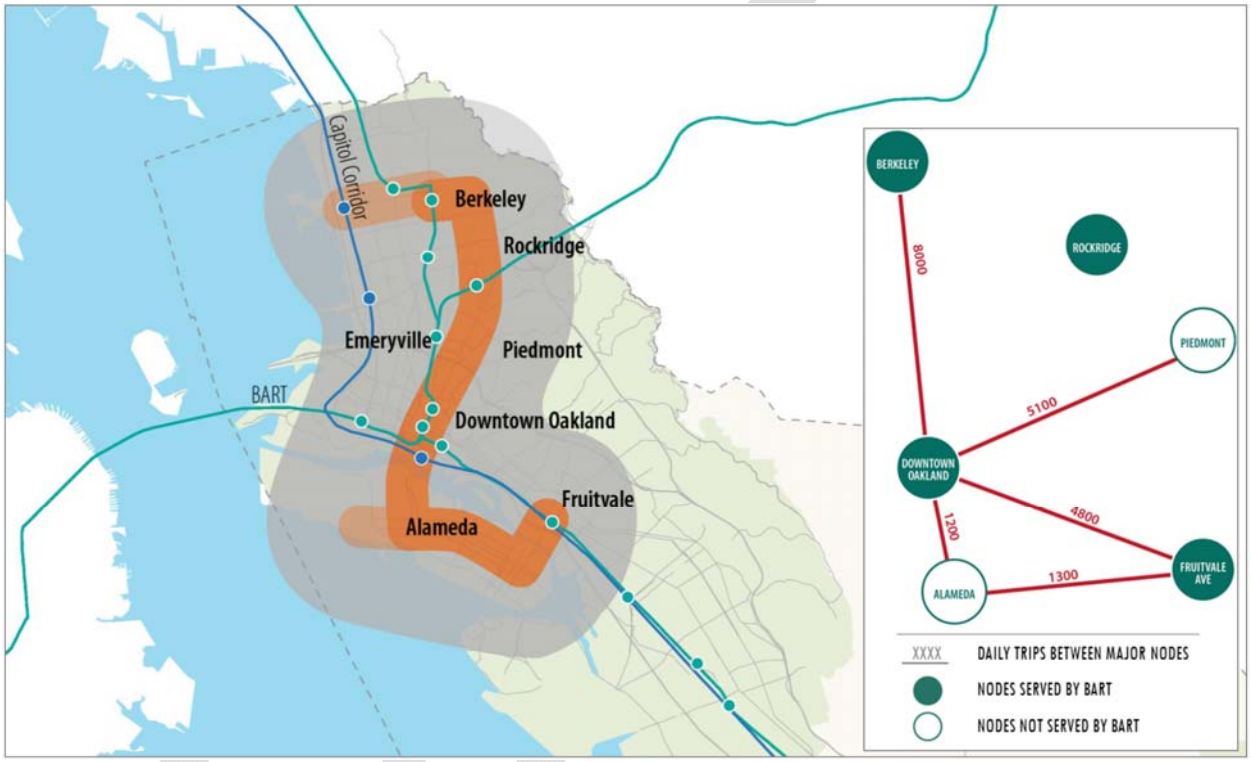
- New vehicles
- Bus bulbs
- Queue jumps
- Portions of the route operating on dedicated or semi-exclusive lanes

- Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control

Draft recommended service levels include:

- 24 hours of service
- 5 minute headways
- 8 miles
- 40 minute trip time

U4 Berkeley – Fruitvale BART



U4. Berkeley – Fruitvale BART

This project is an upgrade to the existing AC Transit routes 51A and 51B; two of the top five highest ridership routes in the system. On-time performance is better than other routes in the system, but still low compared to national standards at 66 to 69%. The project includes potential extensions along University Avenue and to Alameda Point.

Draft recommended capital improvements include:

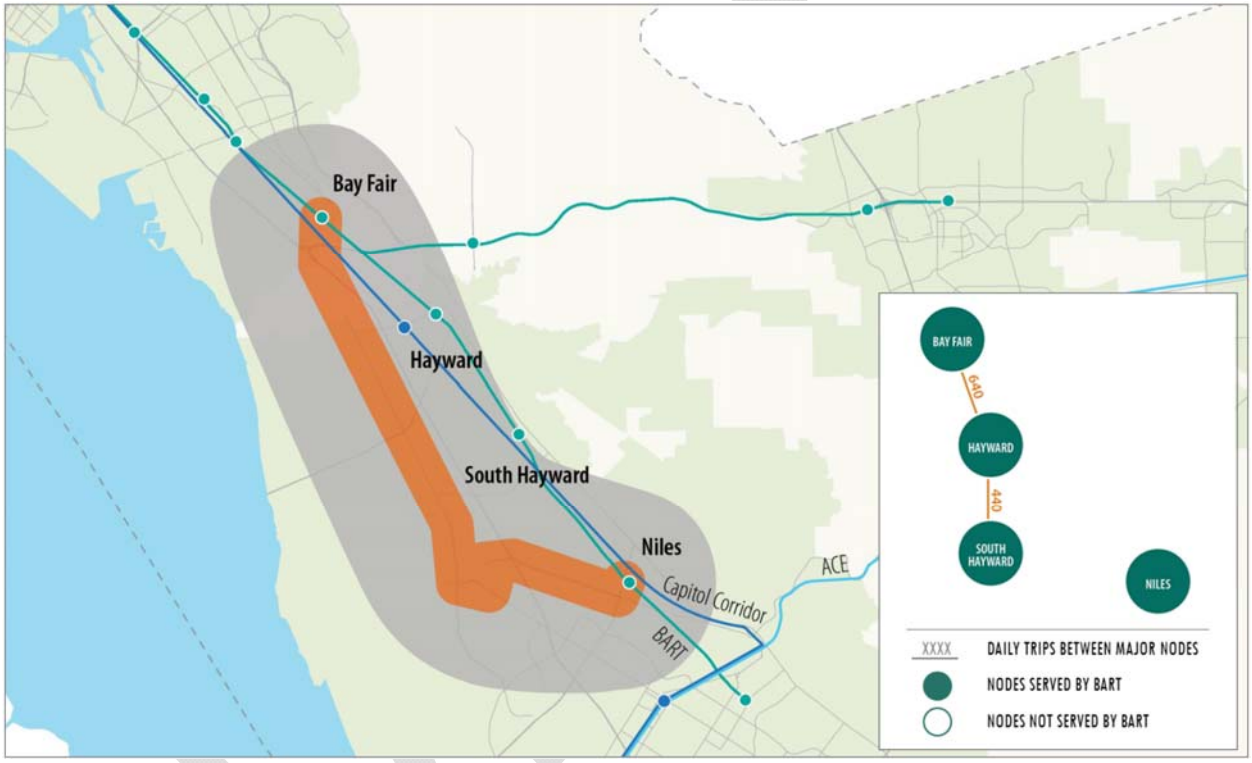
- New buses
- Bus Bulbs
- Queue Jumps
- Portions of corridor with semi-exclusive lanes
- Other selected transit priority treatments including transit

signal priority (TSP) and adaptive signal control

Draft recommended service levels include:

- 20 hours of service
- 12 minute headways for Rapid Bus and 20 minute headways for local service
- 11 miles
- 50 minute trip time

U5 Bay Fair BART – Union City BART



U5. Bay Fair BART – Union City BART

The proposed route would provide connections via Hesperian Boulevard to two BART stations in central Alameda County. Though this corridor did not show a high trip density in the market analysis, it was identified as one of AC Transit's Major Corridors. The Line 97 has strong ridership of more than 1.3 million annual riders, but an intensification of lands uses along this corridor would likely improve the transit compatibility and improve the relatively poor on-time performance of 65%.

Draft recommended capital improvements include:

- New buses
- Bus bulbs
- Queue jumps
- Semi-exclusive lanes on portions of the corridor, otherwise

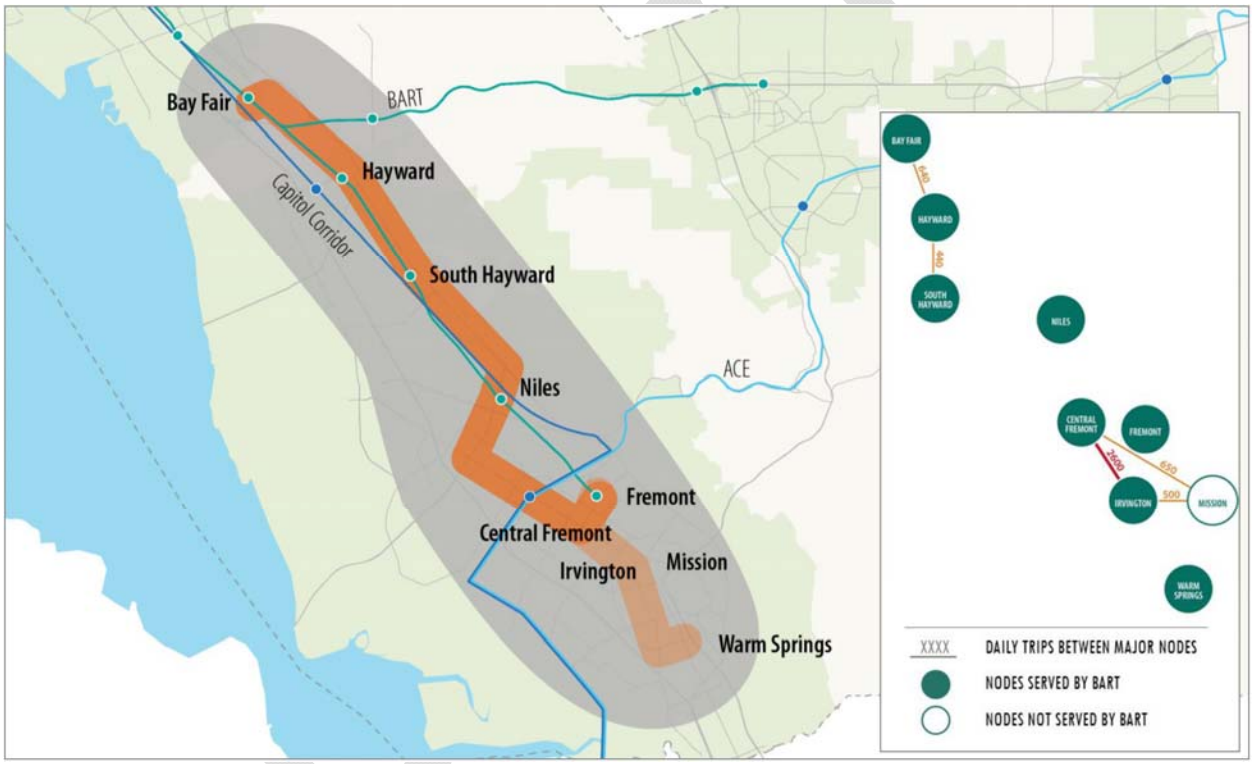
mixed flow

- Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control (currently being designed)

Draft recommended service levels include:

- 20 hours of service
- 12 minute headways for Rapid Bus and 20 minute for local service
- 12 miles
- 35 minute trip time

U6 Bayfair BART – Warm Springs BART



U6. Bay Fair BART – Warm Springs BART

The proposed route would provide connections to two BART stations in central Alameda County along Mission Boulevard. Though this corridor did not show a high trip density in the market analysis, it was identified as one of AC Transit's Major Corridors. While the Line 99 has strong ridership of more than 900,000 annual riders, an intensification of lands uses along this corridor would likely improve the transit compatibility. Transit preferential treatments would also improve the relatively poor on-time performance of 59% for this route. The line could potentially be extended to serve the new Warm Springs BART station.

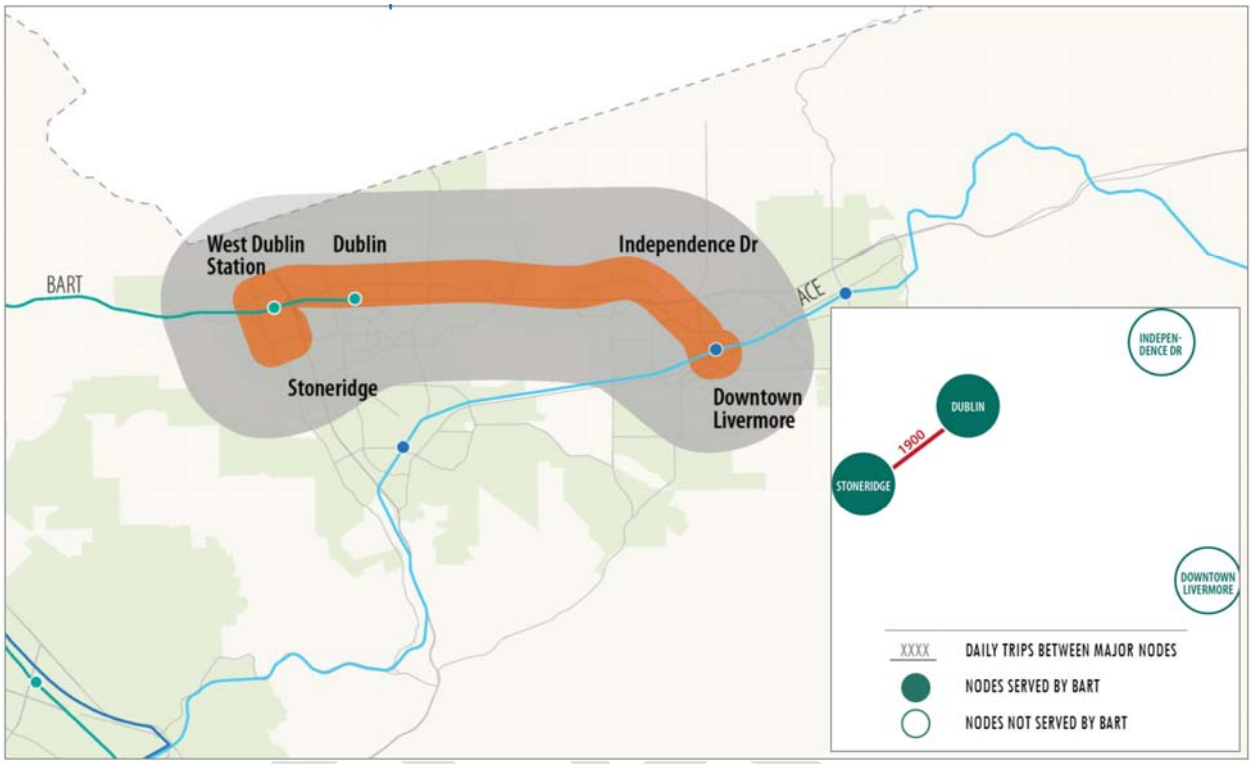
Draft recommended capital improvements include:

- New buses
- Portions of the route would have dedicated lanes
- Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control

Draft recommended service levels include:

- 24 hours of service
- 5 minute headways
- 20 miles
- 50 minute trip time

U7 W. Dublin/Pleasanton BART – Livermore ACE



U7. W. Dublin/ Pleasanton BART– Livermore ACE

The current LAVTA Rapid bus has had lower than anticipated ridership and is not meeting farebox recovery standards set by MTC for receipt of Regional Measure 2 operating funds. The realignment of the existing Rapid line to capture more of potential ridership to the north of the I-580 is contingent upon the proposed future extension of Dublin Boulevard to North Canyons Parkway. LAVTA's Comprehensive Operations Analysis (which is currently underway) may recommend modifications to this proposed recommendation; these will be incorporated to the extent possible based on the timing of the two planning efforts.

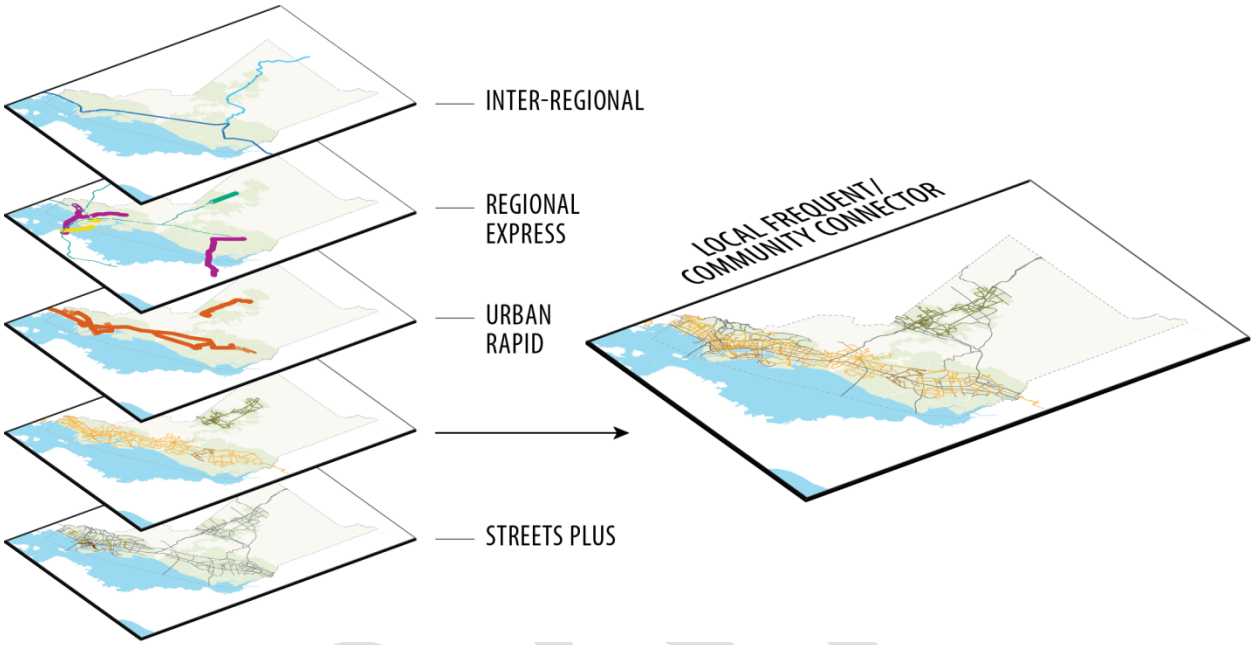
Draft recommended capital improvements include:

- Primarily dedicated transit lanes with some mixed flow
- Selected transit priority treatments including TSP

Draft recommended service levels include:

- 20 hours of service
- 12 minute headways
- 20 miles
- 50 minute trip time

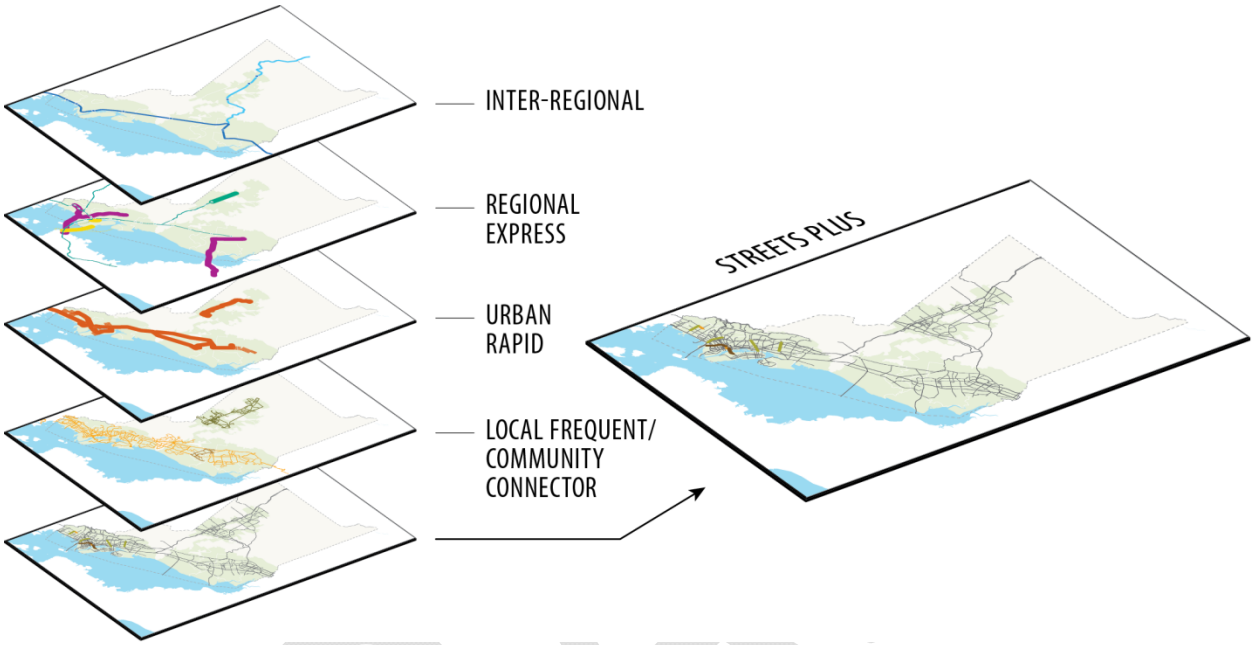
Local Frequent/Community Connector Tier



The Local Frequent and Community Connector tiers are critical to the provision of transit service. These two tiers combined provide basic transit service coverage in communities and also serve first and last-mile connecting functions to the Regional Express and Urban Rapid and services. These services also connect more dispersed trip origins and destinations.

There are no proposed capital or route modifications to the local/community tier of service within Alameda County. This level of service does not require intensive capital investments. Transit service for these routes would be based on the service standards laid out in the previous sections of this technical memorandum and are expected to be determined by the transit providers in consultation with local jurisdictions. Improvements to these services in the future would be undertaken as part of service improvement efforts such as regularly updated Short Range Transit Plans and AC Transit's current Service Expansion Plan, and transit plans and studies undertaken by local jurisdictions.

Streets Plus Tier



The street network provides the public right-of-way within which all bus services operate. It also provides access to and from transit stops and stations. Specific transit corridor improvements have been described in previous sections, but additional infrastructure improvements have been identified that are necessary to facilitate our transit system functioning at the optimal level and to support the goal of increasing transit ridership.

Such improvements include transit preferential treatments on streets that would serve multiple transit routes, e.g. Broadway in Downtown Oakland, and where improvements would greatly facilitate more efficient transit operations. Other improvements are recommended for streets that provide critical east/west connections to the Urban Rapid services that are aligned primarily along north/south corridors and which, due to their length, might not rise to the level of a major investment for transit, but nonetheless provide critical connectivity between routes.

A few street segments warrant special transit consideration due to the concentration of transit services that operate on these streets and their location within major activity centers. They are designated as Transit Priority Zones, consistent with the

recommendations included in the Major Corridors Study for AC Transit. In these Transit Priority Zones, pedestrian facilities and amenities are important features as are design elements intended to minimize delays for bus transit. Design features may include single or double transit lanes, off-board payment areas, boarding islands, parking and turn restrictions, and pedestrian improvements, stop optimization, bus bulbs, and transit signal priority.[24]

Transit Priorities in the AC Transit Service Area

Transit Priority Zones in Downtown Oakland and Downtown Berkeley

Two locations in the study area stand out for special consideration, given their locations in the major corridors' service areas: Broadway in downtown Oakland and Shattuck Avenue in downtown Berkeley. In both places, there is a high concentration of transit activities, including the convergence of several bus lines, intermodal transfers, and on-street passenger activity. Because of this high concentration of transit services, any reduction in delays in these areas could be a keystone to improvements along the remainder of the corridors. Transit Priority Zones are being proposed for both locations.

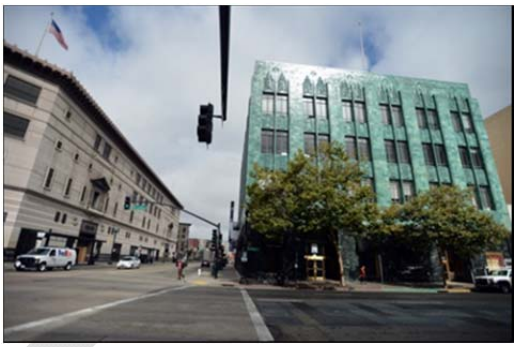
In addition to the more specific improvements below that have been outlined in AC Transit's Major Corridor Study, transit flows in these two downtown areas would benefit from modern, integrated traffic signal control systems that facilitate traffic progression.

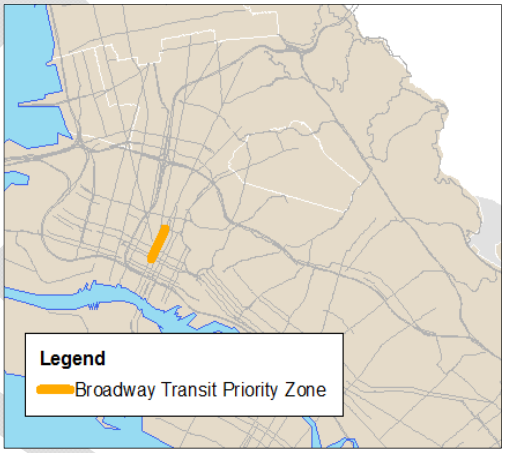
[24] Major Corridors Study, Task 3 Development of Alternatives, July 20, 2015, Final Draft.

Downtown Oakland

In downtown Oakland, there is an opportunity to create a Transit Priority Zone on Broadway between 11th Street and 20th Street, where many of the major corridors' bus lines and many other lines converge. In fact, 11 bus lines currently travel on this street during the weekdays, with 40 buses traveling along Broadway every hour during peak periods to provide a combined headway of 1.5 minutes.[25] The International Boulevard BRT line will also operate along Broadway when it begins service in 2016. AC Transit's intermodal Uptown Transit Center, another major transit facility, is located on Broadway and 20th Street, and its bus operations would improve with Transit Priority Zone treatments.

Potential Transit Priority Zone improvements on Broadway include TSP and adaptive signal control; station enhancements, including improved bus stop signage, that would complement the planned BRT stations currently being designed for the International Boulevard BRT line; parking and turn restrictions for cars; and creating signage to direct autos to the parallel streets of Franklin and Webster, which have wide rights-of-way and (currently) a good amount of capacity.





Downtown Oakland

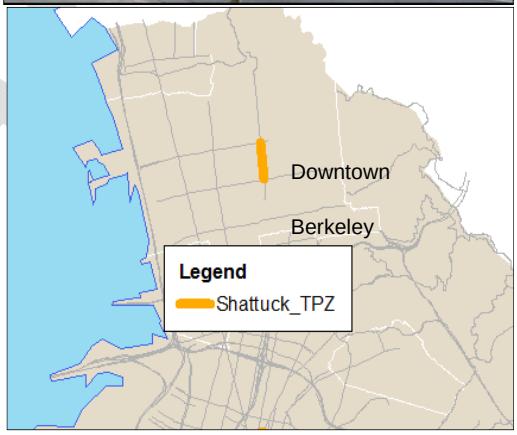
[25] Communication with Steven Newhouse, AC Transit, June 16, 2015

The vision of downtown Oakland and the transit priority treatments on Broadway will be shaped by the Downtown Oakland Comprehensive Circulation Study, led by Alameda CTC, and the Downtown Specific Area Plan, led by the City of Oakland, which are currently underway.

Downtown Berkeley

There is also an opportunity to create a Transit Priority Zone along Shattuck Avenue in downtown Berkeley, namely around University Avenue and Allston Way near the BART station.

Currently, to improve pedestrian access and safety, the City of Berkeley is looking at reconfiguring the west (southbound) leg of Shattuck Avenue into a two-way street, while the east (northbound) leg would remain a one-way street. Accompanying this new circulation pattern would be new bus stops, concrete bus pads, traffic signals, curb modifications, and other changes. The City of Berkeley will also reconstruct the public plaza above the downtown Berkeley BART station. (Design plans are not available at this time.)[26] These proposed changes do not conflict with the principles of creating a Transit Priority Zone and could be augmented to include more intensive transit-priority treatments in this area, including a semi-exclusive bus lane; transit signal priority (TSP) and adaptive signal controls; and sidewalk extensions and sufficiently long bus loading zones at the new public plaza.



[26] City of Berkeley, Shattuck Reconfiguration and Pedestrian Safety Project, Information Sheet, April 2015, Available: http://www.ci.berkeley.ca.us/uploadedFiles/Public_Works/Level_3_-_Transportation/Info%20Flyer Shattuck%20Reconfig_Apr%202015.pdf

Transit Network Priority Opportunities

Two major opportunities have been identified for further evaluation as part of this network definition task: Webster/Posey tubes and the San Pablo/Grand Avenues corridor from Telegraph Ave to the I-80 ramps to the Bay Bridge. Both of these transit priority opportunities are locations that currently have multiple bus lines or the potential for serving multiple bus lines and experience significant recurring congestion that regularly impairs the speed and reliability of routes operating in the corridor. These locations overlap with proposed urban rapid routes, but at this stage of the network development process they are still under consideration.

Webster/Posey Tubes

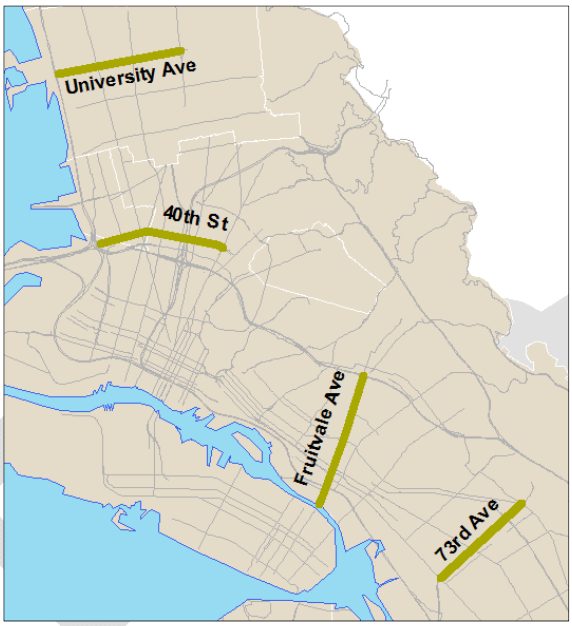
The Webster and Posey tubes provide access between the island of Alameda and downtown Oakland. The tubes provide the primary means of getting to and from the island for the west end of Alameda. Nearly 6,000 total trips (all modes) pass through the tubes in the PM peak hour and the tubes experience back-up in the morning peak hour getting off the island and in the afternoon in Oakland returning to the island.[27] The AC Transit buses become stuck in these queues with the rest of traffic. By providing transit preferential treatments, such as queue jumps and transit signal priority, delays for the transit patrons would be reduced.

Grand Avenue

Grand Avenue is a main access route to the Bay Bridge from downtown and West Oakland. It is a four-lane roadway that feeds directly onto the Bay Bridge and is presently used by the Line NL bus to access the bridge. As queues form on the Bay Bridge approaches during congested commuter hours, this route may also become congested. While traffic is not currently severe on Grand Avenue, the opportunity to provide dedicated or semi-exclusive bus lanes on this corridor to accommodate future transit accessing the Bay Bridge is recommended for further consideration if additional transbay transit lines are considered for routing via Grand Avenue from Oakland.

[27] PM peak hour two-way volumes estimated from the Alameda County Travel Demand model for the Alameda County Multi-Modal Arterials Plan, Fehr & Peers, 2015.

Improvements in these locations could help improve transit operations and reliability for all bus routes traveling on these streets. Improvements will be defined as a combination of transit speed and reliability treatments such as queue jumps, transit signal priority, etc. These improvements could be implemented with the institution of new urban rapid service or on their own.



Improvements to East/West Corridors

The geography of the east bay area results in a very north-south focused roadway network and set of transit services. A robust transit network would include strong east-west connections on key arterials.

The following east/west street segments are critical in providing connections between the north/south Urban Rapid services.

- University Avenue in Berkeley
- 40th Street in Emeryville/Oakland
- Fruitvale Avenue in Oakland
- 73rd Avenue in Oakland

These east/west connectors could benefit from transit priority treatments, such as transit signal priority or bus bulbs.

Transit Priority Areas in East and South County

In addition to the Transit Priority Zones identified for AC Transit, key roadways in East and South Alameda County are critical to the efficient operation of LAVTA and Union City Transit bus routes. These roadways generally provide access to rail stations which are key intermodal transit hubs served by a number of bus and shuttle routes in both East and South County. These rail stations also have large park-and-ride facilities, and the roadways used by buses and shuttles to access rail stations are often the same as those used by automobiles to access the rail station park-and-ride facilities. Consequently, it may be necessary to invest in infrastructure improvements on these roadways to ensure that buses and shuttles have quick, reliable and safe access to rail stations.

In East County, portions of Santa Rita Road and Owens Drive in Pleasanton and Dublin as well as portions of Stanley Boulevard and Railroad Avenue in Livermore provide key connections to BART and ACE rail stations. Additionally, ensuring efficient transit operations on roadways that connect the Tri-Valley cities of Livermore and Pleasanton (e.g. I-580, Jack London Boulevard and Stanley Boulevard) are critical for efficient and reliable operation of LAVTA's routes that serve multiple communities in the Tri-Valley.

In South County, the Union City BART Station is a key intermodal transit hub for Union City Transit, AC Transit and BART. Portions of Decoto Road and Alvarado Niles Road provide primary access to the station not only for transit vehicles, but for private automobiles as well. Additionally, Alvarado Niles Road is the spine of most Union City Transit bus routes and connects its key hubs at the Union City BART Station and Union Landing.

In addition, current and future BART stations in Fremont (Fremont, Warm Springs, and potentially Irvington) also serve as intermodal hubs as well as major park-and-ride facilities, and the roadways leading to and from these stations provide important access for local bus connections. In Newark, a new transit center and park-and-ride is being considered in coordination with Dumbarton Corridor Area Improvements; facilitating inter-county and local bus travel to and from this new transit center will be important to ensuring frequent, reliable bus service.

System Integration

Previous sections of this technical memorandum have focused on how to make transit infrastructure and service improvements on all tiers of the system to facilitate faster, more reliable transit service. The last factor that is critical to achieving success in improving transit ridership is the delivery of an integrated transit system. Physical integration (i.e. how the transit services connect and how the street network functions) in conjunction with the transit network and institutional integration (i.e. how services and information are coordinated) both affect the transit customer experience. Providing an integrated transit system depends on the cooperation and willingness of all levels of government and the private sector to play a role in improving transit services.

The building blocks for system integration are laid out below. A more detailed discussion of how to implement these elements will be the subject of future technical memoranda addressing interagency coordination, transit oriented development, and implementation strategies. The following section introduces key concepts necessary for system integration.

Physical Integration

The tier structure that is proposed as an organizing element for the transit network in Alameda County relies on making connections between the transit tiers at major activity nodes and transit hubs. These nodes or hubs provide the points where these connections occur, facilitating the integration of transit services. This integration requires cooperation between the transit operators and the local jurisdictions to ensure that transit hubs and their function are understandable and easy to use by transit customers.

In addition to the physical integration of the transit tiers, the street network serves as the access system to all transit services, whether the transit customer is driving, walking, or bicycling to their transit stop. The transit patron wants to feel safe and secure and have a pleasant experience getting to their destination. This means a positive experience getting to and from the transit stop a well as on the bus or train.

The achieve this, the street network and its interface with the surrounding land use should be designed with attributes, as noted below, that promote a transit oriented community, rather than focusing on density alone as a means to realizing increased transit ridership.

- Signal systems on street networks that facilitate the flow of transit.
- Street networks that minimize out of direction travel for pedestrians walking to bus stops
- Minimizing barriers to pedestrian flows (e.g. walled developments that limit the number of access points to major bus routes)
- Sidewalks of adequate width to accommodate pedestrians on all streets
- A network of safe bicycle routes that connect to major transit hubs and bus stops
- Clean, well-lighted bus stops with access to transit information
- Land use guidelines that orient buildings and front doors of residential and commercial buildings to the sidewalk, rather than abutting large expanses of parking

Because the authority for the street network and land use regulations lies with cities and the county, they play a large role in helping to improve the potential for transit success.

Institutional Integration

Making physical improvements alone will not achieve the desired results for transit, if institutional barriers to transit use remain. The experience for the transit customer also needs to be as seamless as possible, as transit riders move from one mode to another. Better integration of transit information, fares, and fare payment systems are critical to attracting "choice" riders to transit and providing improved services (and potentially lower fare costs) for those dependent on transit.

This institutional integration is difficult to achieve solely at a countywide level given the multitude of transit service providers within the Bay Area and in Alameda County. This integration requires advocacy on the part of Alameda CTC to achieve results at a regional level. The elements of a better institutionally integrated transit system include:

Provide clear and consistent transit information

Ease of access to transit information is a challenge to the transit user with so many different operators. MTC can take a role at the regional level to create a regional transit map, but Alameda CTC could initiate this at a county level as a pilot for a regional program.

Provide easy access to transit information

In the past, the regional 511 Transit Trip Planner served as a one-stop shopping center for obtaining transit information. Today applications such as Google's transit trip planner are becoming increasingly popular. New informational kiosks, such as those provided by New York Metropolitan Transportation Authority provide interactive touch-screen access to a multitude of transit options. Transit operators are encouraged to continue to

share information and incorporate these new opportunities into their transit information toolkit.

Implement real-time transit and first and last-mile connecting information and options at transit stations

Applications with interactive digital maps, routes/locations, and real-time information on the location of transit vehicles and shuttles can facilitate connectivity between transit modes and ease of trip planning. At transit stations where parking is the key to providing access to the transit system, integrate real-time parking information for transit patrons. Universities have been some of the early adopters of real-time parking information. This avoids the need for potential transit patrons to circle the garages or lots in search of parking.

While the sharing of information is critical, so is the availability of options for connecting to and from transit services. Providing bicycle-sharing, shuttle service, and ride-sharing options at transit stations can encourage more transit ridership.

Provide universal fare collection with integrated fare structures

The introduction of the Clipper Card has had a positive impact on the ease of transfers among different operators, but it is not fully integrated with all operators at this time nor is it easy to secure and add value to the cards.

Cash value and transit passes can be loaded to the Clipper Card at BART and Muni stations, at service centers (e.g. Walgreens and the Transbay Transit Center), online, through Autoload, and through employee benefit programs. Monthly passes and cash value can be purchased, but each transit operator still maintains their own accounts, which means it is not only more costly for transit services, but it is also more time consuming when adding value to the Clipper Card. Unlike other programs such as the Los Angeles Tap or the Atlanta Breeze cards, Clipper Cards need to be purchased at designated outlets and must be registered on-line. Though Clipper Cards can be used for parking payments at BART stations and a limited number of public garages, this requires a separate account to be maintained.

As MTC undertakes the update to the Clipper Card services, consolidation of fare structures and providing a universal transit pass would be desirable. According to the recent SPUR Seamless Transit Report, the New York City Transit system reported a

20% increase in ridership in the 1990's when they launched the Metro card, which integrated fare policies and the payment system.[28]

Institute convenient on-line ticketing

While on-line access to add fares is currently available with the Clipper Card, there can be delays in the registering of purchases made on-line. This can make on-line purchases less convenient that purchasing from a ticket machine. Innovations in ticketing, such as Clipper card values that cover all types of service without regard to operator, mobile ticketing, and digital wallets, and proof-of-payment should be explored to eliminate the delays in registering fare payments.

[28] *Seamless Transit, How to make Bay Area public transit function like one rational, easy system*, SPUR Report, April 2014, citing *Increasing Transit Ridership: Lessons from the Most Successful Transit Systems in the 1990's*, Brian Taylor and Peter Hass, Mineta Transportation Institute, June 2002.

Next Steps

Many of the improvements included in this technical memorandum can result in significant improvements to transit operations and increased ridership and productivity. To assess the potential for transit benefits, it is necessary to provide enough detail for proposed changes to existing operations and the roadway network to estimate cost and travel time benefits during the evaluation process. However, at the county-wide planning level it is neither feasible nor prudent to perform all the transit planning, traffic and civil engineering required to create detailed street-by-street, intersection-by-intersection designs for each of the proposed routes.

The approach taken in this network development phase was to identify concept-level candidate corridors (which could include variations on alignments) and develop a prototypical alignment with a spectrum of preferential transit treatments such as those described in Table 2 based on the market analysis, knowledge of the corridor, and an understanding of the relevant transit agencies operations. These prototypical services will then be used as input into the estimation of benefits (e.g. travel time reductions) and cost that will inform the evaluation process to be performed in a future task.

Appendix A

Purpose

Appendix A documents the approach used to identify and define the organizational structure of transit service tiers that is recommended for the Alameda County Countywide Transit Plan. Examples of how transit operators in the Bay Area and a few other select examples apply service tiers are included for reference.

Background and Constraints

Alameda County voters approved Measure BB in November, 2014. With the passage of Measure BB. significant increases in funding for public transit have become avaialable. As part of the Countywide Transportation Planning process, the Alameda County Transportation Commission is developing a Countywide Transit Plan to provide a framework for future reliable, convenient, and highly utilized transit services.

The Countywide Transit Plan is intended to provide a vision for transit services in the county. Though Measure BB provides an infusion of new funding, transit resources are still limited. As a result, the transit vision is intended to not only provide a framework for the future, but also to help decision-makers prioritize both operating and infrastructure funding to ensure that the public receives the best value for its investment.

The objective of the Countywide Transit Plan is to:

- Identify important transit service markets
- Match those markets with realistic infrastructure improvements
- Create comprehensive transit products (service and infrastructure) that make good use of available funds

Transit service markets can be characterized using different descriptors. These include the general categories of:

- Inter-regional – long distance trips connecting communities across regions and the state
- Regional – across county lines or long distances within a county
- Local – on arterials or other main streets, but generally serving trips of one to five miles, and

- Community – serving shorter connecting trips, also shuttle services serving social needs

Measure BB is able to fund any of these services at transformative levels, but it cannot fund all the service types at a scope that makes impactful changes. A necessary first step in developing a transit network is organizing service markets into service types or tiers to establish a common language for understanding the characteristics of each service tier, the types of trips served, and the necessary infrastructure for successful operation of each tier.

The first step in recommending service tiers for use by Alameda CTC in the Countywide Transit Plan involved understanding how transit providers approach the establishment of service tiers. This understanding was achieved through a survey of transit providers.

Current Practice in Defining Transit Service Tiers

In March 2009, the Center for Urban Transportation Research (CUTR) at the University of South Florida issued Best Practices in Transit Service Planning. This report reviewed transit practices at 60 transit operators (including Orange County Transportation Authority and Santa Barbara Metro Transit in California) across the country. The study outlined four different categories that transit agencies ordinarily use to define their fixed-route service structure:

- Number of stops or service frequency,
- Population or target market type served,
- Route design, and
- Time of day.

Examples of service types are shown in Table 1, and were considered, as a structure for the Countywide Transit Plan was developed.

Table 1. Examples of Service Types

Classification System	Examples of Service/Route Categories
Number of stops or service frequency	• Local service – comprises the majority of the system and represents the "average route." Also known as regular, base, or core service • Limited-stop service – has fewer stops, operates at higher speeds than local service, and tends to run on a freeway or arterial to increase speeds • Rapid service or bus rapid transit – a form of limited-stop service that combines a much higher operating speed with transit priority and possibly segregated infrastructure • Express service – serves two distinct points with no or few intermediate stops, typically from the suburbs to downtown or employment centers
Population served	• Commuter/work-based service – peak period service for commuters • Community-based service – service geared toward a specific community or area, typically for transit-dependent populations • Student-based service – service geared toward schools and university students • Regional service – service that is focused on the regional population, connecting one major urban area with another
Route design	• Radial/trunk routes – act as the backbone of the system, operating on arterials • Cross-town routes – non-radial routes that do not directly serve the central business district • Circulator routes – provide service within a confined area • Feeder / shuttle routes – provide service in higher density areas to feed to other routes in the system or regional transit stations • Regional routes – service that is regional in nature, connecting one major urban area with another
Time of day	• Peak-period service (AM and PM peak periods) • Non-peak service • Night service

Source: Best Practices in Transit Service Planning, March 2009, Center for Urban Transportation Research (CUTR) at the University of South Florida.

Peer Transit Agencies

While the general guidance provided by best practices research is useful, each transit operator chooses to define service slightly differently, using different groupings of service characteristics. Bay Area transit agencies were surveyed to understand their service tier definitions, as defined by policy. Most agencies nationwide do not explicitly document their service tiers, although a few agencies, including King County Transit and Denver RTD, do and are included here for reference. Service design guidelines for peer transit agencies are described below:

AC Transit

AC Transit has a variety of service types defined primarily by residential density and route design. These include the following:

- Trunk Routes and Major Corridors – Operates on corridors where residential densities are at least 20,000 residents per square mile (or equivalent commercial density). These routes are the backbone of the system.
- Rapid – Provides limited-stop service along a Trunk Route and Major Corridor.
- Urban Secondary, Crosstown, and Feeder Routes – Services operating in medium density corridors (10,000–20,000 residents per square mile or equivalent commercial density). These routes complement the Trunk Routes.
- Suburban Crosstown and Feeder Routes – Operates in low-density corridors (5,000–10,000 residents per square mile). These routes feed BART and other AC Transit routes, and provide circulator services.
- Low-Density Routes – Operates in areas of very low density (fewer than 5,000 residents per square mile).
- All-Nighter (Owl) Routes – Provides service between midnight and 6:00am.
- Transbay Routes – Provides service to downtown San Francisco via the Bay Bridge Corridor and to Peninsula destinations via the San Mateo and Dumbarton bridges.

Golden Gate Transit

Golden Gate Transit defines three categories of service — GGT Bus, Golden Gate Ferry, and GGT Partnership — according to the level of service provided. These categories are described below:

- GGT Bus
    - Regional Commute – Operates only during peak weekday commute periods between residential neighborhoods and collection points within Marin and Sonoma counties with express service to San Francisco

Financial District and Civic Center. Level of service is set to match demand.

  - Regional Basic – Operates all day, seven days a week with limited stops between San Francisco (Transbay Terminal and Civic Center) and various suburban centers in Marin and Sonoma counties. Level of service is set by policy (30- to 60-minute frequency).
  - Regional Commute Shuttle – Provides commute period shuttle services to and from the direct Transbay bus routes.

- Golden Gate Ferry
  - Operates two ferry routes between Marin County and San Francisco all day, seven days a week.
- GGT Partnership
  - Partnership Basic Service – Operates between service areas of AC Transit and other East Bay agencies in Contra Costa County and GGT service areas in Marin County.
  - Partnership Commute Service – Provides commute express service between Santa Rosa and San Francisco.
  - Partnership Marin Local – Operates local Marin County routes, and one seasonal route
  - Marin recreational route (service level set by and funded by Marin Transit).

SamTrans

SamTrans operates five types of fixed route service, and Caltrain and BART shuttles, according to the following design standards:

- Fixed-route Community – Consists of the majority of SamTrans' routes and serves local youth, shopping centers, residential areas, and government centers (average 60 minute headways).
- Fixed-route Express – Operates during weekday peak hours only and connects to at least one of four BART stations (10- to 30-minute headways).
- Fixed-route BART Connections – Connects to BART stations within San Mateo County seven days a week, on weekdays from 6am until 11pm, and on weekends from roughly 8am to 8pm.

- Fixed-route Caltrain Connections – Connects to Caltrain stations. Generally operate between 6am and 8pm weekdaysy, with several routes also providing night and weekend service.
- Fixed-route BART and Caltrain Connections – Connects BART and Caltrain stops, in addition to other destinations. Operates seven days a week, from 6am to 1:30am.
- Employer Shuttles – Operates shuttles linking BART and Caltrain stations to employment centers in San Mateo County. In general, shuttles operate during morning and evening commute hours.

SF Muni

The Muni Forward program categorizes service based on service characteristics as follows:

- Rapid Network – Consists of the heaviest demand routes operating with the most frequent service (5- to 10-minute service frequency)
- Local Network – Combines with Rapid Network to create core network (10- to 15-minute service frequency)
- Community Connector – Fills gaps in coverage and connects to core network (15- to 30- minute service frequency)
- Specialized Services – Augments all day service and addresses focused needs (includes express routes)

VTA

The VTA Service Design Guidelines, adopted in February 2007, define service categories in the Santa Clara Valley area. Land use and density targets are defined for categories such as light-rail transit (LRT) and bus rapid transit (BRT). Five general types of transit service are defined based on the service level provided:

- Community Bus – Provides circulator service in lower-density communities.
- Local Bus – Provides service to major activity centers. Three types of local routes are defined: feeder, secondary grid, and primary grid (with shorter routes being considered local feeder routes and longer routes as local primary grid routes).
- Express Bus – Provides fast service traversing long distances and connecting suburban areas with employment centers. Limited Stop, Express, and Regional Express routes are defined within this category based on the type of trip served.
- BRT – Operates frequent and fast bus service on major corridors with higher densities, similar to rail transit, with service frequency between 5 and 15 minutes. BRT-1 and BRT-2 are defined in this category based on the level of segregation from mixed-flow traffic.

- LRT – Provides high-speed and environmentally friendly rail service linking major corridors, trip generators, and county cores.

WestCAT

The 2008 WestCAT Short Range Transit Plan defines five types of service:

- Dial-A-Ride – Provides accessibility through curb-to-curb service to comply with the service standards of the Americans with Disabilities Act.
- Local Fixed Route – Provides a high degree of accessibility to residents operating on a fixed route with 30-minute peak service frequencies and hourly base/midday service.
- Express Bus – Express service offers much lower accessibility but provides a high degree of mobility with frequent, direct service. Express routes have high speeds and carry large numbers of passengers and connect with BART stations. Service frequencies are 15 minutes peak and 30 minutes base/midday.
- Transbay Express Bus – Fast express service to downtown San Francisco, operating throughout the day. Service frequencies are 15 minutes in the peak and 75 to 90 minutes midday.
- Regional Service – Service linking the service area to the county seat and the local community college. Service frequencies are 30- to 60-minutes peak and 60 minutes base/midday.

King County Metro

King County Transit Golden Gate Transit defines six “Service Families” based on the level of service frequency:

- Very Frequent – 15 minutes or more throughout the day/7 days week
- Frequent – 15 minutes peak/30 minutes midday/7 days a week
- Local – 30 minutes peak/60 minutes midday/5 to 7 days a week
- Hourly – 60 minutes or less often/weekdays only
- Peak – Limited peak only service/8 trips a day, directional/weekdays
- Alternative Servicer – No Standards

Denver RTD

Denver Regional Transportation District operates a variety of service types, organized by land use type and route design:

- Local – Central Business District. These are local services operating into the Denver CBD.

- Local – Urban. These routes are local or limited routes that serve urban areas, having residential population densities of about 9 people per acre and employment densities of 4 to 20 people per acre.
- Light Rail Transit – Rail transit service operating on fixed track at high speeds (50+ miles per hour) on exclusive right of way, with the ability to operate in mixed-flow traffic on city streets.
- Limited – Bus services on high-density corridors with stops at 0.5 to 1.5 mile intervals, providing faster service than local routes, but not operating on freeways.
- Local – Suburban. These routes have population densities of 5 people per acre and employment densities of 2 people per acre.
- Express – High-speed service on limited access freeways from suburban sections to downtown and other employment centers. Express service is provided up to a maximum distance of 16-18 miles.
- Regional – Long-haul routes provide service between outlying communities and employment centers in Denver and Boulder, with distances of about 18 miles.
-

Transit Service Categories for the Alameda County

Based on a review of the service typologies summarized above, the following criteria were outlined to assist in classifying transit services into categories consistent with their functional design for the Countywide Transit Plan:

- Principally define service tiers by the design of the route (trunk, local, last-mile, etc.), but include temporal elements (peak versus all-day service).
- Use a geographic-based system, which is convenient and easy to remember for the County (regional express versus urban rapid).
- Make service tiers descriptive enough to clearly distinguish between different categories and service levels.
- Pair service tiers with characteristics that influence transit use, such as density, parking policy, mix of uses, and urban design so that the most intensive transit services serve the areas most likely to use transit services. The Transit Competitiveness Index (TCI) identifies transit competitive areas in the County and packages these characteristics into a common metric.

As the transit service market is identified through a review of transit competitiveness and overall market size (the “demand” approach), the “supply” response to the layering of service tiers – that match the size and requirements of the market. AC Transit – the dominate surface transit operator in Alameda County – already organizes its services using these characteristics, as described in the previous section.

Based on the basic guidelines outlined above, a review of other best practices, and the existing organization of AC Transit service types, the service tiers recommended for the Alameda Countywide Transit Plan are summarized in Table 2.

Table 2. Recommended Countywide Transit Plan Service Tiers

Type	Where Used
Inter-Regional	For travel that extends beyond and through the nine-county Bay Area.
Regional Express	For travel between major travel nodes where there is substantial point to point traffic. Major employment access.
Urban Rapid	For travel to major travel nodes from productive (transit competitive) origins to concentrated destinations. Major employment access/often university access.
Local Frequent	For travel along a Corridor with productive, dispersed origins
Community Connector	For community access in lower productive areas. Serves schools, medical facilities, shopping.

Table 3 describes in more detail the service charactieristics for each of the five service categories. There may be some overlap in service definitions among these categories.,

Table 3. Transit Service Tier Descriptions

Type	Description	Example
Inter-Regional	High-speed (above 40 mph) Very limited stops (3 to 15 miles) Peak or hourly service frequency ROW, exclusive, protected Capital intensive	Capitol Corridor Altamont Commuter Express
Regional Express	High-speed (above 25 mph) Limited stops (1 to 3 miles) High service frequency (> 8 trips/hr) Service span (16-24 hours) High ridership (> 60 passengers/veh hr) ROW: exclusive, protected Capital intensive	BART LA Silver Line (Bus) Seattle Sound Transit Bus
Urban Rapid	Mid-speed (15-25 mph) Limited stops (0.5 to 1 mile) High service frequency (5- 8 trips/hr) Service span (16-24 hours) High ridership (35 to 60 passengers/veh hr) Primarily surface operation ROW: protected, but with crossings Moderate capital investment	Bus Rapid Transit – East Bay BRT LAVTA Rapid Bus Rapid Transit – Lane County (Eugene) LRT (SF Muni T-Third, San Diego, Portland, Salt Lake)

Type	Description	Example
Local Frequent	Low-speed (12-15 mph) Frequent stops (0.25 - 0.50 mile) Mid-frequency service (3-5 trips/hr) Service span (12-16 hours) Moderate ridership (20-35 passengers/veh hr) All surface operation ROW: in mixed flow Limited capital investment	AC Transit Lines 57, 12, 88
Community Connector	Low-speed (8-12 mph) Frequent stops (0.20 - 0.25 mile) Low-frequency service (<3 trips/hr) Service span (<12 hours) Low ridership (<20 passengers/ veh hr) All surface operation ROW: in mixed flow Limited capital investment	AC Transit Line 65, 67 Kaiser Shuttle Emery-Go-Round

Appendix B

Purpose

Appendix B documents the methodology used to determine where transit investments should be made in Alameda County. It outlines the process of identifying activity nodes, defining travel markets, and aggregating the markets into corridors recommended for transit investments.[1]

Approach

Five tiers of transit service have been identified for the Alameda County transit network:

- Inter-regional
- Regional Express
- Urban Rapid
- Local Frequent
- Community Connector

The core transit network described in this memo is focused on identifying the markets to be served by the regional express and the urban rapid networks in Alameda County. These are the markets that have countywide significance in terms of transit services and are the markets that have the greatest potential for increasing transit ridership if the appropriate level of investments is made. The inter-regional market is one that is framed and planned within the context of statewide rail services. The Local Frequent and the Community Connector tiers are focused on providing local transit services that link from the Regional Express and Urban Rapid services to the local communities within the county and ensure adequate transit coverage throughout the county.

The core network is meant to provide a framework for Alameda CTC, the transit agencies operating in Alameda County, and the local jurisdictions to focus transit service investments and to improve market conditions in the county. The focus is on transit priority treatments that will provide effective, cost efficient Regional Express and Urban Rapid transit service. Most of Alameda County has competitive transit markets. The methodology developed for specifying the core network, limits the number of designated travel markets to those most highly competitive so the quality of the urban

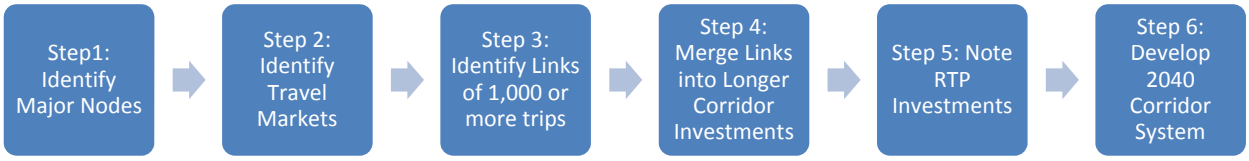
[1] Cambridge Systematics and Arup were the primary authors of this technical memorandum based on memorandum submitted to Parsons Brinckerhoff.

rapid service can be ensured and sustained. To identify these most competitive markets, the methodology limits the number of major nodes to those with the highest trip densities. It selects only travel markets between these major nodes that have the highest trip volumes.

The approach to market definition relies on the 2040 projected travel patterns generated from the Alameda CTC Travel Demand Model updated in 2014.[2] The trip volumes generated from the travel demand model and used for the transit market analysis were based on the growth projections from *Plan Bay Area* that were allocated to Travel Analysis Zones (TAZs). Using the model data and the Transit Competitiveness Index (TCI) tool an analysis was conducted to determine the potential viability of transit markets in Alameda County. Transit viability was based on the density of trips, housing, and jobs within each TAZ and confirmed against the TCI score for the TAZ. Once transit viability was confirmed, corridors were identified for transit investments based on trip density (see Figure 1). The methodology has three main objectives:

- Identify major activity nodes from the 2040 projections for trip origins and destinations, by travel analysis zones (TAZs).
- Define travel markets between these major origin and activity nodes according to the projected travel volumes of travel in 2040.
- Select the corridors for transit investments by combining travel markets into rational service corridors.

Figure 1. Corridor Development Process



Source: Arup and Parsons Brinckerhoff, 2015

Major Activity Node Identification

The approach to major node and primary transit market identification began with an examination of the trip densities, by TAZ, generated within the Alameda County Travel Demand Model and culled from the Transit Competitive Index (TCI) tool, described in Technical Memorandum #2.[3] TAZs with the highest trip densities were considered to be the most promising for transit service.

[2] The Alameda CTC Travel demand model was updated in 2014 to include the Play Bay Area growth projections from Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) regional travel demand model.
[3] Alameda Countywide Transit Plan, Technical Memorandum #2, Alameda CTC, June 2015.

The TCI methodology is relatively new; however, it has been used in the Bay Area for MTC's Transit Sustainability Project and also applied by Cambridge Systematics (CS) in a similar approach for a Small Starts feasibility study in Las Vegas for the Regional Transportation Commission (RTC) of Southern Nevada, the Maryland Parkway Alternative Analysis.[4]

The Maryland Parkway Alternative Analysis was completed in March of 2014.[1] CS developed a methodology for identifying "anchor stations" along the five mile corridor which runs through downtown Las Vegas. This methodology included a screening process that identified the major nodes of activity as potential anchor stations and the volume of travel between these nodes as the potential preferred alignment. The methodology produced station locations and a preferred alignment that was so appealing to the stakeholder groups, RTC, and the FTA; it was selected without the usual lengthy process of screening multiple alternatives. FTA praised the approach and has recommended it be adopted for future Small Starts alternative

Six separate analytical steps were undertaken to create the activity nodes. The process was scaled from its application in a single corridor (Maryland Parkway) to its application for the development of a core transit network across Alameda County.

1. **Identifying trip origins and destinations for each of the 1,580 TAZs in Alameda County in 2040.** From the initial trip table matrix, two lists were created. The first ranked all TAZs in descending order based on their destination trip densities. The second ranked them according to trip origin densities.

2. **Determining TAZ thresholds to identify competitive transit markets.** The ranked lists created in Step 1 were classified in ArcGIS using the Natural Breaks method. The natural breaks method is an accepted statistical technique that employs data clustering classification to reduce the variance within classes and maximize the variance between classes.[5] It is designed to place data values into naturally occurring categories. For this study, the intent was to identify a reasonable break point that would begin to segregate the most highly competitive transit markets from the broad number of competitive transit markets in Alameda County. This will allow the limited transportation funding dollars available to be spent in the markets that are

[4] Developed by Cambridge Systematics for the Regional Transportation Commission (RTC) of Southern Nevada commissioned the Maryland Parkway Corridor Alternatives Analysis (AA) to study potential transit improvements between downtown Las Vegas and the McCarran International Airport. http://www.rtcsnv.com/wp-content/uploads/2014/04/Maryland-Pkwy-AA-Final-Report-DRAFT-v1.0.pdf

[5] A method of statistical data classification that partitions data into classes using an algorithm that calculates groupings of data values based on the data distribution. Jenks' optimization seeks to reduce variance within groups and maximize variance between groups.

most likely to produce the highest return in ridership due to their potential transit productivity.

The TAZs in this top tier became the initial seed (or nucleus) TAZs. The trip density thresholds established using this method are:

- Origin Nodes: 70,000 trips per square mile; and
- Destination Nodes: 100,000 trips per square mile.

The TAZs with trip densities above the thresholds identified above were designated as seed TAZs. This methodology produce 54 seed TAZs in 2010 and 71 in 2040. As an initial outcome, this seemed within an appropriate range of nodes for a core network. The consultant team had expected to identify a network that would function effectively with somewhere between 50 and 100 nodes countywide. Thus, adhering to the Natural Break method resulted in a reasonable outcome for establishing initial trip density thresholds. In the next step, this outcome was compared to a separate methodology based on employment and residential densities to confirm the results.

3. **Validating TAZ population and employment densities through land use and market analysis.** To confirm that the TAZs selected as activity nodes were accurately capturing the most transit competitive areas of the county and where growth was most likely to occur, a check was made against independently produced population, housing, and job density maps that overlaid the county's Priority Development Areas (PDAs). The activity nodes were also compared to the most active residential and commercial areas using a market index tool as an indicator of where growth was most likely to occur.[6,7] Some minor inconsistencies between the land use and trip densities were resolved using Google map inspections to assess whether the TAZ boundaries resulted in a reasonable mix of land uses combined into a single TAZ.

4. **Refining the transit market by consolidating TAZs to create major activity nodes.** Activity nodes were consolidated to form major activity nodes. A 1/3 mile radius circle was drawn from the centroid of each activity node. If the 1/3 mile radius circle overlapped other activity nodes, the nodes were combined to form a major activity node and a new centroid was defined.[8] If the 1/3 mile radius circle did not overlap other activity nodes, then the activity node alone was identified as a major activity node.

[6] April 10, 2015 Memorandum from CD&A, Identifying TAZ clusters as Activity Nodes for TCI Modeling.
[7] April 10, 2015 Memorandum from Strategic Economics, Market Index Technical Memorandum.
[8] The activity nodes were aggregated if the 1/3 mile radius circle encompassed at least ½ of an adjacent node.

5. **Final delineation of major activity nodes: For the next step in the creation of major activity nodes, a 1/2 mile radius buffer was created around each of the major node centroids described above.** A 1/2 mile radius circle was drawn from the centroid of the newly defined major activity nodes. TAZs were once again combined if at least half of the TAZ fell within the 1/2 mile radius circle, the distance that is considered to be a reasonable walking distance to access transit. Applying the "natural breaks" methodology to these newly defined major activity nodes, a second tier of thresholds was established for these more broadly defined major activity nodes:

    - 50,000 trips/sq. mile or greater for origin trip density, and
    - 80,000/trips/sq. mile or greater for destination trip density

    The final delineation of the major activity nodes included the most competitive activity nodes aggregated with those that that had a slightly lower trip density and a slightly higher potential walk distance. Nodes that qualified as both origin and destination (O-D) major activity zones were identified as such.

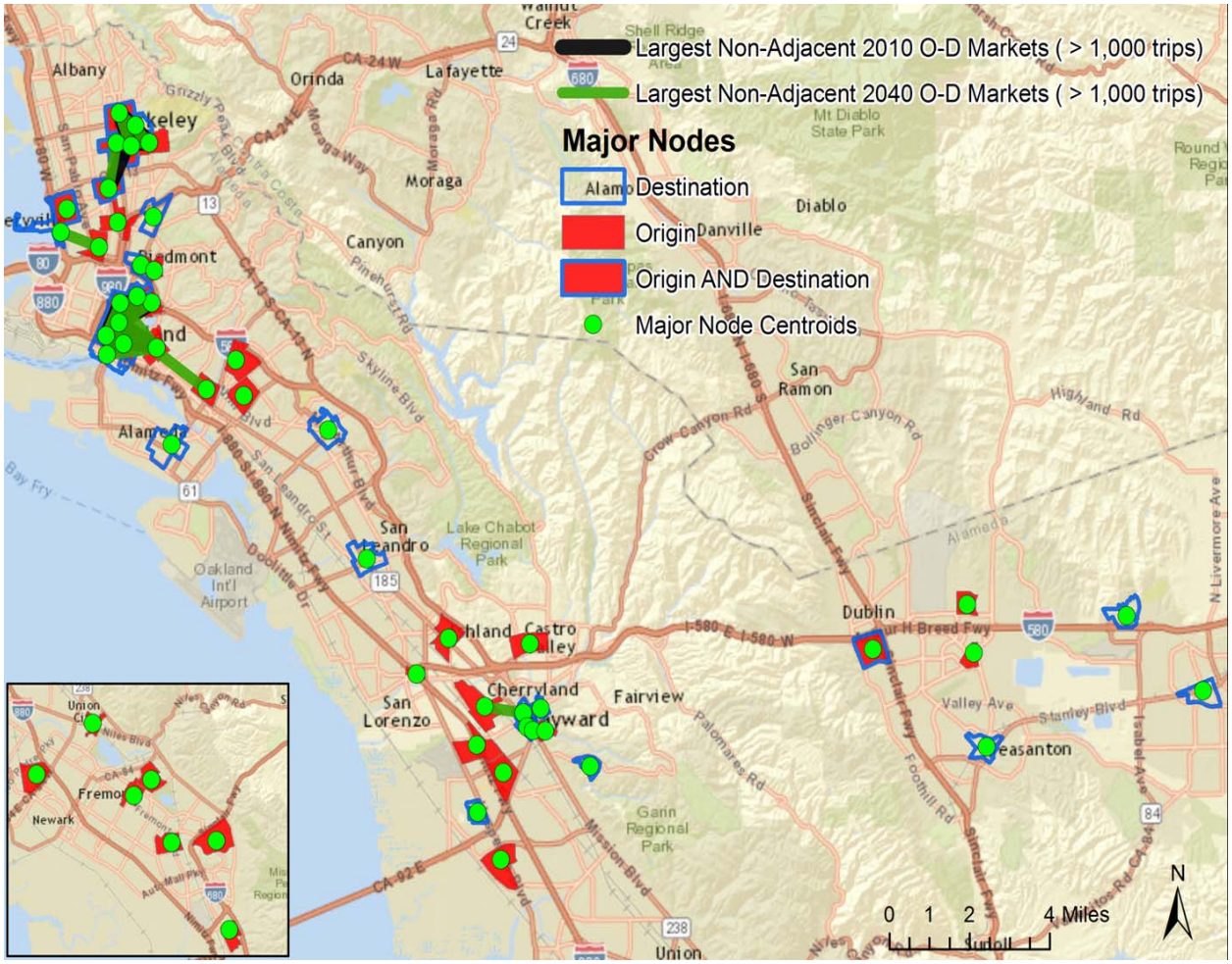
    These thresholds represent the next (second) tier of trip densities using the Natural Breaks method described in Step 2. This method created major nodes consisting of a seed TAZ that had trip densities in the first tier (above the thresholds in Step 2) plus adjacent TAZs that fell within the second tier.

6. **Validating the designation of major activity nodes through the application of the TCI score (a separate indicator of transit competitiveness).** As a check on the methodology, the aggregate TCI scores for each of the major destination and origin nodes were measured. The results showed that each node had a TCI of greater than 500. The TCI score for a destination node is based on all travel from any TAZ in the Bay Area to that node and the score for an origin node is based on all travel from that node to destination TAZs anywhere in the Bay Area.

The study team made the three following adaptations/ refinements to the methodology. First, some major O-D nodes —for example, downtown Oakland—abut one another forming continuous larger areas. The study team subdivided these larger areas into several smaller nodes based on the 1/2 mile radius criteria. Second, the size and shape of TAZs in Alameda County varies greatly. The study team minimized the number of TAZs in a major activity node as much as possible to maintain the 1/3 to 1/2 mile radius, but inevitably, some major nodes ended up larger in area than others. Third, some major nodes satisfied both the origin and destination criteria, so these nodes were designated as both a major origin and major destination node.

The major nodes were identified for two analysis years - 2010 and 2040. Figure 2 shows the major origin, destination, and dual origin/destination nodes in 2010 and 2040.

Figure 2. Major Origin and Destinations Nodes for Alameda County in 2010 and 2040



Source: Cambridge Systematics, 2015

The application of the methodology yielded the following results:

- For 2010: a total of 54 nodes in Alameda County, where 26 nodes were designated major origins, 16 nodes as major destinations, and 12 as both a major origin and major destination.
- For 2040: a total of 71 nodes in Alameda County, where 26 nodes were designated major origins, 16 nodes as major destinations, and 29 were designated both a major origin and major destination.

The desired outcome of a systematic application of this methodology was to create a manageable number of major activity nodes that would not generate a core network too large for a feasible Urban Rapid tier, or too small that it excluded a major activity node.

The 71 nodes appear to be a manageable number and in reasonable locations given the projected development patterns. As the methodology is reviewed with the transit agencies and local jurisdictions, however, unique situations that do not fit within the framework of the described thresholds may be identified. This may warrant inclusion or removal of some nodes that were identified through this systematic methodological approach based on unique or compelling circumstances.

Core Network Identification

Once major origin (O) and destination (D) nodes were identified, the major node O-D pairs were connected using desire line maps created in ArcGIS. The methodology involves the following steps:

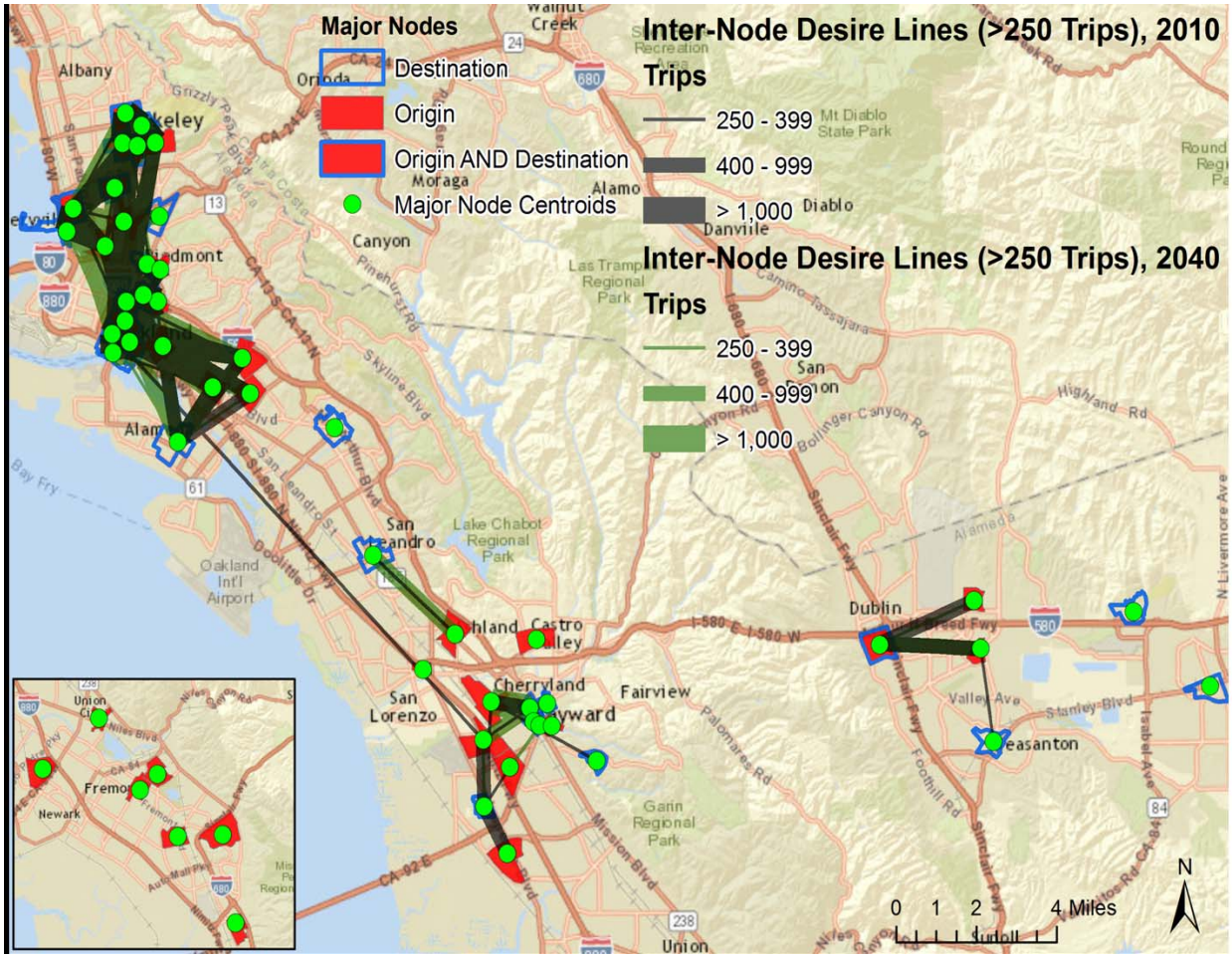
1. Examine travel volumes for travel between all of the major origin and destination nodes throughout Alameda County.
2. Produce a matrix with the origin nodes along one axis (column) and the destination nodes along the other (rows) that shows the total number of trips between each major node.
3. Create a “desire line” map in ArcGIS using the results of this matrix. The desire line map showed the total number of trips occurring between a given major node O-D pair, or “travel market”. Maps were created for both 2010 and 2040 analysis years. Using sensitivity analysis and in consultation with other members of the consultant team, the minimum threshold for the desire lines was set at 200 trips; no desire lines were shown for O-D pairs for which there were fewer than 200 trips.
4. Classify trips based on the following break points, and draw desire lines with corresponding thicknesses:
    - Minor travel market: 200 – 499 trips;
    - Moderate travel market: 500-999 trips; and
    - Major travel market: 1,000 or greater trips.

Figure 3 shows the results of this process for all of Alameda County for 2010 and 2040. Because travel markets in the Berkeley-Emeryville- Oakland area are very dense, a separate analysis of travel volumes of 1,000 daily trips or greater between major nodes was completed for this area. The results are shown in Figure 4.

As with the methodology used to create major activity nodes, the methodology and the thresholds used to identify travel markets was structured to generate a manageable number of major travel markets for transit corridor improvements, but not so few that

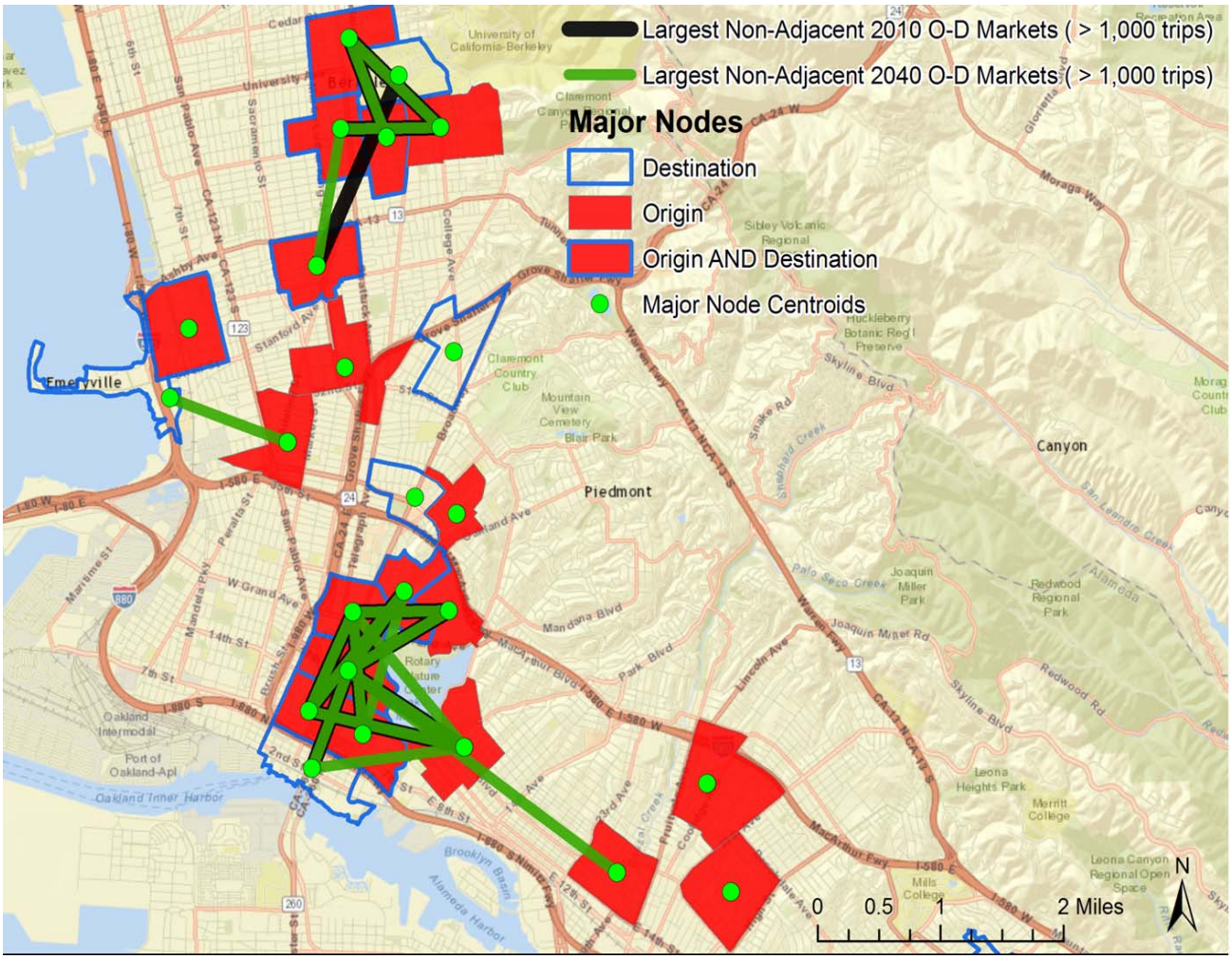
significant travel markets were excluded. Even with this approach, a few of the major nodes were “stranded,” because they did not have enough travel to and from other major activity nodes to result in a desire line of more than 200 trips. This suggests that while these major activity nodes might be transit competitive based on density, overall trip volumes, and TCI scores, the trips are likely going to and from dispersed origins and destinations. These activity nodes might be better served by services that include park-and-ride facilities or feeder bus services to provide a concentrated point of access for transit.

Figure 3. Major Travel Markets between Major Nodes throughout Alameda County in 2010 and 2040



Source: Cambridge Systematics, 2015

Figure 4. Major Travel Markets Greater than 1,000 Daily Trips within the Northern Inner East Bay in 2010 and 2040



Source: Cambridge Systematics, 2015

As noted above, unique situations that do not fit within the framework of the described thresholds may be identified. This may warrant inclusion or removal of some travel markets identified through this systematic methodological approach based on unique or compelling circumstances.

Bay Area Core Network Analysis

The identification of regional activity nodes and travel markets required a slightly modified approach to the one used within Alameda County. After assessing the results of the Alameda County market analysis and receiving feedback from Alameda CTC, transit operators, and other stakeholders, a subsequent analysis was undertaken to identify the potential travel markets between Alameda County and other counties in the Bay Area.

Because the demand for regional types of services comes from a broader market, the trip origins and destinations tend to be more dispersed than those related to the demand for Urban Rapid core services. The regional services are accessed not only by walking, but also by feeder bus, park-and-ride, and kiss-and-ride so the service area is larger than those defined by a 1/2 mile walking distance. As a result, different thresholds were used to identify major markets for inter-county or regional trips.

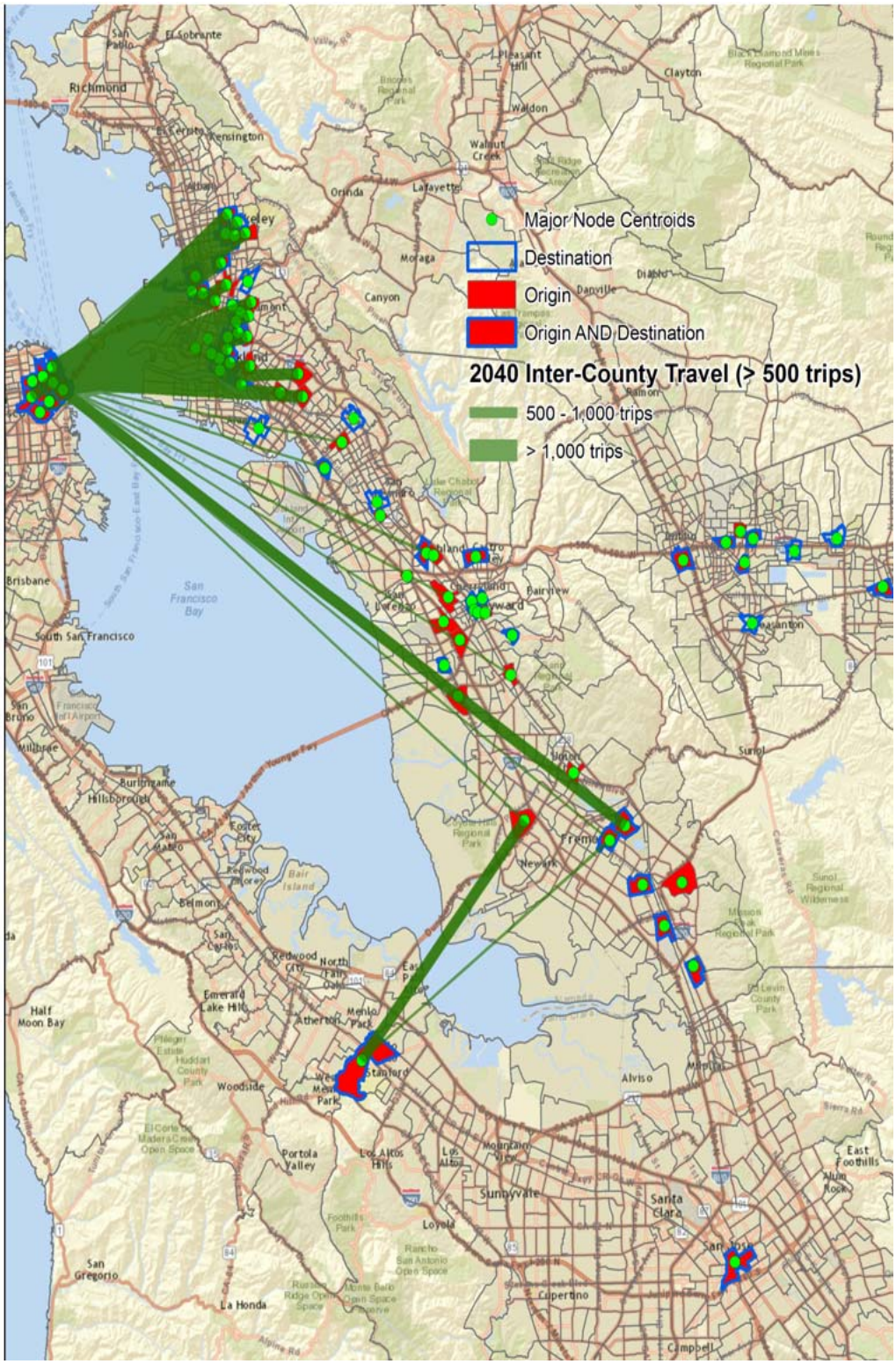
In order to identify major nodes in other parts of the Bay Area, the TCI heat maps (maps showing density by intensity of color) were examined for each major origin and major destination node in Alameda County. TAZs that showed up in the composite of all heat maps with a TCI of greater than 250 were selected for analysis. The threshold of 500 was lowered because using this threshold throughout Alameda County would have excluded all nodes except those along Market Street in San Francisco. This refined analysis yielded eight major nodes in San Francisco centered along Market Street which formed a continuous agglomeration along Market Street from The Embarcadero to Van Ness Avenue. To more effectively assess travel markets, the elongated node was broken into eight smaller nodes, sized in a similar manner to the Alameda County analysis. All eight were designated as major origin and destination nodes.

In addition to the eight major nodes in San Francisco, the study team identified one major node in downtown Palo Alto (which included a portion of Stanford University), and one in downtown San Jose. These regional major nodes had aggregate TCI scores of greater than 250 for both origin and destination trips, which are half the level of 500, achieved for the Alameda County major nodes. Both of these nodes are designated as major origin and destination nodes. The study team added these major nodes to the Alameda County Core Network, and mapped desire lines for intra- and inter-county trips using trip volumes, shown as Figure 5. The markets which showed as having competitive activity node, but did not have high trip densities, represent those areas where trips origins and destinations are dispersed and therefore do not achieve high trip densities in any one market. For example, San Jose has major activity nodes, but not concentrated trips densities from any one activity node in Alameda County. These are the type of transit trips that are best served by providing concentrated access points such as park-and-ride facilities.

Travel Demand Originating Outside the Bay Area

Outside of the nine-county Bay Area region, San Joaquin is of particular interest to the development of a Countywide Plan as trips coming over the Altamont Pass have a significant impact on travel in the I-580 corridor. Transit solutions for this corridor are the subject of two separate studies. The ACE*forward* planning efforts, at the inter-regional level, are looking at increasing the number of daily trains coming over the Altamont Pass and increasing service to Alameda and Santa Clara counties. The proposed BART

Figure 5. Major Bay Area Nodes and Travel Markets Outside of Alameda County



Source: Cambridge Systematics, 2015

to Livermore project is evaluating the potential extension of BART service to Isabel Avenue and beyond to better serve the City of Livermore. The service improvements for the ACE train and the proposed BART extension provide an opportunity to ultimately provide a link between the inter-regional service and the regional service in the vicinity of Livermore and providing more transit options for those commuting in the I-580 corridor.

Environmental review is underway on both of these projects. This plan acknowledges both of these studies (see following section on draft recommendations), but does not presuppose the outcomes of the recommendations. Detailed ridership projections will be included as part of the published environmental documents for each project.

Combining Travel Markets into Transit Corridors

The final step in developing the draft recommendations for transit corridor improvements is the combining of travel markets into rational transit corridors. This step requires not only a systematic approach, but an understanding of transit service planning and close coordination with the transit agencies.

The process that is outlined below focused on developing draft recommendations for enhancing transit service in the Regional Express and the Urban Rapid tiers. These tiers are emphasized because they provide the greatest opportunity for impacting transit ridership in Alameda County. Ridership on Regional Express services has been growing in recent years and additional capacity is needed to serve the county. The Urban Rapid service is intended to provide the infrastructure and service enhancements that will better serve bus transit patrons and reverse the decline in ridership that the bus operators have experienced over the past decade.

The consultant team respected the current practices of the transit operators. AC Transit, LAVTA, Union City and BART operate their systems and their routings for operational, market, social and historic reasons. Unless there was an overriding rationale to change a route, the consultant team respected the current practices. In some cases, Corridors were combined to mirror the current routes, while in other cases routes were altered to realize opportunities for infrastructure improvements on an adjacent street or to respond to an identified market and demographic demand.

These market opportunities are identified though the Transit Competitiveness Index tool to identify nodes and corridors where transit can compete for trips well. The TCI assumes that transit is providing an attractive service. This is defined as:

- Safe
- Reliable
- Accessible

    - Frequent service
    - Robust spans-of-service, and
    - Functional and attractive stops and terminals

- Fast

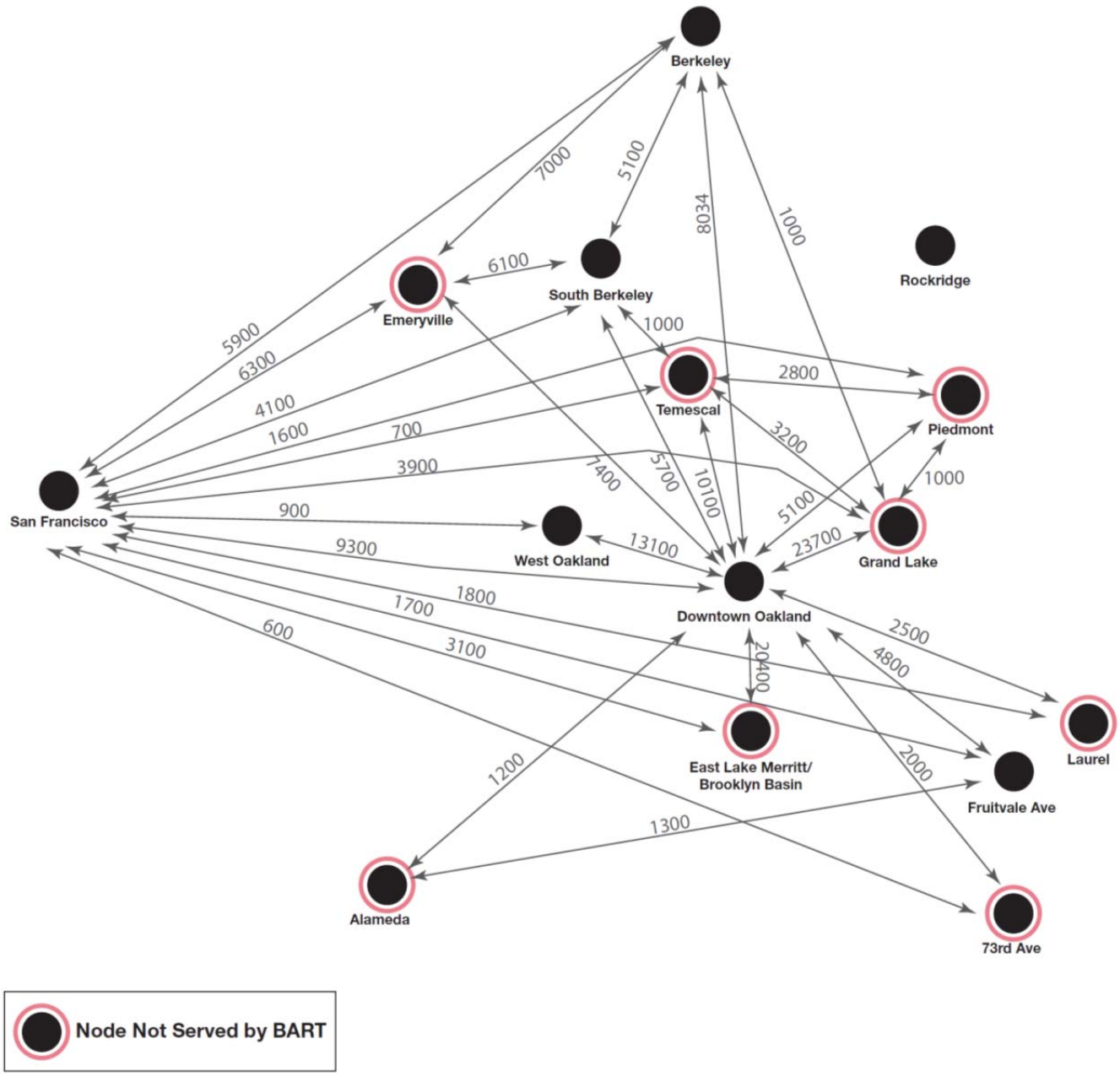
The actual provision of service and improvements focuses on these four core qualities. The intent of this process is to focus resources in the most transit competitive markets to enhance countywide transit services and attract new transit riders. Corridors are the vehicle to focus Alameda CTC resources.

The transit corridors that are recommended for improvements were identified applying the following criteria to the travel markets identified in the previous steps:

- Acknowledging the current structure of transit services;
- Acknowledging current and proposed plans and programs; and
- Identifying potential corridors that offer opportunities for transit priority treatments.

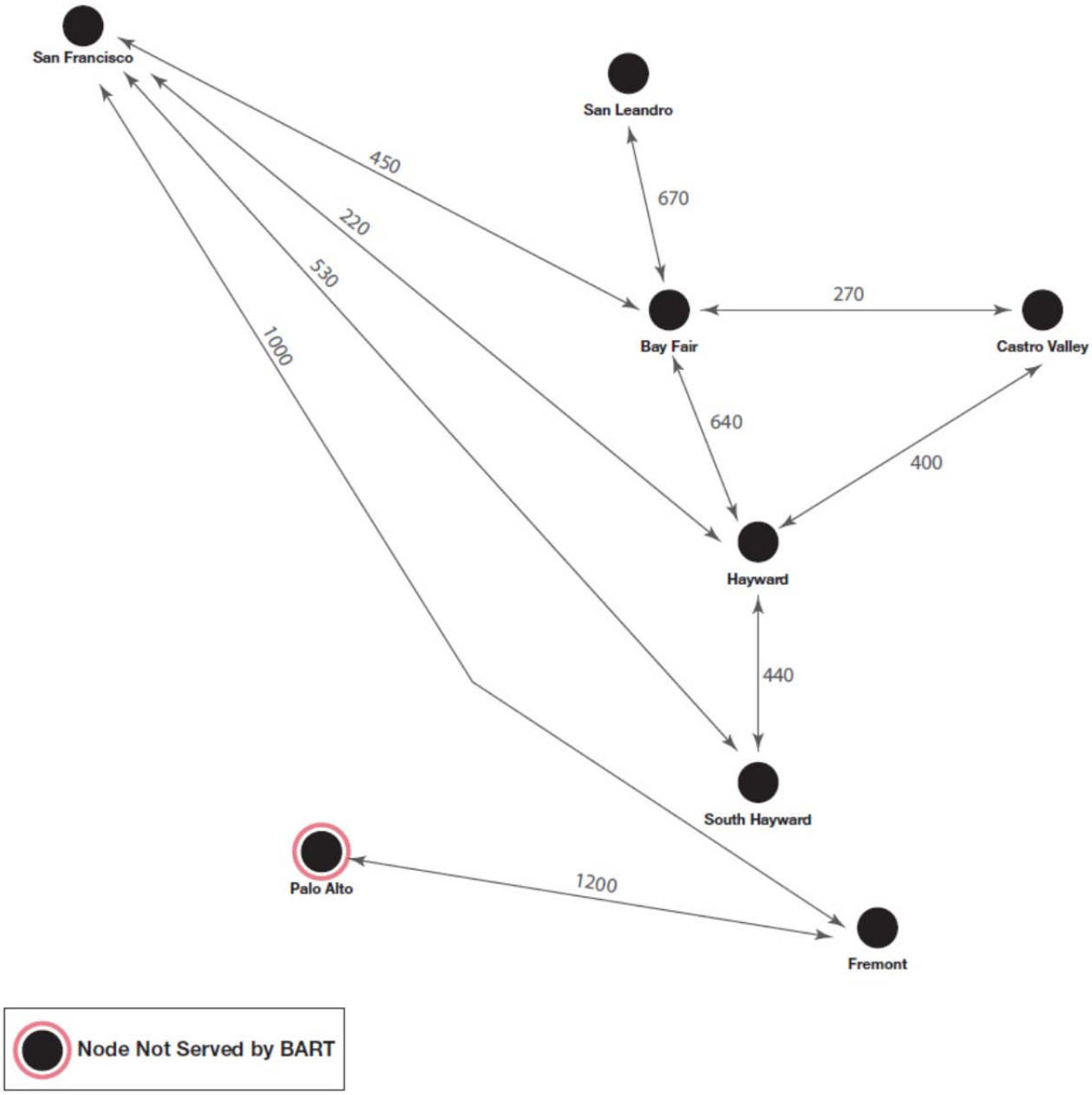
Figure 6 through Figure 10 show an abstract presentation of the O-D pairs and the forecasted daily trips between the identified major activity nodes that were identified in Figure 3 and Figure 5.

Figure 6. 2040 Trips between Nodes - North Alameda County



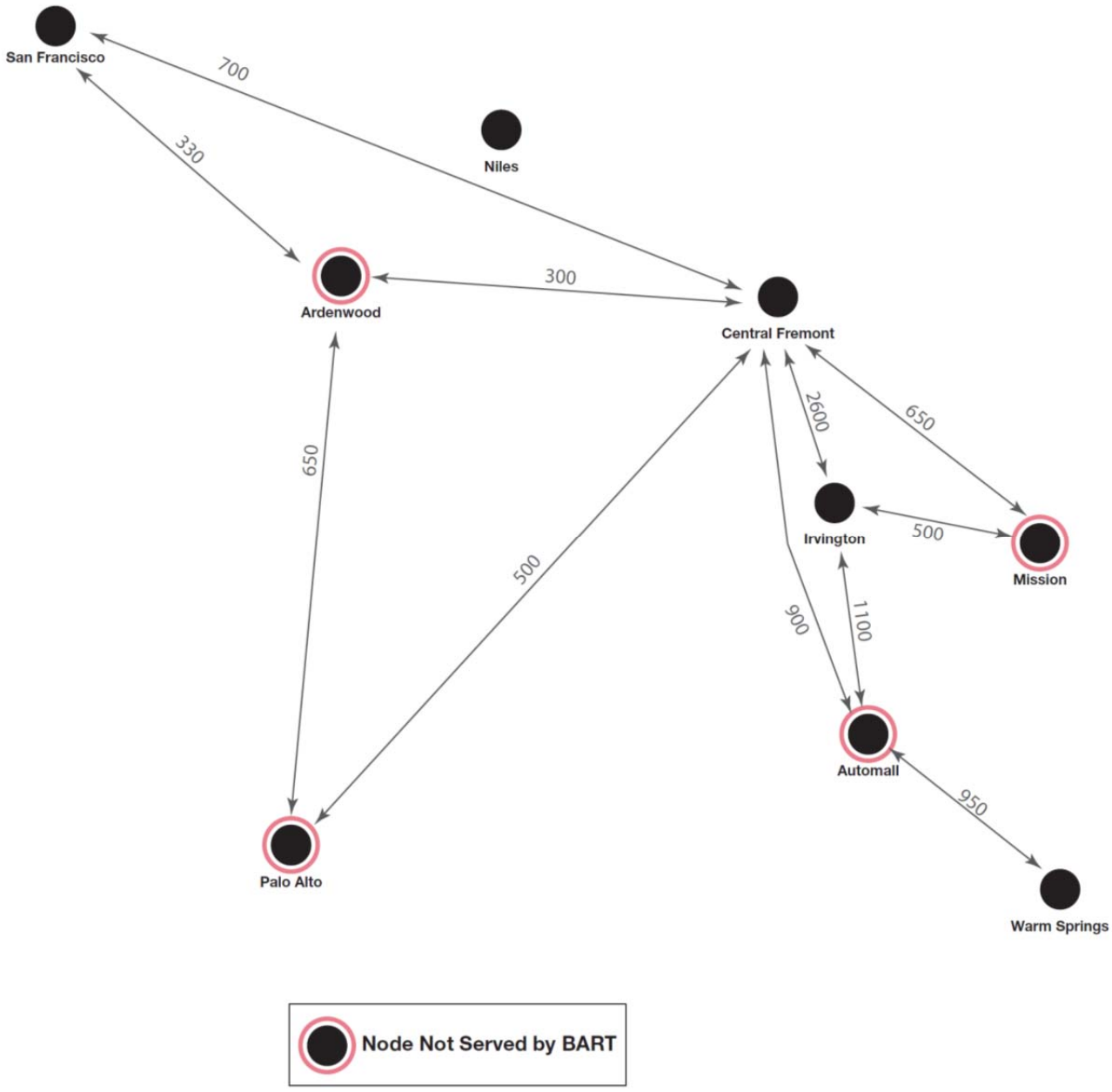
Source: Arup, 2015

Figure 7. 2040 Trips between Nodes - Central Alameda County



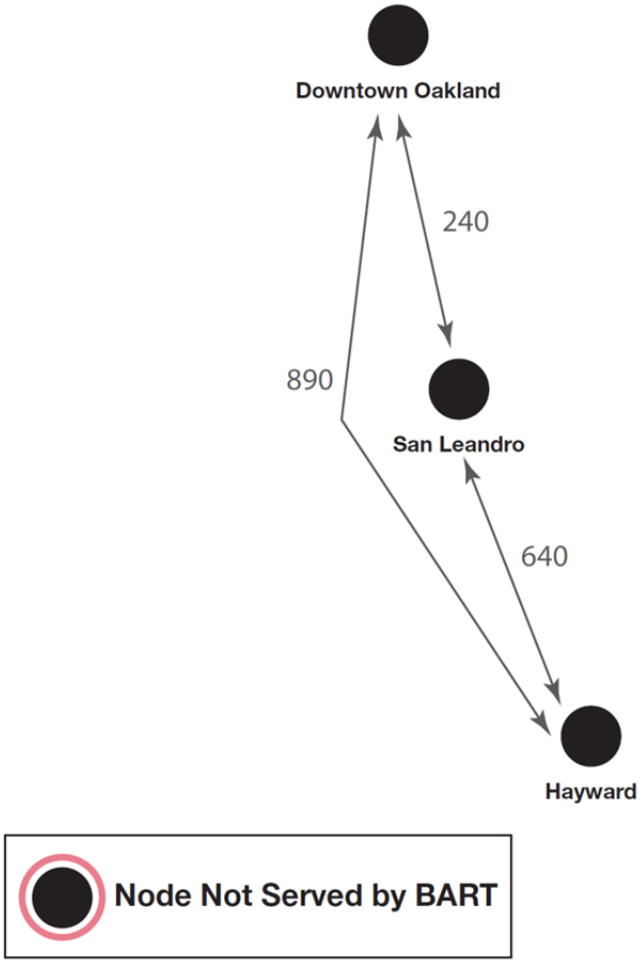
Source: Arup, 2015

Figure 8. 2040 Trips between Nodes - South Alameda County



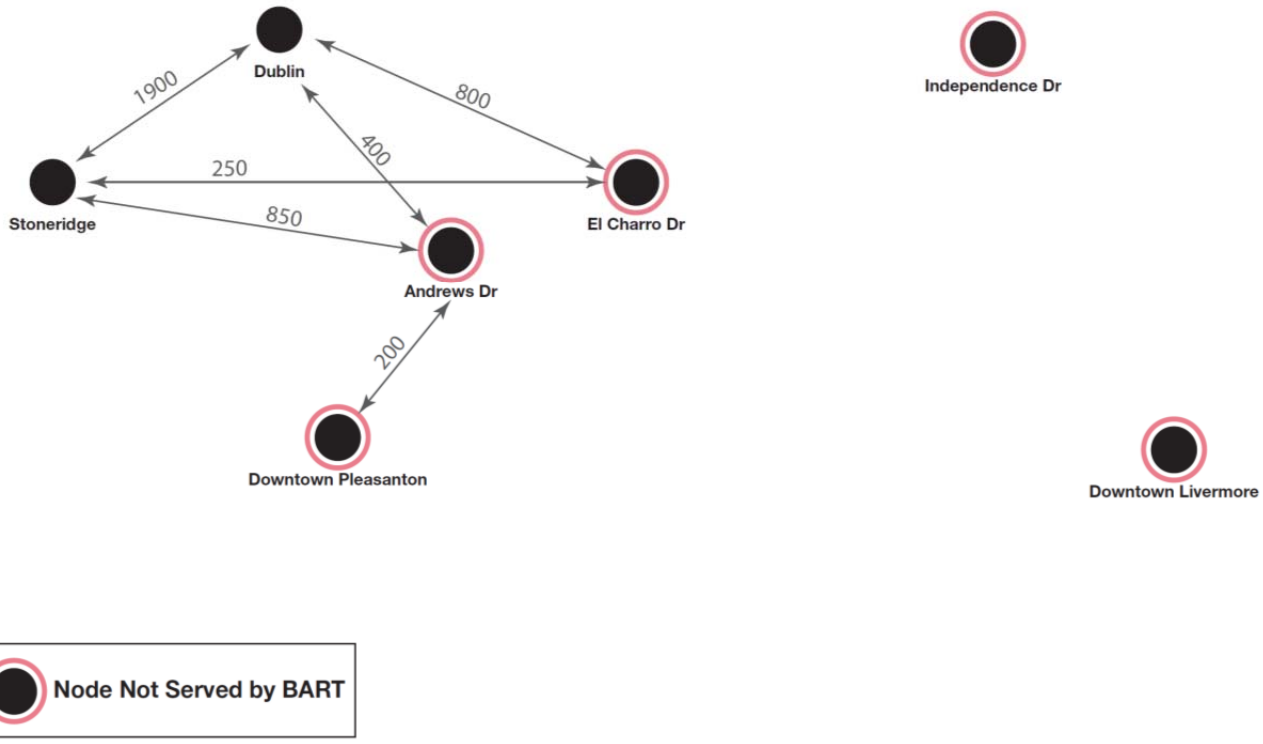
Source: Arup, 2015

Figure 9. 2040 Trips between Nodes – North to South Alameda County



Source: Arup, 2015

Figure 10. 2040 Trips between Nodes - Tri Valley



Source: Arup, 2015

The team used a high trip threshold – 1,000 in most cases – to focus on the highest activity corridors. While the major activity nodes serve as the anchors at each end of the identified travel demand corridors generating a high level of potential transit ridership, the more trip generators along the corridor, the higher the potential for, significantly increasing the overall transit market.

The travel links with the highest potential ridership were identified and were combined to create potential service corridors where service could be upgraded to capture more transit riders. The individual links were combined into corridors by combining travel from one node to others – for example, from downtown Oakland to Temescal and to south Berkeley and then to downtown Berkeley. In other cases, for example, Berkeley to Emeryville to San Francisco, the corridors were designed to match existing service

routes to reduce unnecessary change or to serve underserved markets where development is expected to occur or intensify between now and 2040.

Existing and proposed transit services, including projects in the 2040 Regional Transportation Plan (RTP), were assumed as follows:

- All future regional planned or programmed transit high-category projects are included as part of the 2040 base network. This also includes projects that are currently under construction, such as the East Bay Bus Rapid Transit route along International Boulevard and the BART to Warm Springs project.
- Future planned or programmed projects were identified through a combination of regional and county plan documents. These include Plan Bay Area, Measure BB Expenditure Plan, and AC Transit planning documents.
- The enhanced network assumes the Phase I Service Plan from the BART Sustainable Communities Operations Analysis – Peak Commute Period. This Analysis includes minor reroutings, some additional turnbacks (for example, at BayFair station), as well as additional service frequencies.
- Service or operational changes from the ACE*forward* or Capital Corridor Vision Plan will be incorporated into the Countywide Transit Plan as specific recommendations from these independent planning efforts are developed.

Using the steps outlined above, a 2040 Corridor system that focuses on the Inter-Regional Services, Regional Express routes and Urban Rapid services was developed. This creates a limited number of highly capitalized corridors. The remaining parts of the network – including the Local Frequent and the Community Connector services are the lower tier elements of the system, continue to operate, and receive some operating and capital funding to ensure the entire system functions well. Parts of the corridor system are familiar – the fixed rail services – while the development of the surface corridors was informed by infrastructure quality, right-of-way and existing travel patterns.

Proposed Alameda County Transit Corridors

These 2040 major transit corridors were identified as follows:

Inter-Regional

Capitol Corridor: Via UPRR from Richmond (CC County) to Emeryville, Oakland, Coliseum, and then to Fremont and San Jose (three route options south of Coliseum).

ACE: Via UPRR from Tracy (San Joaquin County) to Livermore, Pleasanton, Fremont, and San Jose.

Regional Express

BART Corridors:

- Santa Clara County/Warm Springs to San Francisco/Daly City
- Santa Clara Co/Warm Springs to Richmond
- Livermore-Dublin/Pleasanton to San Francisco/Daly City
- Richmond to San Francisco/Peninsula
- Pittsburg to San Francisco/Peninsula.

Ferry Transit:

- Brooklyn Basin – SF Ferry Terminal: Oakland to Alameda to San Francisco with an extension to Brooklyn Basin (includes Estuary)
- Alameda to SF Ferry Terminal: Alameda to San Francisco with a new terminal at Alameda Point in addition to the Harbor Bay terminal

Transbay Surface Corridors:

- Berkeley - Emeryville - San Francisco Transbay Transit Center: This route provides transbay service from Berkeley and Emeryville (generally conforms with AC Route F)
- Eastmont Transit Center – Oakland - San Francisco Transbay Transit Center: This routes services the Maxwell Park and Laurel Districts via MacArthur/Grand to downtown Oakland and San Francisco (generally conforms with AC Route NL)
- Tri-Cities - Palo Alto: Enhanced investments in the Tri-Cities area of southern Alameda County to serve the transbay market to Palo Alto (generally confirms with AC Routes U, DB, and DB1).

Urban Rapid

Intra-East Bay Services

- Emeryville – Bay Fair BART Station: Downtown Oakland-International Blvd District to San Leandro (generally conforms with AC Route 1R), but potentially extends service to Emeryville
- Richmond Parkway Transit Center – Jack London Square Amtrak: From Richmond to downtown Oakland via San Pablo Avenue (generally conforms with AC Route 72R)
- Berkeley – Brooklyn Basin: Downtown Berkeley to downtown Oakland and with a potential extension to Brooklyn Basin (generally conforms to AC Route 1R)

- Berkeley – Fruitvale BART: Downtown Berkeley via College/Broadway to downtown Oakland and Alameda connecting to Fruitvale BART with an extension to serve Alameda Point (generally conforms to AC Route 51A/51B)
- Bay Fair BART – Union City BART: Connecting San Leandro, Hayward and Union City via Hesperian Boulevard (generally conforms to AC Route 97).
- Bay Fair BART - Warm Springs BART: Connecting San Leandro, Hayward, and Fremont via Mission Boulevard (generally conforms to AC Route 99).
- West Dublin BART – Livermore ACE: To Los Positas College and downtown Livermore via Stoneridge Mall Rd, Dublin Blvd, North Canyons Parkway and Portola/Livermore Avenue (realignment of existing Rapid service contingent upon proposed extension of Dublin Boulevard).

The Corridor system identifies those corridors capable of supporting high frequency transit service, but acknowledges that these corridors operate within a universe of diverse transit products. Below the higher-level transit corridor tier, additional Local Frequent arterial and Community Connector services will operate, and, if socio-economic and land use characteristics change, these services may be re-evaluated for consideration as competitive corridors and become part of the Urban Rapid tier. Local and community transit service is critical to providing a full range of services for the county. This service is assumed to be made available based on local needs and priorities.

APPENDIX C

Urban Rapid Bus
Case Study – King County Metro Transit RapidRide

Background

In the late 1990s Metro Transit encountered severe challenges maintaining transit speed and reliability on several main corridors in their service area. In order to maintain existing schedules at that time they were forced to increase service hours. The agency added over 100,000 annual service hours between 1995 and 2001 just to maintain existing service levels and quality. To combat the speed and reliability issues the agency decided to modify these routes with the following improvements aimed not only at speed and reliability improvements but also providing a better customer experience overall. The physical and operational changes included the following:

- Off-board fare payment
- Branded Stations with distinctive shelters, seating, lighting, real-time customer information “next bus” signage, etc.
- Transit Signal Priority, Continuous vehicle-to-roadside communication
- Bus Pullouts
- Transit Queue Jumps
- Transit Priority or Business Access Transit Lanes (BAT)
- Frequent Service (minimum 10-minute frequency weekdays from beginning of morning rush to end of evening rush)
- Longer Stop Distance

Identification and Selection of Corridors

Sixteen initial corridors were identified for potential implementation. The list was screened down to three promising corridors based on the following criteria:

Would the service compete with current or planned regional rail projects?

What is the ridership potential along the corridor? Current weekday ridership and surrounding population and employment densities were used as indicators. Specific ridership forecasts were not prepared.

Would the BRT service provide significant connections for the riders? The number of designated urban centers that would be served, and the number of transit hubs and transfer points that would be served to provide connections to other transit services were considered in the evaluation.

What is the potential for improvement in speed and reliability in the corridor?

After identifying the candidate corridors Metro developed a Request for Proposals (RFP) for the jurisdictions along each of the identified routes and created a competition where jurisdiction had to respond to specific questions and commit to contributions such as implementing traffic operations changes, implement TSP, expedite technical review and permitting, etc. The order of implementation was based on the responses from the jurisdictions. Eventually three additional corridors were added to the program for a total of six RapidRide Corridors that are now in operation.

Relevance to Proposed Urban Rapid Corridors for Alameda Countywide Transit Plan

The six King County Metro RapidRide corridors that went into operation between 2010 and 2014 provide a wealth of information regarding the potential results for urban rapid routes in Alameda County. Some of the key similarities between the existing RapidRide system and the proposed urban rapid routes include:

Similar Environments

- Similar urbanized area population—3M Seattle vs. 3.2M SF/Oakland (NTD/2010 census)
- Similar levels of traffic congestion affecting transit operation—INRIX and Tom-
- Tom both put Seattle and SF/Oakland in the top 8 in the US
- Similar types of service areas—Mix of urban, suburban and exurban, with geographic constraints including highly congested bridges
- Similar transit interfaces—inter-city rail, commuter rail, light rail, ferries, street cars
- King County Metro and AC Transit are peer agencies in terms of unlinked passenger trips carrying 117M and 97M annual trips respectively.

Similar Proposed Roadway Treatments and Operations

- Neither are full BRT with exclusive lanes
- Both include moderate capital improvements such as: Queue Jumps, Bus Bulbs, Transit Priority Lanes, Longer Stop Spacing, higher station amenities.
- With the exception of the shorter (6-7 mile) routes near Fremont, the proposed route lengths are similar to KCM RapidRide routes.
- Both transit agencies are mature systems looking for ways to enhance existing ridership
- Both include the application of modern technologies (TSP and real-time bus arrival information)

Results of King County Metro Rapid Ride Implementation

In December of 2014, Metro Transit published the King County Metro RapidRide Performance Evaluation Report. The agency currently has six RapidRide lines (A through F) throughout King County. The agency document significant increases in surveys customer satisfaction and metrics of operational performance. Highlights in several main categories include:

- **Reliability**—headway adherence ranges from 78% to 87%
- **Ridership**—ridership increases ranged from 20% to 81% from the start of service (2010 through 2014 depending on the route) to December 2014.
- **Travel Time Reduction**—Depending on the route the travel time decreased from 3% to 19% compared to previous operations.

4.2B

Evaluation Methodology and Performance Measures

Countywide Transit Plan

DRAFT Technical Memo #6

ALAMEDA County Transportation Commission

Prepared for:
Alameda County Transportation Commission

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With

Cambridge Systematics
Community Design & Architecture
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October 2015

PARSONS BRINCKERHOFF

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Acronyms

Acronym/Abbreviation	Definition
ACE	Altamont Commuter Express
Alameda CTC	Alameda County Transportation Commission
BART	Bay Area Rapid Transit
FTA	Federal Transit Administration
GHG	Greenhouse Gas
HH	Households
MMAP	Multi-Modal Arterials Plan
MPO	Metropolitan Planning Organization
MTC	Metropolitan Transportation Commission
PDA	Priority Development Area
SANDAG	San Diego Association of Governments
TOD	Transit Oriented Development

1.0. Introduction

1.1. Study Process

This Technical Memorandum documents the performance measures and methods that will be used to evaluate the Draft Transit Network Recommendations described in Technical Memorandum #5. The purpose of the memo is to:

- Provide structure and consistency to the evaluation process, and
- Provide decision makers with a procedure for identifying key differences among proposed recommendations.

The evaluation methodology builds on the transit vision and goals adopted by Alameda CTC in March 2015[1], and will be applied to the draft recommendations and proposed network modifications.[2]

Transit Vision and Goals

The performance measures for the Alameda Countywide Transit Plan are derived from the transit vision and goals documented in Technical Memorandum #3. That document provides a description of the linkage between the vision and goals for the Transit Plan and Alameda CTC's vision and goals from the 2012 Countywide Transportation Plan.

Transit Vision

The adopted vision focuses on the challenge to improve transit network efficiency and effectiveness, while providing environmental and economic benefits and is as follows:

"Create an efficient and effective transit network that enhances the economy and the environment and improves the quality of life."

A simple, focused vision sets the stage for an effective performance framework. The strategic goals define what the vision needs to accomplish through a set of separate, yet integrated elements that support the vision.

Transit Goals

Based on the vision, and an understanding of the current conditions in the county, a set of seven transit goals were identified:

[1] See Technical Memorandum #3: Vision and Goals, Alameda Countywide Transit Plan, March 2015
[2] See Revised Draft Technical Memorandum #5: Transit Network Methodology, Alameda Countywide Transit Plan, August 2015

1. **Increase transit mode share**. The number of people living in Alameda County and their auto trips are growing significantly faster than the number of people that are riding transit. If this trend continues, congestion will continue to increase over time and air quality will continue to degrade. To realize a more environmentally sustainable future, transit ridership will need to increase at a rate faster than auto trips. The goal is to not only increase transit ridership, but to increase the per capita use of transit for all types of trips.
2. **Increase effectiveness**. The transit effectiveness goal seeks to increase the number of transit users for the available transit capacity. To achieve a more financially sustainable transit system, it is important to ensure that major transit investments benefit and are used by the greatest number of people, and that supply matches demand.

   Because transit serves multiple purposes in a community, transit effectiveness must also take into account the need to provide a basic level of transit service. During peak hours, transit provides a critical alternative to private auto trips and to travel on highly congested roadways. Transit also serves as the lifeline for transit-dependent populations that may have no other transportation option. Effectiveness (developing transit facilities and services that match demand and generate the highest ridership) must always be balanced with the need to maintain a basic level of service coverage.
3. **Increase effectiveness of inter-regional transit.** One of the roles of transit service in Alameda County is to provide connections to adjacent regions and to the statewide rail network. These services provide alternatives to auto travel on some of the most heavily congested corridors in Alameda County. The Capitol Corridor provides an alternative to travel on I-80 and I-880 from Contra Costa, Solano, Yolo, and Sacramento counties, and ACE provides an alternative to travel on the I-580 corridor from San Joaquin County.

   By maximizing the effectiveness of these transit services that link the state rail network to regional and local transit services, the demand for inter-regional travel on the county's freeway system, as well as vehicle miles traveled and greenhouse gas emissions, is reduced.
4. **Increase cost efficiency**. The cost of providing transit service is increasing in the county without a commensurate increase in service levels or passengers. To maintain and expand transit services, and to increase frequency and service hours, resources must be used as efficiently as possible.
5. **Improve access to work, education, services and recreation**. The transit system should make it easier for people to travel without having

to rely on a car. Integration with appropriate land use and enhanced first- and last-mile connectivity will increase transit viability and overall accessibility.

6. **Reduce emissions**. Alameda County has adopted a goal to reduce greenhouse gas emissions to 1990 levels. With transportation being the single largest contributor to greenhouse gas emissions, shifting travel away from cars and onto transit can help reduce emissions and enhance the quality of life and the environment in Alameda County.
7. **Achieve a state of good repair**. To provide a safe and reliable transit experience for the user, the transit system needs to be in good working condition. Maintenance of the existing transit facilities and fleet need to be balanced against system expansion.

   This is a particularly acute issue for BART, which is the backbone of the county's transit system, but it is also important for the delivery of reliable bus and ferry service. Maintenance of the core network is critical to being able to accommodate future growth of the system.

1.2. Development of Projects Included in Transit Network

In many transit studies, projects included in the evaluation process are proposed by communities, elected officials, or transit advocates as part of a community visioning process and represent a wide range of improvement ideas. Typically, a high-level screening is applied to the initial set of projects to eliminate those that are infeasible or do not meet the goals and objectives as well. This is not the case for the Alameda Countywide Transit Plan. For this planning effort, the Draft Transit Network Recommendations defined during the creation of the network vision were developed through a strategic technical analysis based on a thorough review of existing conditions, existing plans and studies, a market and transit operational analysis, and an understanding of the Alameda CTC's transit vision and goals. As a result, the evaluation of the transit vision network begins with a relatively limited set of Draft Transit Network Recommendations described in Technical Memorandum #5. [3]

The qualitative and quantitative performance measures, described in the rest of this memorandum, represent a refined set of measures that will be used to provide a more robust picture of the performance of the transit vision network as a whole and for individual draft recommendations. The focus of the evaluation will be to provide information regarding the characteristics of each draft recommendation rather than the development of a rank-ordered

[3] See Revised Draft Technical Memorandum #5: Transit Network Methodology, Alameda Countywide Transit Plan, August 2015

list of recommendations. In that context, relationships or inter-dependencies between recommendations will be discussed in detail.

1.3. Network Alternatives

Task 5 generated a set of draft recommendations to help the county make progress towards achieving the transit vision and goals. These draft recommendations are collectively referred to as the transit "vision" network. The vision network will be compared against existing conditions and a future baseline network that is consistent with the projects contained in MTC's Regional Transportation Plan (see Table 1 below).

Table 1: Network Alternatives

#	Network Alternatives	Year	Description
1	Existing Conditions	2010	Land use and transportation conditions as they were in 2010 per the updated Countywide Travel Demand Model.
2	Baseline Conditions	2040	Consistent with MTC's regional transportation plan.
3	Vision	2040	Set of all improvements identified in the Countywide Transit Plan

SOURCE: Parsons Brinckerhoff, 2015

2.0. Evaluating Performance

2.1. Performance Measures

The performance measures were developed to assess how the transit vision network and draft recommendations support implementation of the adopted transit vision and goals. These measures were compared with selected recent transit studies to validate the scope and completeness of the measures used. In particular, the following studies were reviewed when developing the performance measures presented below:

- Sound Transit Long-Range Plan/ST2 Planning: System and Project Evaluation Methodology Report 02/2006
- Sound Transit: North Corridor Transit Project Alternatives Analysis Report 09/20/2011
- City of Seattle and Sound Transit: Ballard to Downtown Seattle Transit Expansion Study 05/30/2014

- SANDAG 2050 Regional Transportation Plan: Technical Appendix 4 – Transportation Project Evaluation Criteria and Rankings
- City of Seattle Transit Masterplan Final Summary Report April 2012
- Community Transit Long Range Plan, 2011
- Federal Transit Administration National Transit Database, updated annually

Performance measures will be used for two types of evaluations, which will be documented in a future technical memorandum:

- **Network:** This evaluation will quantify the anticipated benefits cumulatively resulting from the draft recommendations with respect to each identified goal. Performance measures will be applied to the existing and future baseline alternatives as well as the "Vision" network in order to gauge the relative effect of each network alternative.
- **Project:** The assessment will consider the costs and benefits of both capital and operating activities associated with each draft recommendation or proposed project. General assumptions will be made regarding capital and operating costs for each proposed network recommendation. (Those projects that are already in the project development or environmental phase will not be evaluated.) These cost assumptions will be used only for comparative purposes and are intended to provide information that can be used in prioritizing and/or phasing of project implementation.
    - **Capital:** This evaluation will allow Alameda CTC to do a comparative assessment of capital projects with respect to each identified goal.
    - **Operations**: A significant portion of the county's funds will continue to support operations and maintenance of transit services. The operating performance varies significantly across transit operators. This evaluation will allow Alameda CTC to evaluate operations practices of transit operators.

Both quantitative and qualitative performance measures have been identified for network and project evaluation. These are described below.

Quantitative Performance Measures

Quantitative performance measures for each goal are summarized in Table 2 and are described in the following section.

Table 2: Quantitative Performance Measures

#	Goals	Performance Measures		
		Network-Level	Project-Level Capital	Project-Level Operating
1	Increase transit mode share	Per capita daily transit ridership	Net new riders	
		Percentage of intra-county trips on transit		
2	Increase effectiveness (including inter-regional travel)	Passenger trips per revenue vehicle mile		Passenger trips per revenue vehicle mile
		Miles of dedicated right-of-way (proxy for travel time reliability)	Miles of dedicated right-of-way (proxy for travel time reliability)	
		Daily transit trips (unlinked)	Daily transit trips (unlinked)	
			Reduction in transit travel time (peak/off-peak)	
		Number of transit hubs served, including inter-regional hubs		
3	Increase cost efficiency		Capital cost per net new rider	
		Operating cost per boarding		Operating cost per boarding
4	Improve access	Number of HH/jobs within half-mile of transit stops within each service tier	Number of HH/jobs within half-mile of transit stops	
		Number of Communities of Concern affected		
5	Reduce emissions	GHG emissions	Zero emission vehicles	
6	State of good repair		Cost of mid-life overhaul and/or replacements before 2045 to be included in cost estimates	

SOURCE: Parsons Brinckerhoff, 2015

The definitions for the quantitative performance measures are as follows:

- **Per capita daily transit ridership**: This measure will be used to compare transit usage normalized with population over time (2010 vs. 2040). For evaluation of networks, ridership and population data will be taken from the travel demand estimation process (using both the Alameda County Travel Demand Model as well incremental approaches to ridership forecasting as detailed in the Appendix). For evaluation of operations, ridership data reported by transit agencies and population estimates/projections prepared by state or regional agencies will be used.
- **Percentage of intra-county trips on transit**: This measure will be used to track progress towards increasing transit mode share for intra-county trips. For evaluation of networks, intra-county ridership data will be taken from

the travel demand estimation process (using both the Alameda County Travel Demand Model as well incremental approaches to ridership forecasting as detailed in the Appendix).

- **Net new riders**: This measure will be used to compare the ability of a project to attract new riders to transit. This measure will be used for evaluation of projects only and will use estimates of net new riders from the travel demand estimate process.
- **Passenger trips per revenue vehicle mile**: This measure will be used to assess the utilization of service for both networks and projects. For network and project evaluations, the passenger trips will come from the travel demand estimation process, while the revenue vehicle mile data will be derived from proposed service levels.
- **Miles of dedicated right-of-way**: This measure is a proxy for the reliability of transit service under the assumption that exclusivity reduces schedule variability associated with intermittent general purpose traffic congestion. The measure will be used for both network and project evaluations. The data will come from each project definition.
- **Daily transit trips**: This measure will show the transit trips associated with the project and will be aggregated at the network level. This measure is being used in addition to net new riders to allow for comparison to other transit agencies and provide input to efficiency metrics such as passenger trips per revenue vehicle miles. This data will come from the travel demand estimation process.
- **Reduction in transit travel time**: Transit travel time improvements will be estimated based on the type of physical changes proposed for the corridor. This measure will be applied at the project level. This data will come from a combination of synthetic and incremental modeling exercises (as detailed in Section 2.2 and the Appendix).
- **Number of transit hubs served, including inter-regional hubs:** This measure will show the "interconnectivity" of a particular transit line. This data will come from project definition evaluated against the existing and planned transit hubs.
- **Capital cost per net new rider**: This measure will be applied at the network and project level. Capital costs will be estimated from data bases that have compiled costs for comparable types of improvements in Alameda County and in other regions.
- **Operating cost per boarding**: This measure will be applied at the network and project level. Operating costs will be estimated from current operating costs for comparable types of service in Alameda County and other regions.

- **Number of households (by income level) and jobs within half-mile of transit stop within each service tier**: This measure provides useful information related to the potential overall market and equity issues associated with proposed service changes. It will be applied at the network and project levels. It also, provides a measure that helps provide context for the comparison of proposed projects in Alameda County to similar transit projects implemented elsewhere in the US.
- **Number of Communities of Concern affected:** This measure will help to establish whether the proposed modification will have a positive impact on Communities of Concern, i.e. those communities that face particular transportation challenges, either because of affordability, disability, or because of age-related mobility limitations. These may also be defined as those areas covered by Community Based Transportation Plans. A qualitative assessment of the extent to which proposed transit improvements benefit these communities will also be performed.
- **GHG emissions:** This measure will be applied on the network-level only and is generated based on output from the travel forecasting process (using both the Alameda County Travel Demand Model as well incremental approaches to ridership forecasting as detailed in the Appendix).
- **Zero emission vehicles**: This measure will be applied at the project level as an indicator of relative fleet emission impacts associated with the proposed improvement. Information on the use of zero-emission vehicles will be obtained from individual transit operators.
- **Cost of mid-life overhaul and/or replacements before 2045:** In order to reflect the goal of state of good repair, project cost estimates will take into account the cost of a mid-life overhaul and capital replacement required before 2045 as appropriate depending on asset type. This information will be obtained from individual transit operators as well as form the consultant team's database of relevant transit capital projects.

Qualitative Performance Measures

In addition to the quantitative measures listed above, the projects will also be evaluated using a set of qualitative performance measures to capture those benefits that cannot be readily modeled or forecasted so as to provide a quantitative metric. Qualitative measures include:

- **Support TOD strategy:** Linking transit investment with supportive land use patterns is critical to the success of transit. This performance measure will assess the characteristics of land uses adjacent to the proposed transit project to assess the potential for transit success.

  - *Density* – Are high density development and housing affordability requirements in place for development near transit stations/stops?
  - *Mix of Uses* – Does the local jurisdiction have policies that encourage mixed-use development, such as, zoning codes that allow a mix of uses, form-based development codes (which generally facilitate mixed use development or co-locations of different uses better than conventional zoning approaches), innovative jobs/housing balance policies and programs, shared parking allowances or requirements?
  - *Parking Management Policies* – Does the local jurisdiction have progressive parking policies, such as, value or demand priced parking, reduced parking requirements in areas served by transit, parking maximums, shared parking policy, reduced parking for affordable housing units, provision of free or reduced-cost transit passes, and a tracking system to monitor these programs?

- **Number of existing or planned major activity nodes served:** Major activity nodes with high levels of transit demand serve as anchors for transit routes. Generally, major activity nodes are locations where there are a concentrate number of trip destinations and/or origins, such as colleges or universities, downtown central business districts, shopping centers, and large medical centers. The routes that are most productive, not only have major anchors at each end of the route, but also have the potential to generate robust transit demand along the route.

  Proposed projects will be evaluated in terms of how well they serve multiple existing or planned major activity nodes (including active PDA's).

- **Intermodal connectivity**: Projects will be evaluated in terms how effectively they connect different types of transit services within the transit network. This will be evaluated by assessing the number of transit service tiers served and the ease of access between different transit modes.

- **Customer experience:** Customers' expectations evolve as amenities and services become available to them. Most transit agencies in Alameda County have carried out customer satisfaction surveys to identify factors that affect their decisions to use transit. Most agencies have also adopted performance measures to track customer satisfaction over time. A qualitative assessment will be made of each project's impact to the rider's experience based on factors such as: service reliability, ease of transfers, ease of access to transit information and whether or not the proposed project has the potential to improve customer satisfaction.

- **Compatibility with Arterials Plan recommendations**: Coordination with the Arterials Plan typologies will ensure consistency between both plans.

2.2. Modeling Considerations

Because forecasts of transit demand associated with individual or groups of draft recommendations are a critical input to several of the most important evaluation criteria, it is important to understand the advantages and disadvantages of different modeling procedures and how the results should be interpreted. Therefore, a brief discussion of travel demand modeling and the proposed combined approach is provided below.

This evaluation employs a combination of **synthetic** and **incremental** approaches to forecasting transit ridership.

The **synthetic** evaluation method uses a travel demand model (in this case, the 4-step Alameda County Travel Demand Model), which forecasts both travel mode choice and route choice based on statistical estimates of origins and destinations given future land use and transportation system changes.

Incremental approaches to transit ridership forecasting are based on observed transit usage. They forecast transit ridership changes by applying demand elasticities to whatever type of change is being made (fares, frequency, etc.).

An FTA-sponsored survey of MPOs found that 63 percent of the respondents used service elasticities to forecast ridership and 51 percent used 4-step travel models, with many using both in combination. The primary reason for using both is that each method has important limitations that can be overcome through the use of the other method. This can be seen in the comparison table below (see Table 3).

Table 3: Network Alternatives

Synthetic Methods (4-step models)	Incremental Methods (elasticities)
Advantages • Sensitive to changes in land uses and to transportation projects, including improvements in other modes • Can forecast ridership for new modes or extension of an existing mode to areas not previously served	Advantages • Use of route-level survey data eliminates the upstream error (land use data, income data, etc.) found in travel models. The base ridership will be accurate • Can be used to forecast changes for small-scale projects
Weaknesses • Intended to function at a large scale; incapable of forecasting effects of micro-scale projects such as queue jumps • Provides reasonable forecasts for transit as a whole but not for individual bus routes	Weaknesses • Critically dependent on data for existing conditions, so cannot be used where service does not already exist • Insensitive to other changes in the network such as improvements to a parallel freeway

SOURCE: Parsons Brinckerhoff, 2015

As is the case with virtually all synthetic approaches which rely on travel demand models, the Alameda CTC travel demand model is much more accurate for auto travel than for transit, especially bus transit. However, the model is validated (tested for accuracy) at the level of daily ridership by transit operator.[4] In other words, the model is expected to provide a good estimate of total daily ridership for each transit operator, but is not validated for more detailed levels of analysis, such as ridership on individual bus lines at different times of the day.

Many of the draft recommendations to the Alameda County transit network involve a combination of small-scale improvements to bus routes and specific roadways (e.g. transit signal priority, bus bulbs, transit queue jumps, etc.). Synthetic models are not sensitive to these types of changes even though there are examples of transit ridership gains as the result of transit speed and reliability improvements.[5] For the evaluation phase of this project, a combination of synthetic and incremental approaches will be utilized in order to capture the advantages of each analysis approach and overcome the limitations that either approach would have if used alone.[6]

[4] See Table 3-15 in Alameda Countywide Transportation Model Update – Model Documentation, Dowling Associates, August 2011
[5] For a case study of King County Metro Rapid Ride, see Technical Memorandum #5: Transit Network Methodology, Alameda Countywide Transit Plan, August 2015
[6] For further detail, see the Appendix, Draft Technical Memorandum #5.4, Proposed Modeling Approach, Alameda Countywide Transit Plan, August 2015.

2.3. Application of Performance Measures

Results from the evaluation of draft recommendations using quantitative and qualitative performance measures will be presented in a matrix format. The transit vision network will also be evaluated against existing conditions and baseline conditions networks. For each performance measure, results will be presented on a three-point scale (low, medium, high). Each performance measure will be assigned weights determined through discussions with Alameda CTC. Table 4 shows a sample evaluation matrix.

Table 4: Sample Evaluation Matrix

Project			Quantitative Performance Measures													
	Per Capita Transit Ridership	Percentage of Intra-County Trips on Transit	Net New Riders	Passenger Trips per Revenue Vehicle Mile	Miles of dedicated right-of-way	Capital cost per net new rider	Daily Transit Trips	Reduction in Transit Travel Times	Operating Cost per Net New Rider	Number of Transit Hubs Service, including Inter-regional hubs	Operating Cost per Boarding	Number of HH/jobs within half-mile of transit stops	Number of Communities of Concern affected	GHG Emissions	Zero Emissions Vehicles	Cost of mid-life overhaul and/or replacements before 2045 to be included in cost estimates
Project 1	○	●	◐	○	◐	◐	●	◐	○	◐	○	●	●	○	◐	●
Project 2	●	◐	◐	○	●	◐	◐	○	◐	○	●	◐	●	◐	●	○
Project 3	◐	◐	○	○	◐	◐	●	◐	●	◐	◐	●	◐	●	●	◐
Project 4	●	●	●	◐	◐	●	○	◐	●		●	○	○	○	◐	●
Project 5	○	○	◐	●	○	◐	○	○	●	○	◐	◐	◐	○	●	◐

Legend: ○ 1 – Low Score; ◐ 2 – Medium Score; ● 3 – High Score

3.0. Appendix – Proposed Modeling Approach

Technical Memorandum

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To: Kara Vuicich, Alameda County Transportation Commission

From: Don Hubbard, TE, AICP, Parsons Brinckerhoff

Subject: Tech Memo 5.4, Proposed Modeling Approach

Date: August 15, 2015

The Alameda County Transportation Commission's (Alameda CTC's) Countywide Transit Plan and Alameda-Contra Costa County Transit District's (AC Transit's) Major Corridors Study, both entail the use of ridership forecasting to estimate potential relative benefits associated with recommended improvements. This memo describes the approach that we propose to take for this forecasting work and the reasoning behind the recommended approach.

Goals of the Forecasting Task

The forecasting is being undertaken to provide a means to compare the relative benefits of different proposed transit improvements. It must cover a variety of improvement types singly or in combination

- New routes
- Extensions of existing routes
- Changes in frequency of service
- Linear improvements (e.g. dedicated lanes for portions of route)
- Point improvements (bulb-outs, queue jumps, etc.)

General Approaches to Ridership Forecasting

There are two general approaches to transit ridership forecasting:

- ***Synthetic methods*** forecast ridership based on information on land uses, travel behavior, and the modes and routes available to travelers. These are usually combined into a 4-step model such as the Alameda CTC Travel Demand Model.
- ***Incremental approaches*** are based on observed transit usage and forecast changes using elasticities for whatever type of change is being made (fares, frequency, etc.).

A survey sponsored by the Federal Transit Administration (FTA) found that 63 percent of the surveyed MPOs used service elasticities to forecast ridership and 51 percent used 4-step travel demand models, with many using both in combination. The primary reason for using both is that each method has important limitations that can be overcome through the use of the other method. This can be seen in Table 1. We recommend using a combination of synthetic and incremental approaches in order to capture the advantages of each and overcome the limitations that either approach would have if used alone. It should be noted that FTA accepts both approaches so long as they are used appropriately and performed properly.

Table 1: Comparison of Synthetic and Incremental Approaches

Synthetic Methods (4-step models)	Incremental Methods (elasticities)
Advantages • Sensitive to changes in land uses and to transportation projects, including improvements in other modes • Can forecast ridership for new modes or extension of an existing mode to areas not previously served	Advantages • Use of route-level survey data eliminates the upstream error (land use data, income data, etc.) found in travel models. The base ridership will be accurate • Can be used to forecast changes for small-scale projects
Weaknesses • Intended to function at a large scale; incapable of forecasting effects of micro-scale projects, such as queue jumps • Provides reasonable forecasts for transit as a whole, but not for individual bus routes	Weaknesses • Critically dependent on data for existing conditions, so cannot be used where service does not already exist • Insensitive to other changes in the network such as improvements to a parallel freeway

The Alameda CTC Travel Demand Model

The Alameda CTC model was created in 2007 based on Metropolitan Transportation Commission's BAYCAST model. The mode split component of the Alameda CTC model was copied from the Valley Transportation Authority (VTA) model, which has more detail than the BAYCAST model. The model was recently updated to improve transit accuracy, make the land use forecasts consistent with the Sustainable Communities Strategy, and validate it to more recent data.

AC Transit and other bus routes are represented in the model as a series of points along the road system, some of which are designated as stops. Ridership is estimated based on comparison of the overall cost of using transit versus using some other mode, for each origin-destination pair. The costs of taking the bus include:

- If walk access, then walk time from home to bus stop. If kiss-and-ride access, then drive time. If park-and-ride access, then drive time and parking costs.
- Wait time at the bus stop, which is a function of service frequency. The model allows for different headways for peak- and off-peak hours
- Bus travel time, which is computed based on auto travel time. This varies by route but is generally 1.5 to 3.0 times the auto travel time, and includes dwell time at bus stops. This formulation allows the model to reflect the effect of congested conditions on both auto and bus travel times

Each model run generates two ridership figures. One is based on AM peak period conditions (traffic levels, headways, etc.) and is used to represent the six peak hours of the day (3 hours in the AM and 3 hours in the PM). The other figure is based on mid-day conditions (speeds, headways, etc.) and represents all off-peak hours.

As is the case with virtually all 4-step models, the Alameda CTC model tends to be more accurate for auto travel than for transit, especially bus transit. The model was validated (tested for accuracy) at the level of daily ridership by transit operator. In other words, the model is expected to provide a good estimate of total daily ridership for each transit operator, and does. The model also provides forecasts at

more detailed levels of analysis, but the further the analysis moves away from the validation level the less reliable the forecast will be, and more care must be exercised in using the forecasts.

This can be seen in Table 2, which compares the model forecasts to Alameda CTC data for three routes that have been identified for possible improvements. The model's forecasts, at a very detailed level (for individual routes in individual time periods) range anywhere from 1 percent to 376 percent of actual ridership; a high margin of error. But, when both time periods and all three routes are combined the aggregate forecast has a low margin of error (11 percent off). For the entire AC Transit bus system, the model results are only 6.6 percent higher than observed ridership[1].

Table 2: Comparison of Alameda CTC Model Ridership to Actual Ridership for 3 Routes

Route	Location	Count				ACTC Model				Total	
		Southbound		Northbound		Southbound		Northbound			
		Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak	Count	Model
1	International South of Seminary	768	972	582	790	62	5	201	11	3,112	279
		Ratio of Model/Count >				*0.08*	*0.01*	*0.35*	*0.01*		*0.09*
1R	International South of Seminary	853	969	873	835	894	232	3,286	880	3,530	5,292
		Ratio of Model/Count >				*1.05*	*0.24*	*3.76*	*1.05*		*1.50*
97	Hesperian South of Turner	357	408	328	533	294	112	1,232	155	1,626	1,793
		Ratio of Model/Count >				*0.82*	*0.27*	*3.76*	*0.29*		*1.10*
Total		357	408	328	533	294	112	1,232	155	8,268	7,366
		Ratio of Model/Count >				*0.82*	*0.27*	*3.76*	*0.29*		*0.89*

Knowing this, the proposed approach is to be selective about how we use this model. Appropriate uses are:

- Percentage response to major changes in inputs - For example, the model may be somewhat off on its base forecast for off-peak ridership on a route, but can still give a reasonable forecast of the percentage increase in ridership from shortening the headways, or the percentage increase in ridership from a major land use change. The percentage increase is then applied to observed ridership.
- Indicating relative performance – The model can provide an accurate prediction of which of several alternate routes is likely to attract the highest ridership.
- Predicting ridership for new service to an area not currently served. For the introduction of new service, this is the most effective tool for capturing the potential ridership.

There are other types of analysis where a countywide 4-step model is not the preferred forecasting tool. Models of this type are not intended for very fine-grained analysis such as analyzing the effects of queue jumps or curb extensions, whose effects are small in relation to the model's margin of error. For that a different kind of analysis is needed.

Incremental Modeling

Incremental, or pivot-point, modeling is suited for analyzing relatively small-scale changes to transit services. Incremental analysis is done in three steps as follows:

[1] See Table 6.6 in *Alameda Countywide Transportation Model Update – Model Documentation*, July 2015

1) Compute the percent change in the independent variable (travel time, fare, etc.)
2) Multiply the percentage change in the independent variable by the elasticity of the dependent variable (usually ridership) to find the predicted percentage change in the ridership.
3) Apply the predicted percentage change in ridership to the observed ridership to find the predicted new ridership

For example, several other transit systems reported an observed elasticity of +0.33 for changes in service frequency during the AM peak hour.[2] So if a route had an existing ridership of 1,000 passengers and service frequency increased from 4 to 6 buses an hour (a 50% increase), then ridership would be expected to increase by 16.5% to 1,165 passengers. The advantage of this modeling system is that it can work for relatively small increments, including the small reductions in travel time from queue jumps and curb extensions. A previous memo went through a detailed example of how the change in ridership from curb extensions could be computed, and also described how the traveler benefits could be calculated in dollar terms for use in cost-benefit analysis (see Attachment A).[3]

Discussion Draft of Approaches by Project Type

Based on the preceding information we have identified some approaches for the various project types currently under consideration (see Table 3). These are summarized in the table below. The project types are listed in order from those most suitable for analysis using the Alameda CTC model to those least suitable.

[2] *TCRP Report 95: Traveler Response to Transportation System Changes*, TRB 2004

[3] Technical Memorandum: *Methodology for Evaluating Travel Benefits*, Parsons Brinckerhoff, May 8, 2015

Table 3: Recommended Residential Land Use Categories

Proposed Improvement	Main Effect of Improvement	Proposed Forecasting Technique
Route extensions	The route would serve areas not currently served, or not served by the route proposed for extension	Code the extensions into the Alameda CTC model to get a preliminary estimate of ridership. Then factor ridership up or down for the extension based on how closely the model matches observed trip-making for the existing portion of the route.
Dedicated transit lanes	Reduce travel times for transit riders	Add new nodes to the Alameda CTC model that will enable us to *hard-code* travel times that are independent of auto travel times. Revise the transit line file so that whatever routes would use the lanes would be assigned the new travel times. Run the model to compute the percentage change in ridership by line, and apply it to the latest ridership data. If the new lanes would be created by reducing existing auto lanes then auto dis-benefits would be considered.
Peak-hour bus lanes	Reduce travel times for transit riders, but only during peak hours	Use the same approach as for dedicated transit lanes, but disregard any changes occurring in the off-peak hours.
Bus Lanes in one direction of travel	Reduce travel times for transit riders, but only in one direction	Same approach as for dedicated transit lanes. However, some post-processing will be required to correct for the fact that the Alameda CTC model assigns transit trips for the AM peak period only, so it does not naturally capture the effect of a change in a single direction of travel.
Changes in service frequency	Reduced wait times for transit riders	A) Adjust the headways for the lines affected. Then run the model to compute the percentage change in ridership by line, and apply it to the latest ridership data. or B) Use the elasticity of ridership to service frequency to compute increases in ridership
Transit-preferential streets	Minor reductions in travel times for transit riders	A) Adjust the bus speed factor so that bus travel times are closer to auto travel times for the affected streets, or B) Use the elasticity of ridership to travel time to compute increases in ridership
Curb extensions	Minor reductions in travel times for transit riders	Estimate time savings from existing studies. Use the elasticity of ridership to travel time to compute increases in ridership.
Queue jumps	Minor reductions in travel times for transit riders	Estimate time savings from existing studies or intersection Level of Service (if known). Use the elasticity of ridership to travel time to compute increases in ridership.

Sensitivity and Expected Scope of Change

In order to get a preliminary indication of how sensitive ridership might be to changes in travel time, we ran a sensitivity test using the Alameda CTC model. The test consisted of doubling the service frequency across-the-board for all transit modes in the model. The results are shown in Table 4:

Table 3: Results of Alameda County Sensitivity Test for Service Frequency

Measure	Base Ridership	Ridership	Change in Ridership	% Change
Total Model Peak Transit Trips	1,498,512	1,730,542	232,030	15%
Total Model Off-Peak Transit Trips	2,019,846	2,837,114	817,268	40%
Peak Local Bus Trips	364,191	435,572	71,381	20%
Off-Peak Local Bus Trips	220,455	264,782	44,327	20%
Intra-Alameda County Peak Transit Trips	218,651	252,848	34,197	16%
Intra-Alameda County Off-Peak Transit Trips	287,394	444,901	157,507	55%
Intra-Alemeda Cnty Peak Local Bus Trips	55,443	66,220	10,777	19%
Intra-Alameda Cnty Off-Peak Local Bus Trips	33,939	41,685	7,746	23%
Alameda County Daily VMT	42,031,415	41,509,587	-521,828	-1.2%

Table 4 shows that local bus services, at least in the model, are relatively insensitive to what would in reality be a major change in transit operations. There is some nuance to the results; for example, the table shows that off-peak transit operations are more sensitive to reductions in headways than peak-period operations. Presumably, this is because the headways are already relatively short during peak periods so riders would gain relatively little from the change. A small, but measurable reduction was forecast for countywide daily vehicle miles of travel (VMT).

Our conclusion from this test is that the net changes in ridership resulting from the proposed improvements may be relatively small; in fact close to the margin of error of the county-wide model. So to the extent possible cross-checks would be performed to ensure that the results fall within a reasonable range based on observed data.

Our other conclusion from this test is that focusing exclusively on changes in ridership may tend to under-estimate the benefits of the proposed projects. In cases where the increase in ridership is small, the main benefit of the project will come from reduced travel times for existing passengers. So reductions in travel times may be a better measure of project performance than change in ridership.

Attachment A

PARSONS BRINCKERHOFF

Technical Memorandum

2329 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
Phone: 916-567-2500
Fax: 916-925-3517

Project: ACTC Countywide Transit Plan (PB Project #13347A)

Subject: Methodology for Evaluating Travel Benefits

Date: May 8, 2015

The purpose of this memorandum is to describe the proposed methodology for computing the value of traveler benefits for various possible projects to improve bus performance. The methodology is described in reference to several sample calculations.

Benefits from Bus Curb Extensions and Queue Jumps

Bus curb extensions (mid-block bulb-outs) and queue jumps reduce delays for buses at individual sites on a route. If treatments occur at a number of locations and the locations selected had previously caused delays for the buses then the aggregate effect may be a noticeable reduction in bus travel time. However, the reduction in bus travel time is partially offset by increases in travel times for travelers in automobiles, which must also be accounted for.

To illustrate how the benefits of curb extensions can be estimated a calculation was performed using the example of a proposed set of curb extensions Along College Avenue, Broadway, and Embarcadero that are portions of a proposed service between downtown Berkeley and Brooklyn Basin (see Exhibit 1). The methodology for estimating the benefits of these improvements follows several steps, namely (the letters refer to places in Exhibit 2):

1) In this planning-level example the exact number of curb extensions is not known. The number of curb extensions (C) was therefore calculated by multiplying the length of the treated section (A) by the assumed distance between curb extensions (B).

2) The value of a curb extension or queue jump lies in buses' ability to resume travel without having to find a gap in the traffic in the adjacent lane. The amount of time saved per curb extension (F) is found by using the traffic volume in the adjacent lane (D) to reference a look-up table from the *Bus Rapid Transit Practitioners' Guide* (E). [1]

3) The total time saved on each segment (G) is found by multiplying the number of curb extensions (C) by the time savings per curb extension (F). This is then summed over the entire route (H).

4) If the reduction in travel time is substantial, then ridership may increase. The increase in ridership can be estimated by determining the reduction in travel time (H) as a percentage of the total travel time for the route (I). The percentage change in travel time (J) is then multiplied by the elasticity of ridership to travel time (K) to find the change in ridership (L).[2]

5) The number of riders that will benefit from the curb extensions (N) is found by applying the percentage increase (L) to the existing passengers per hour per route segment (M).

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[1] *Bus Rapid Transit Practitioner's Guide*, Transit Cooperative Research Program Report 118, Federal Transit Administration, March 2007

[2] Note: This calculation is based on the entire route, and so may be an over-estimate of the change in ridership.

6) Total passenger time saved per segment (O) is found by multiplying the reduction in bus travel time (G) by the number of passengers affected in each route segment (N). This can be aggregated to find the total travel time saving for the route (P).

7) The value of the bus passenger's time saved (R), i.e. their benefit from the project, is found by multiplying the total time savings (P) by the average value of travelers' time (Q).

8) While a bus is stopped at a curb extension it blocks other traffic that would otherwise be using the lane. This traffic may be able to maneuver around the bus if there is another lane in the same direction and if usable gaps are available in the traffic using that lane. The delay (T) imposed on auto travelers (drivers and passengers) is estimated by multiplying the reduction in travel time for buses (G) times a factor relating bus delay to car delay (S).

9) Not all cars using the road in the peak hour will be affected; only those cars that happen to be behind a bus would be delayed. The delay imposed on auto travelers in each route segment (W) is computed by multiplying the increase in travel time for autos (T) by the number of cars in the lane (D), the number of travelers per car (U) and the percentage of cars affected (V). This delay is then aggregated for the entire route (X).

10) The value of the time lost for auto travelers (Y) is found by multiplying the total delay for auto travelers (X) by the value of traveler time (Q).

11) The net benefit of the improvements per peak hour (Z) is the benefit to bus travelers (R) minus the dis-benefit to auto travelers (Y). This can be multiplied by an annualization factor (AA) to convert the net benefits per peak-hour into net benefits per year (AB).

Exhibit 1 – Proposed Improvements

Estimate of Travel Benefits - Downtown Berkeley to Brooklyn Basin, Southbound

Items highlighted in yellow are inputs (dummy data)
Items highlighted in peach are inputs (real data)
Items highlighted in green are outputs
(reference cited in text)

Inputs & Assumptions

(B)	1.0	Assumed distance between bus bulbs (miles)
(I)	40	Average Bus Travel Time (minutes)
(J)=(H)/(I)	-4.1%	Reduction in Travel Time (%)
(K)	-0.2	Elasticity of Ridership to Travel Time
(L)=(J)*(K)	**0.8%**	Growth in Ridership
(S)	0.5	Seconds of car time added per second of bus time reduction
(U)	1.2	Assumed vehicle occupancy for cars

Average Bus Clearance Time (E)

Adjacent Lane Volume (veh/lane/hr)	100	200	300	400	500	600	700	800	900	1,000
Average Re-Entry Delay (Seconds)	1	2	3	4	5	6	8	10	12	15

Source: *Bus Rapid Transit Practictioner's Guide*, TCRP Report 118

Portion of Route	Length	Total Bus Bulb-Outs	Adjacent Lane Volume	Reduction in Bus Delay per Bulb-Out (Seconds)	Total Reduction in Travel Time (Seconds)	Average Passengers per Hour (before bump-up)*	Average Passengers per Hour (after bump-up)	Total Passenger Time Saved (Seconds/Hr)	Increased Travel Time for Autos (seconds /veh)	% of Cars Affected	Total Auto Traveler Time Added (Seconds/Hr)	
	(A)	**(C)=(A)*(B)**	**(D)**	**(F)**	**(G)=(C)*(F)**	**(M)**	**(N)=M*(1+L)**	**(O)=(G)*(N)**	**(T)**	**(V)**	**W=D*T*U*V**	
College Avenue SB	1.3	2	800	10	20	104	104.8	2,097	10	20%	1,920	
Broadway SB	3.1	4	900	12	48	184	185.5	8,904	24	20%	5,184	
Embarcadero EB	1.5	2	1,000	15	30	548	552.5	16,574	15	20%	3,600	
		Total reduction in Bus Travel Time >			98	**(H)**		27,575	**(P)**		10,704	**(X)**

* Source: ACTC traffic model

Assumed value of passenger time ($/hour) >	$5.00	**(Q)**	$5.00
Value of passenger time saved ($/hour) >	**$38.30**	**(R)=(P)*(Q)**	**$14.87** **(Y)=(X)*(Q)**

Net Benefits per Peak Hour (gains for bus riders minus losses for car travelers) >	**$23.43**	**(Z)=(R)-(Y)**
Annualization Factor >	400	**(AA)**
Net Benefits per Year (gains for bus riders minus losses for car travelers) >	**$9,373**	**(AB)=(Z)*(AA)**

Exhibit 2: Sample Calculation

DATE:	October 5, 2015
SUBJECT:	Countywide Goods Movement Plan Draft Strategy Evaluation
RECOMMENDATION:	Receive an update on the Countywide Goods Movement Plan Draft Strategy Evaluation

Summary

Goods movement is critical to a strong economy and a high quality of life in Alameda County. Alameda CTC is developing a Countywide Goods Movement Plan that will outline a long-range strategy for how to move goods efficiently, reliably, and sustainably within, to, from and through Alameda County by roads, rail, air and water.

In September, the Draft Strategy Evaluation technical memorandum was presented to the Goods Movement Technical Team. This technical memorandum includes an assessment of the performance of all strategies (which include capital projects, programs, and policies) using the Plan's adopted performance measures. The Strategy Evaluation memorandum also introduces three "opportunity packages" which are groupings of strategies that rated highly. Opportunity packages serve to ensure that synergistic strategies are considered together (e.g. expansion in Port rail terminal capacity and improvements in rail access routes) and that strategies that address different goals are considered together (e.g. increased warehousing activity at the Port and zero emission truck demonstration projects).

Comments from the Goods Movement Technical Team on the Draft Strategy Evaluation were due by September 25, and a summary of comments received will be handed out at the October ACTAC meeting. In addition to Technical Team review, several other forms of stakeholder engagement have been used to receive input on the strategy evaluation and the opportunity package concept. The opportunity packages were presented at a July roundtable which brought together a broad array of stakeholders including business, labor, public health, government, and others in a large group setting. In addition, the project team held a series of focus group meetings with smaller groupings of stakeholders to receive more in depth input on the strategy evaluation and opportunity packages.

The project team will incorporate feedback on the strategy evaluation as part of the Draft Countywide Goods Movement Plan. The Draft Plan is anticipated to be released in November. Input on the Draft Plan will be sought during the winter with Final Plan adoption in early 2016.

Fiscal Impact:

There is no fiscal impact.

Attachment:

A. Alameda County Goods Movement Plan Draft Strategy Evaluation Technical Memorandum

Staff Contact

Tess Lengyel, Deputy Director of Planning and Policy

Matthew Bomberg, Assistant Transportation Planner

DATE:	October 5, 2015
SUBJECT:	Countywide Transportation Plan: Alameda County Final Project and Program List for Plan Bay Area 2040
RECOMMENDATION:	(1) Approve the Final lists of regional, committed, county-level projects and programs for submittal to the RTP (2) Direct staff to forward both the Final lists to MTC by October 30, 2015

Summary

MTC and ABAG are in the process of performing a focused update of Plan Bay Area, which includes the Regional Transportation Plan (RTP) and Sustainable Community Strategy (SCS) as mandated by SB 375. The RTP is scheduled to be adopted in the spring of 2017 and is updated every four years. To support development of the RTP, MTC requested that each Congestion Management Agency (CMA) in the Bay Area coordinate project submittals from its county. On June 1, 2015, Alameda CTC released a call-for-projects to solicit applications for projects, programs, and plans to be considered for the 2016 Countywide Transportation Plan (CTP) and the 2017 RTP update. Projects submitted at this time would also be considered for future Comprehensive Investment Plan (CIP), One Bay Area Grant (OBAG), and State Transportation Improvement Program (STIP) funding. The call-for-projects closed on July 31, 2015. This item is not a programming action; rather, it is a long-range planning action to allow Alameda County projects to be submitted into the RTP. This action does not program any Measure B, VRF, Measure BB funds or any other funds.

MTC has assigned Alameda CTC an initial target county budget of $2.65 billion, which is a 25-year funding assumption. Alameda CTC must submit financially constrained final programmatic and project lists to MTC by October 30, 2015. These lists will be used by MTC staff in the first round of evaluating transportation investments in the RTP to determine how they perform against adopted performance measures and targets, including greenhouse gas reduction targets and a Sustainable Communities Strategy target.

In September 2015, Alameda CTC adopted a draft list of projects and programs and submitted it to MTC by the required September 30 deadline. During October, several corrections were requested by jurisdictions on the draft list; the final list reflects those changes. Specific changes made on the project lists from September to October are described below under *ACTAC Comments* on draft list.

Jurisdictions throughout Alameda County submitted about 330 applications for consideration. During August staff reviewed and sorted these applications to create Final

recommended RTP project and program lists for submittal to MTC. This item summarizes the concurrent RTP and CTP Call for Projects and Programs process and outcomes, and requests Commission approval for actions as summarized above. This memo also provides a brief update on the RTP/SCS development process.

Background

Call for Project Process

In support of the development of the RTP, MTC requested that each Congestion Management Agency in the Bay Area coordinate project submittals from its county and assist with public outreach. Alameda CTC is also in the process of updating its CTP, the long-range planning and policy document that guides future transportation investments for all transportation modes and users in Alameda County. As such, Alameda CTC released a call-for-projects in June 2015 that will inform the 2016 CTP, the 2017 RTP, and the Alameda CTC's CIP; it will also inform Alameda CTC OBAG2 and STIP funding allocations. The call-for-projects closed on July 31st, 2015.

Project and Program Screening

Alameda CTC received 313 applications during the call-for-projects. During August 2015, staff and the consultant team conducted an initial screening and evaluation process for all applications to inform the RTP lists. Applications were sorted into the following categories:

(1) *Programmatic*: MTC guidance requested that agencies bundle projects, programs, and plans into programmatic categories, where possible. Capital projects and programs that are not capacity increasing and exempt from air quality conformity requirements and/or categorically exempt (CE) from CEQA or documented categorical exclusion (DCE) from NEPA. Programmatic categories are groups of similar projects, programs, and plans that are included under a single listing in Plan Bay Area 2040. Therefore, programmatic applications were further sorted into MTC's 14 designated programmatic categories for the RTP:
    a. New Bicycle and Pedestrian Facilities (Expansion)
    b. Management Systems (System Management)
    c. Safety and Security (System Management)
    d. Travel Demand Management (System Management)
    e. Intersections (System Management)
    f. Multimodal Streetscape (System Management)
    g. Minor Highway (System Management)
    h. Minor Transit (System Management)
    i. Minor Freight (System Management)
    j. Land Use (System Management)
    k. Planning (System Management)
    l. Emission Reduction (System Management)
    m. Rehabilitation (Preservation)

n. Routine Operation and Maintenance (Operations)

(2) *Projects*: Capital projects that are regionally significant, committed or capacity increasing and are not exempt from CEQA or NEPA air quality conformity analysis. These projects were sorted into three categories as defined by MTC:

a. *Regional*: MTC's definition for a regional project is those projects that are regionally significant where "regional" is defined as serving more than a single County.
b. *Committed*: MTC's definition of committed projects for purposes of the RTP is that either a) the project is 100% locally funded, or b) the project includes a full funding plan and environmental clearance by September 30, 2015. MTC further defines a full funding plan as including local and discretionary funds..
c. *Local/Countywide*: All remaining projects are considered local or countywide projects.

These distinctions are important for two reasons: (1) Projects that can be modeled need to provide much more detailed information in the application process than programmatic projects that will be quantitatively and qualitatively assessed using other methods, (2) Regional and Committed projects do not count towards Alameda CTC's allocated RTP budget of $2.65 B.

Public Outreach:

Similar to the 2012 CTP development, the 2016 CTP update includes a transparent process, with Alameda CTC closely working with the jurisdictions, transit agencies, and stakeholders. In addition, Alameda CTC collected input from the general public during outreach meetings for each of the ongoing multimodal plans which will inform the CTP. Public outreach for the Plan will be coordinated closely with other outreach efforts that are underway at the agency to ensure strategic use of stakeholders' time; CTP input will be sought at strategic points throughput the Plan development process. Additional outreach for development of the Alameda County CTP will take place in the coming months as noted above.

ACTAC Comments

Types of Changes: (1) Project title updated for BART to Livermore/ACE, (2) Inserted cost and funding for Alameda CTC's Trail Maintenance application, and (3) Fixed project title typos for Grimmer Boulevard Greenway and Vasco Road Interchange.

- Regional Table:
    - Project title changed from "BART to Livermore Project Development" to "BART to Livermore/ACE Project Development"

- Programmatic Projects Table:
    - Revised project details for Alameda CTC's Countywide Trail Maintenance (CTP Index #329) :
        - Changed project title from "Trail Maintenance" to "Bicycle and Pedestrian for Regional Projects and Trail Maintenance"
        - Added cost ($154 million) and requested funding ($154 million), however totals cost and funding for programmatic projects were unchanged for now.
- Projects Table:
    - Project title spelling corrected for two applications:
        - Grimmer Boulevard Greenway (CTP index #141)
        - I-580 Vasco Road Interchange Improvements (CTP index #174)

Changes to be Made from September Commission to October ACTAC/PPLC/ Commission:

Several corrections were requested to the draft approved RTP lists. There were three categories of changes: *(1) Corrected project cost and funding based on comments from project sponsors; (2) Moved projects between categories/tables based on updated project information; and (3) Moved projects to the correct subcategories in the projects and programmatic tables.* Changes to each of the tables in Attachments A, B, D and-E are described below. There were no changes to Attachment C.

- Attachment A, Table 1: Summary Table:
    - Revised as necessary based on changes below
- Attachment B, Table 2: Regional Table:
    - Updated cost, programmed funding, and requested funding for:
        - I-580/I-680 Interchange Improvement Project (CTP Index #027).
        - I-880 Northbound HOV/HOT Extension (A Street to Hegenberger) (CTP Index #034)
    - Carried project over from the 2012 CTP:
        - Widen I-580 for eastbound and westbound HOV/HOT from between Greenville Road and San Joaquin County line (CTP Index #330)

- Correct the funding request to match application for SR-84/I-680 Interchange Improvements and SR-84 Widening project (CTP Index #037)

- Per BART's request, update programmed and requested funding for two BART projects:

    - BART Metro: Bay Fair Connection (CTP Index #041)
    - BART to Livermore/ACE Project Development (CTP Index #043)

- Attachment D, Table 4: Programmatic Projects Table:

    - Updated cost, programmed funding, and requested funding for:

        - Alameda County's Parking Demand and Management Strategy Study (CTP Index #018)
        - BART's Station Modernization Program (Alameda County) (CTP index #044)
        - LAVTA's Major Service Improvements (Routes 10, 12, and 15) (CTP index #298)
        - City of Alameda's Park Street Streetscape Improvements (CTP index #066)
        - Livermore's Isabel/BART PDA Multimodal Improvements (CTP index #171)
        - Livermore's Annual Pavement Maintenance – MTS Routes (CTP index #173)
        - Hayward's Tennyson Avenue Grade Separation at Niles Subdivision (CTP index #165)
        - MTC/Oakland/San Leandro's I-880 ICM North Alameda Segment (CTP Index #191)

    - Corrected cost and funding request for Alameda CTC's Transit Operations Service Augmentation (CTP Index #328)

    - Moved Oakland's West Grand Avenue Complete Streets Project (#201) to Projects Table, since it requires air conformity analysis (road diet).

    - Move 6 applications that are related to shuttles from the Safety and Security subcategory to the Travel Demand Management subcategory:

        - West Berkeley Shuttle (CTP index #111)
        - Hayward's First/Last-Mile BART shuttle (CTP index #166)
        - Oakland's Library shuttle (CTP index #210)
        - Oakland's Citywide Neighborhood Bus Shuttle Program (CTP index #213)
        - San Leandro's LINKS Shuttle Service (CTP index #257)
        - Emeryville's Door to Door Paratransit Shuttle (CTP index #121)

- Attachment E, Table 5: Projects Table:
    - Moved City of Fremont's SR-262 Mission Boulevard Cross Connector Improvements (CTP index #150) to the Regional Table:
        - Update cost, programmed funding, and requested funding
    - Updated programmed funding and requested funding for:
        - Dublin's Dougherty Road Widening (CTP index #112)
        - Hayward's I-880 Winton Avenue Interchange Improvements (CTP index #161)
        - Livermore's Iron Horse Trail (CTP index #170)
        - Livermore's I-580 First Street Interchange Improvements (CTP index #168)
        - Livermore's I-580 Greenville Road Interchange Improvements (CTP index #169)
    - Corrected ATP fund eligibility for projects within the Three Major Trail Development Program subcategory
    - Moved 7 projects to the correct subcategory (Arterial Projects – Improvements):
        - Fruitvale Avenue Lifeline Bridge Project (CTP Index # 016)
        - Fremont's Auto Mall Parkway Widening and Improvements (CTP index # 132)
        - Fremont's Fremont Boulevard Widening (CTP index #140)
        - Fremont's Grimmer Boulevard Greenway (CTP index #141)
        - Fremont's Kato Road Widening (Warren Avenue to Milmont Drive) (CTP index #144)
        - Fremont's SR-84 Mowry Avenue Widening (Peralta Boulevard to Mission Boulevard) (CTP index #151)
        - Fremont's SR-84 Peralta Boulevard Widening (Fremont Boulevard to Mowry Avenue) (CTP Index #152)

<u>Final RTP List Recommendations</u>

Applications for a total of $21.1 billion in programs and projects funding requests were received as follows: $7 billion in programs, $2.2 billion in countywide/local projects, and $11.8 billion in regional projects. The total overall cost of all the projects and programs, including committed projects, is $26.1 billion, as shown in Attachment A, Table 1. As part of the RTP, MTC has assigned Alameda County an initial target budget of $2.65 billion over a 25 year horizon. This amount is expected to be combined with other sources to fund programs and projects in Alameda County. MTC is currently developing more refined financial forecasts, which are anticipated to be available in late fall and are likely to be less than the $2.65 billion.

For the Final RTP submittal due October 30, 2015, the following is recommended:

- Regional projects: It is recommended that regional/multi-county projects be submitted to MTC for a total of $14.8 billion, of which $9 billion is discretionary and is assumed to be from the regional discretionary budget. These projects serve a regional need and are shown on Attachment B, Table 2.

- Committed projects: It is recommended that committed projects for a total of almost $528 million be submitted to MTC. These projects meet the funding and environmental clearance requirements of MTC. These projects are shown on Attachment C, Table 3.

- For programmatic categories: It is recommended that the amount of funding assigned to programs be for the MTC discretionary funding requests as part of the Alameda County share is $1.1 billion. This represents 43% of the $2.65 billion discretionary funding target being assigned to the 14 program categories shown in Attachment D, Table 4.

- For local/countywide projects: It is recommended that the remaining 57% or $1.5 billion of the $2.65 discretionary funding target be assigned to the countywide local projects shown in Attachment E, Table 5.

Schedule and Next Steps

- September 30, 2015: Forward Final lists to MTC.
- Late September: Address Committee/Commission comments; refine Final list to create final submittal for MTC;
- October 8: ACTAC review and recommendation to Committee and Commission
- October 12: Committee review and recommendation to full Commission
- October 22: Commission action on final list for submittal to MTC
- October 31: Forward final lists to MTC

Fiscal Impact: There is no fiscal impact.

Attachments

A. Table 1. Final Summary List of Regional, Committed, Programs and Projects and Comparison of September Draft list and Final October List
B. Table 2. Final Regional Program List
C. Table 3. Final Committed Projects List Submittal for Alameda County
D. Table 4. Final Programs Project List Submittal for Alameda County
E. Table 5. Final Alameda County Project List Submittal for the RTP

Staff Contact

Tess Lengyel, Deputy Director of Planning and Policy

Saravana Suthanthira, Senior Transportation Planner

Table 1 - Final Alameda County Submittal to PBA 2040
Applications Summary (October 2015)

	Total Cost ($ 000s)	Total Programmed Funding ($ 000s)	Total Funding Requests ($ 000s)	Requested Local Discretionary Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)
MTC Programmatic Categories					
Intersection Improvements	**$63,948**	$12,259	$51,689	Specific Local Fund allocations to be made based upon local discretionary actions	$452
Intersection Improvements (Grade Seperations)	**$631,067**	$7,715	$623,352		$26,775
Management Systems	**$132,647**	$45,649	$86,998		$774
Minor Freight Improvements	**$183,281**	$1,812	$181,469		$50,257
Minor Transit Improvements	**$362,177**	$120,716	$241,461		$76,409
Multimodal Streetscape Improvements	**$1,127,942**	$70,699	$1,057,242		$137,519
New Bicycle and Pedestrian Facilities	**$1,633,258**	$72,831	$1,560,427		$443,627
Other	**$510,000**	$0	$510,000		$145,196
Planning	**$219,158**	$6,225	$212,933		$77,465
Preservation Rehabilitation	**$1,109,760**	$340,443	$769,317		$6,901
Routine Operation and Maintenance	**$1,452,560**	$96,900	$1,355,660		$133,367
Safety and Security	**$159,371**	$13,777	$145,594		$22,457
Travel Demand Management	**$327,202**	$55,086	$272,116		$17,374
TOTAL Programmatic	**$7,912,371**	**$844,112**	**$7,068,258**	**$3,177,187**	**$1,138,574**
Transportation Project Categories					
Arterial Projects (Improvements)	**$409,854**	$27,202	$382,652	$191,326	$191,326
Arterial Projects (Gap Closures)	**$310,103**	$26,954	$283,149	$141,575	$141,575
Highway Projects (Interchanges & Crossings)	**$601,218**	$301,992	$299,226	$87,065	$212,162
Transit Oriented Development Projects	**$570,712**	$12,850	$557,862	$60,000	$497,862
Transit Projects	**$252,878**	$10,020	$242,858	$4,781	$238,078
Three Major Trail Development Program	**$206,551**	$12,780	$193,771	$96,886	$96,886
Local Arterial Network Gap Closure	**$38,562**	$1,100	$37,462	$18,731	$18,731
I-580 Corridor TEP Freeway Improvements	**$267,377**	$157,345	$110,032	$55,016	$55,016
I-880 Corridor TEP Freeway Improvements	**$57,002**	$12,418	$44,584	$22,292	$22,292
Union City Rail Program	**$75,000**	$0	$75,000	$37,500	$37,500
TOTAL Alameda County Projects	**$2,789,257**	**$562,661**	**$2,226,596**	**$715,170**	**$1,511,426**
TOTAL Regional	**$14,871,817**	**$3,013,859**	**$11,857,959**	**$2,824,617**	**$9,033,342**
TOTAL Committed	**$527,844**	**$485,971**	**$0**	**$0**	**$0**
GRAND TOTAL	**$26,101,289**	**$4,906,603**	**$21,152,813**	**$6,716,974**	**$11,683,342**
			Current Request for Regional Allocation		**$2,650,000**
			Percent Programmatic		43%
			Percent Projects		57%
			Regional Allocation for Alameda CTC		$2,650,000

Table 1A - Changes to Draft PBA 2040 Applications Summary from September 2015

Final Alameda County Submittal to PBA 2040 Applications Summary (October 2015)					
	Total Cost ($ 000s)	Total Programmed Funding ($ 000s)	Total Funding Requests ($ 000s)	Requested Local Discretionary Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)
MTC Programmatic Categories	$7,912,371	$844,112	$7,068,258	$3,177,187	$1,138,574
Transportation Project Categories	$2,789,257	$562,661	$2,226,596	$715,170	$1,511,426
Regional	$14,871,817	$3,013,859	$11,857,959	$2,824,617	$9,033,342
Committed	$527,844	$485,971	$0	$0	$0
GRAND TOTAL	$26,101,289	$4,906,603	$21,152,813	$6,716,974	$11,683,342

Draft Alameda County Submittal to PBA 2040 Applications Summary (September 2015)					
	Total Cost ($ 000s)	Total Programmed Funding ($ 000s)	Total Funding Requests ($ 000s)	Requested Local Discretionary Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)
MTC Programmatic Categories	$6,851,197	$866,326	$5,984,865	$3,184,347	$1,148,000
Transportation Project Categories	$2,779,156	$571,078	$2,208,078	$705,911	$1,502,167
Regional	$14,369,217	$2,870,509	$11,498,708	$2,826,067	$8,672,642
Committed	$527,844	$527,844	$0	$0	$0
GRAND TOTAL	$24,527,414	$4,835,757	$19,691,651	$6,716,325	$11,322,809

Table 2 - Final Alameda County Submittal to PBA 2040 - Regional Program

Criteria - Projects of regional significance/ falls within or supports a Regional Program/Efforts (Managed Lanes)/ top performer in the prior RTP which is a criteria for Regional Discretionary funding.

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Requested Funding: Discretionary* ($ 000s)	Requested Funding: Other Sources ($ 000s)	Planning Area
	Regional Goods Movement							
214	City of Oakland	Oakland Army Base transportation infrastructure improvements	**$307,106**	$238,563	$68,543	$68,543	$0	North
302	Port of Oakland	7th Street Grade Separation East	**$490,091**	$2,800	$487,291	$227,291	$260,000	North
303	Port of Oakland	7th Street Grade Separation West	**$163,707**	$3,050	$160,657	$160,657	$0	North
306	Port of Oakland	Middle Harbor Road Improvements	**$29,200**	$25	$29,175	$4,175	$25,000	North
305	Port of Oakland	Oakland International Airport Perimeter Dike	**$54,200**	$13,200	$41,000	$41,000	$0	North
308	Port of Oakland	Outer Harbor Intermodal Terminal (OHIT) Phases 2 and 3	**$179,545**	$25,638	$153,907	$153,907	$0	North
307	Port of Oakland	Outer Harbor Turning Basin	**$57,321**	$10	$57,311	$3,388	$53,923	North
	Subtotal Regional Goods Movement		**$1,281,170**	$283,286	$997,884	$658,961	$338,923	
	Regional Highway (Interchanges)							
027	Alameda CTC	I-580/I-680 Interchange Improvement Project	**$1,478,150 (1)**	$20,000	$1,458,150 (1)	$1,458,150 (1)	$0	East
037	Alameda CTC	SR-84/I-680 Interchange Improvements and SR-84 Widening	**$244,000 (1)**	$125,940 (1)	$118,060 (1)	$0 (1)	$118,060	East
150	City of Fremont	SR-262 Mission Boulevard Cross Connector Improvements (2)	**$100,000 (1)**	$50 (1)	$99,950 (1)	$99,950 (1)	$0	South
	Subtotal Regional Highway (Interchanges)		**$1,822,150**	$145,990	$1,676,160	$1,558,100	$118,060	
	Regional Highway (Managed Lanes)							
318	Alameda CTC	I-580 Integrated Corridor Mobility (ICM)	**$117,000**	$0	$117,000	$0	$117,000	East
330	Alameda CTC	Widen I-580 for eastbound and westbound HOV/HOT from between Greenville Road and San Joaquin County line (3)	**$391,000**	$0	$391,000	$0	$391,000	East
030	Alameda CTC	I-680 Northbound and Southbound HOV/HOT Lanes (SR-84 to Alcosta Boulevard)	**$225,100**	$20,000	$205,100	$205,100	$0	East/South
029	Alameda CTC	I-680 Northbound HOV/HOT Lane (SR-237 to SR-84)	**$385,000**	$185,000	$200,000	$0	$200,000	South
028	Alameda CTC	I-680 Southbound Express Lanes (SR-237 to SR-84) Upgrades	**$37,508**	$2,000	$35,508	$35,508	$0	South
034	Alameda CTC	I-880 Northbound HOV/HOT Extension (A Street to Hegenberger)	**$221,100 (1)**	$20,000	$201,100 (1)	$89,000	$112,100 (1)	Central
	Subtotal Regional Highway (Managed Lanes)		**$1,376,708**	$227,000	$1,149,708	$329,608	$820,100	
	Bay Trail Implementation							
049	City of Alameda	Alameda Point Trails	**$12,100**	$100	$12,000	$12,000	$0	North
078	City of Albany	Pierce Street Park Bikeway	**$1,005**	$317	$688	$688	$0	North
192	City of Oakland	Coliseum BART to Bay Trail Connector	**$3,183**	$980	$2,203	$2,203	$0	North
193	City of Oakland	City-Wide Bay Trail Network	**$23,400**	$5,180	$18,220	$18,220	$0	North
211	City of Oakland	Lake Merritt to Bay Trail Bicycle Pedestrian Gap Closure	**$20,984**	$5,043	$15,941	$14,341	$1,600	North
223	City of Oakland	Bay Trail Connections - Four Sites	**$660**	$160	$500	$450	$50	North
286	City of Union City	Union City Boulevard Bike Lanes (Phase 2)	**$8,800**	$1,000	$7,800	$0	$7,800	South
	Subtotal Regional Pedestrian & Bicycle		**$70,132**	$12,780	$57,352	$47,902	$9,450	
	Regional Transit and Park & Ride							
001	AC Transit	East Bay BRT Extension to Bayfair BART	**$50,700**	$0	$50,700	$0	$50,700	Central
006	AC Transit	San Pablo Corridor Transit Improvements	**$103,000**	$0	$103,000	$0	$103,000	North
041	BART	BART Metro: Bay Fair Connection	**$234,049**	$100,000 (1)	$134,049 (1)	$134,049 (1)	$0	Central
043	BART	BART to Livermore/ACE Project Development	**$552,800**	$552,800 (1)	$0 (1)	$0	$0 (1)	East
313	BART	BART Metro Program	**$1,700,000**	$0	$1,700,000	$0	$1,700,000	All
314	BART	BART Security Program	**$250,000**	$205,941	$44,059	$0	$44,059	All
315	BART	BART Station Modernization	**$4,744,000**	$0	$4,744,000	$0	$4,744,000	All
316	BART	BART Station Access	**$800,000**	$0	$800,000	$0	$800,000	All
317	BART	BART Transbay Corridor Core Capacity	**$1,600,000**	$1,306,000	$294,000	$0	$294,000	All
062	City of Alameda	Mariner Square Drive Extension and Park and Ride Lot	**$7,360**	$0	$7,360	$7,360	$0	North
057	City of Alameda	New Alameda Point Ferry Terminal	**$127,198**	$60,062	$67,137	$67,137	$0	North
142	City of Fremont	Irvington BART Station	**$140,300**	$120,000	$20,300	$20,300	$0	South
234	City of Pleasanton	Bernal Park and Ride	**$1,100**	$0	$1,100	$1,100	$0	East
186	City of Newark	Newark Transit station	**$11,150**	$0	$11,150	**$100**	**$11,050**	South
	Subtotal Regional Transit		**$10,321,657**	$2,344,803	$7,976,854	$230,046	$7,746,809	
	Total		**$14,871,817**	**$3,013,859**	**$11,857,959**	**$2,824,617**	**$9,033,342**	

** Includes B, BB, VRF discretionary, (1) funding requests applicants included with their application, and other needs requests identified as (4) "Other/TBD - Alameda CTC.'

***Includes (2) local uncommitted funds on a case by case basis, not specified funds, and (3) "Other/TBS - Non-AlamedaCTC"

Changes Made to September 24, 2015 Draft List

(1) Project sponsor provided corrected project information for one or more: project cost, programmed funding, and/or funding request.

(2) Project moved from projects category (Table 5).

(3) Regional project carried over from 2012 CTP.

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Table 3 - Final Alameda County Submittal to PBA 2040 Committed Projects

Criteria:100% funded through local funds; or project/program has full funding plan and environmental clearance by Sep 30, 2015

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Environmental Clearance (Mo/Yr)	Planning Area
004	AC Transit	East Bay BRT	$179,985	06/12	North/Central
002	AC Transit	Line 51 Project Completion and Capital Replacement	$20,673	02/14	North/Central
024	Alameda CTC	Dumbarton Corridor Area Transportation Improvements	$120,000	07/18	South
032	Alameda CTC	I-880 at 23rd/29th Avenue Interchange Improvements	$110,653	04/10	North
038	Alameda CTC	SR-84 Widening (Ruby Hill Drive to Concannon Boulevard)	$87,533	08/08	East
070	City of Alameda	Rapid Bus Service (Alameda Point to Fruitvale BART)	$9,000	09/20	North
	Total		**$527,844**		

** Includes B, BB, VRF discretionary, (1) funding requests applicants included with their application, and other

***Includes (2) local uncommitted funds, not specified funds, and (3) "Other/TBS - Non-AlamedaCTC"

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Table 4 - Final Alameda County Submittal to PBA 2040 - Programmatic Projects by MTC RTP Category

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)*
	Intersection Improvements					
021	Alameda County	Strobridge Avenue Extension	**$13,380**	$1,370	$12,010	
022	Alameda County	Tesla Road Safety Improvements Phase 1	**$11,065**	$5,065	$6,000	
052	City of Alameda	New Traffic Signal at Central Avenue/Taylor Avenue/3rd Street	**$437**	$0	$437	
060	City of Alameda	McCartney Road Road and Island Drive Intersection Improvements	**$300**	$300	$0	
061	City of Alameda	Main Street Improvements & Realignment	**$6,710**	$3,000	$3,710	
064	City of Alameda	New Traffic Signal at Oak Street and Clement Avenue	**$320**	$0	$320	
065	City of Alameda	New Traffic Signal at Park Street and Pacific Avenue	**$320**	$0	$320	
129	City of Emeryville	Powell Street Bridge Widening at Christie Avenue	**$5,206**	$0	$5,206	
241	City of Pleasanton	Nevada Street Extension	**$2,200**	$200	$2,000	
249	City of San Leandro	San Leandro Street Circulation and Capacity Improvements	**$16,920**	$1,074	$15,846	
254	City of San Leandro	E.14th St/Hesperian Blvd/150th Ave Intersection Improvements	**$7,090**	$1,250	$5,840	
	Subtotal Intersection Improvements		**$63,948**	$12,259	$51,689	$452
	Intersection Improvements (Grade Separations)					
094	City of Berkeley	Gilman Street Multimodal Railroad Grade Separation Project	**$65,682**	$0	$65,682	
165	City of Hayward	Tennyson Avenue Grade Separation at Niles Subdivision	**$40,360**	$4,640 (1)	$35,720 (1)	
261	City of Union City	Alvarado Boulevard Grade Separation	**$30,000**	$320	$29,680	
270	City of Union City	Dyer Street Grade Separation	**$25,000**	$270	$24,730	
279	City of Union City	Niles Subdivision Grade Separation	**$200,000**	$1,920	$198,080	
280	City of Union City	Oakland Subdivision Grade Separation	**$220,025**	$25	$220,000	
285	City of Union City	Smith Street Grade Separation	**$20,000**	$220	$19,780	
287	City of Union City	Union City Boulevard Grade Separation	**$30,000**	$320	$29,680	
	Subtotal Intersection Improvements (Grade Separation)		**$631,067**	$7,715	$623,352	$26,775
	Management Systems					
056	City of Alameda	Emergency Vehicle Preemption System	**$200**	$0	$200	
071	City of Alameda	Citywide Signal Upgrades	**$455**	$0	$455	
077	City of Alameda	Webster / Posey Tubes Incident Management System	**$400**	$0	$400	
103	City of Berkeley	Multimodal Corridor Signal Interconnect	**$8,933**	$0	$8,933	
159	City of Hayward	Citywide Fiber Optics Installation	**$10,000**	$0	$10,000	
208	City of Oakland	Citywide Intelligent Transportation System Program	**$46,335**	$1,000	$45,335	
220	City of Oakland	Citywide Traffic Signal System Management	**$40,600**	$26,000	$14,600	
294	LAVTA	AVL ITS Replacement	**$9,990**	$5,540	$4,450	
191	MTC (Cities of Oakland and San leandro)	I-880 ICM North Alameda Segment	**$15,734**	$13,109 (1)	$2,625 (1)	
	Subtotal Management Systems		**$132,647**	$45,649	$86,998	$774
	Minor Freight Improvements					
319	Alameda CTC	Goods Movement Program Implementation	**$125,000**	$0	$125,000	
100	City of Berkeley	Railroad Quiet Zone Multimodal Safety Project	**$11,461**	$0	$11,461	

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)*
130	City of Emeryville	Quiet Zone	**$4,529**	$29	$4,500	
147	City of Fremont	UPRR Quiet Zone - Various Locations	**$2,995**	$20	$2,975	
148	City of Fremont	UPRR Quiet Zone - Centerville Area	**$2,350**	$20	$2,330	
149	City of Fremont	UPRR Quiet Zone - Niles/Nursery	**$1,310**	$500	$810	
224	City of Oakland	West Oakland Freight Corridor Upgrades	**$9,362**	$470	$8,892	
309	Port of Oakland	Port ITS Implementation Project	**$7,553**	$30	$7,523	
310	Port of Oakland	Port Seismic Monitor Program	**$586**	$7	$579	
311	Port of Oakland	Port Terminal Lighting Upgrade Project	**$5,645**	$6	$5,639	
273	City of Union City	Industrial Rail Connections between Oakland and Niles Subdivisions	**$3,245**	$5	$3,240	
282	City of Union City	Passenger Platform for ACE (Oakland Subdivision)	**$3,000**	$360	$2,640	
264	City of Union City	Passenger Platform for Amtrak (Coast Subdivision)	**$3,000**	$360	$2,640	
284	City of Union City	Shinn Connection (Oakland and Niles Subdivisions)	**$3,245**	$5	$3,240	
	Subtotal Minor Freight Improvements		**$183,281**	$1,812	$181,469	$50,257
	Minor Transit Improvements					
007	AC Transit	Vehicle Expansion	**$62,034**	$7,254	$54,780	
040	BART	19th Street Station Modernization	**$25,000**	$14,000	$11,000	
042	BART	Secure Bicycle Parking at Alameda County BART Stations	**$3,425**	$1,075	$2,350	
044	BART	BART Station Modernization Program	**$240,000 (1)**	$96,316 (1)	$143,684 (1)	
051	City of Alameda	Bus Stop Accessibility Improvements	**$0**	$0	$0	
107	City of Berkeley	Downtown Berkeley Transit Center & Streetscape Improvements	**$5,555**	$851	$4,704	
122	City of Emeryville	Amtrak Platform Extension	**$3,000**	$0	$3,000	
125	City of Emeryville	Bus Shelters - Citywide Bus Shelters - Citywide	**$1,380**	$0	$1,380	
128	City of Emeryville	Powell Street I-80 Ramp Bus Bays	**$2,301**	$0	$2,301	
137	City of Fremont	Fremont BART Station - West Entrance Improvements	**$50**	$0	$50	
275	City of Union City	Union City Intermodal Station Phase 3	**$6,600**	$1,200	$5,400	
295	LAVTA	Bus Shelter Replacement Program	**$1,200**	$0	$1,200	
298	LAVTA	Major Service Improvements (Routes 10, 12, and 15)	**$11,227 (1)**	$0	$11,227 (1)	
301	LAVTA	Livermore Transit Center Rehabilitation	**$405**	$20	$385	
	Subtotal Minor Transit Improvements		**$362,177**	$120,716	$241,461	$76,409
	Multimodal Streetscape Improvements					
010	Alameda County	Castro Valley Boulevard Streetscape Improvement Phase II	**$16,750**	$450	$16,300	
012	Alameda County	East 14th Streetscape Improvements Phase II	**$15,830**	$4,530	$11,300	
013	Alameda County	East Lewelling Boulevard Streetscape Improvements- Phase II	**$11,240**	$440	$10,800	
017	Alameda County	Hesperian Boulevard Streetscape Improvement project	**$24,640**	$17,640	$7,000	
321	Alameda CTC	TOD/PDA Plan Implementation	**$300,000**	$0	$300,000	
046	City of Alameda	Mitchell Street Improvements Project	**$5,646**	$0	$5,646	

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)*
047	City of Alameda	Alameda Point Multimodal Street Network	**$15,100**	$100	$15,000	
055	City of Alameda	Citywide Complete Streets	**$62**	$62	$0	
066	City of Alameda	Park Street Streetscape Improvements	**$2,500 (1)**	$0	$2,500 (1)	
068	City of Alameda	Ralph Appezzato Memorial Parkway Street Improvements	**$1,768**	$0	$1,768	
072	City of Alameda	Stargell Avenue (Main Street to 5th Street) Queue Jump Lanes & Class I Trail	**$4,750**	$1,900	$2,850	
076	City of Alameda	Webster Street Improvement	**$2,900**	$0	$2,900	
082	City of Albany	Solano Avenue Complete Streets	**$3,429**	$652	$2,777	
086	City of Berkeley	Hearst Avenue Complete Streets - Transit Improvements	**$278**	$37	$241	
091	City of Berkeley	Downtown Berkeley Multimodal Area Improvement Program	**$65,855**	$0	$65,855	
097	City of Berkeley	Complete Streets Corridor Improvement Program	**$3,572**	$3,344	$228	
312	City of Berkeley	San Pablo Complete Streets Corridor	**$31,663**	$0	$31,663	
104	City of Berkeley	Southside Multimodal Area Enhancement Program	**$6,928**	$0	$6,928	
105	City of Berkeley	Southside Complete Streets Program	**$11,435**	$0	$11,435	
108	City of Berkeley	University Avenue Complete Streets Corridor	**$73,229**	$0	$73,229	
110	City of Berkeley	West Berkeley Area improvment Program	**$3,277**	$0	$3,277	
138	City of Fremont	Fremont Boulevard Streetscape Project - Centerville (Thornton Avenue to Central Avenue)	**$7,746**	$134	$7,612	
139	City of Fremont	Fremont Boulevard Streetscape Project - Downtown (Country Drive to Sundale Drive)	**$8,529**	$0	$8,529	
153	City of Fremont	SR-84 Relinquishment and Upgrades Phase I	**$13,063**	$0	$13,063	
157	City of Hayward	C Street Complete Street Project	**$2,980**	$0	$2,980	
162	City of Hayward	Main Street Complete Street Project	**$3,047**	$0	$3,047	
163	City of Hayward	Mission Boulevard Phases 2 and 3 Improvements	**$33,900**	$21,900	$12,000	
167	City of Livermore	Downtown PDA Multimodal Improvements	**$7,304**	$440	$6,864	
171	City of Livermore	Isabel/BART PDA Multimodal Improvements	**$16,100 (1)**	$300 (1)	$15,800 (1)	
183	City of Newark	Thornton Avenue Streetscape Improvement (Olive Street to Elm Street)	**$2,200**	$0	$2,200	
184	City of Newark	Thornton Avenue Streetscape Improvement (Elm Street to Willow Street)	**$2,200**	$0	$2,200	
188	City of Oakland	14th Street Avenue Streetscape Project	**$13,205**	$6,405	$6,800	
189	City of Oakland	27th Street Corridor Improvements	**$3,393**	$50	$3,343	
201	City of Oakland	Oakland Complete Streets Program	**$316,000**	$2,000	$314,000	
204	City of Oakland	Fruitvale Alive Gap Closure Streetscape Project	**$8,334**	$327	$8,007	
205	City of Oakland	20th Street Green Corridor Improvements	**$4,746**	$63	$4,683	
207	City of Oakland	East Bay BRT Corridor Connectors Streetscape Improvements	**$14,441**	$3,536	$10,905	
212	City of Oakland	MLK Jr Way Streetscape Project - Phase II	**$7,115**	$1,300	$5,815	
219	City of Oakland	Peralta Streetscape Project (Phase II)	**$7,115**	$300	$6,815	
243	City of Pleasanton	Stanley Boulevard Reconstruction (Main Street to 1st Street)	**$5,700**	$2,700	$3,000	
245	City of Pleasanton	Stoneridge Mall Sidewalk Construction	**$1,030**	$0	$1,030	
251	City of San Leandro	Doolittle Drive Streetscape (Davis to Fairway)	**$421**	$0	$421	
253	City of San Leandro	East 14th Street South Area Streetscape	**$15,720**	$0	$15,720	
258	City of San Leandro	MacArthur Blvd Streetscape Phase 2	**$2,800**	$0	$2,800	
259	City of San Leandro	Marina Boulevard Streetscape (Merced to Monarch Bay Drive)	**$11,000**	$0	$11,000	
268	City of Union City	Decoto Road Complete Street Project	**$7,000**	$840	$6,160	
291	City of Union City	Whipple Road Widening (I-880 to BART track)	**$12,000**	$1,249	$10,751	
	Subtotal Multimodal Streetscape Improvements		**$1,127,942**	$70,699	$1,057,242	$137,519

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)*
	New Bicycle and Pedestrian Facilities					
008	Alameda County	Sidewalk Improvements at Various Locations in Unincorporated Alameda County	**$27,600**	$15,600	$12,000	
009	Alameda County	Bicycle Improvements at Various Locations in Unincorporated Alameda County	**$19,980**	$4,140	$15,840	
324	Alameda CTC	Countywide Bicycle Plan Implementation	**$249,000**	$0	$249,000	
323	Alameda CTC	Countywide Pedestrian Plan Implementation	**$894,000**	$0	$894,000	
050	City of Alameda	Blanding Avenue Track Removal and Corridor Improvements	**$5,170**	$0	$5,170	
073	City of Alameda	Tilden Way Phase 2 Sidewalk Improvements	**$2,830**	$400	$2,430	
080	City of Albany	Complete Streets for San Pablo Avenue and Buchanan Street	**$3,945**	$605	$3,340	
081	City of Albany	San Pablo Avenue Cycle Track	**$290**	$0	$290	
083	City of Berkeley	9th Street Bicycle Boulevard Pathway Extension Phase II	**$1,980**	$124	$1,856	
084	City of Berkeley	Adeline Street Complete Streets Corridor	**$11,672**	$0	$11,672	
085	City of Berkeley	Ashby Avenue Complete Streets Corridor	**$2,579**	$0	$2,579	
087	City of Berkeley	Citywide Bike Boulevard/Major Street Intersections Project	**$6,008**	$35	$5,973	
088	City of Berkeley	Channing Bicycle Boulevard Safety Project	**$9,522**	$0	$9,522	
089	City of Berkeley	Citywide Bicycle Improvement Program	**$37,552**	$0	$37,552	
090	City of Berkeley	College Avenue Complete Streets Corridor	**$481**	$0	$481	
092	City of Berkeley	Dwight Way Complete Streets Corridor	**$647**	$0	$647	
093	City of Berkeley	Gilman Street Complete Streets Corridor	**$81**	$0	$81	
096	City of Berkeley	Milvia Bike Boulevard Project	**$7,452**	$0	$7,452	
101	City of Berkeley	Sacramento Complete Streets Corridor	**$963**	$0	$963	
102	City of Berkeley	Shattuck Avenue Complete Streets Corridor	**$958**	$0	$958	
106	City of Berkeley	Telegraph Avenue Complete Streets Corridor	**$25,349**	$0	$25,349	
109	City of Berkeley	West Berkeley Areawide Pedestrian & Bicycle Improvements	**$25,500**	$0	$25,500	
113	City of Dublin	Downtown Dublin PDA Bike and Ped Plan Implementation	**$21,418**	$325	$21,093	
124	City of Emeryville	Bike Ped Plan Implementation	**$4,800**	$0	$4,800	
131	City of Emeryville	South Bayfront Bridge	**$19,400**	$16,450	$2,950	
155	City of Fremont	Warm Springs BART West Access Bridge and Plaza	**$35,715**	$10,715	$25,000	
156	City of Fremont	I-880 Bicycle and Pedestrian Bridge and Trail	**$21,440**	$0	$21,440	
194	City of Oakland	Citywide Bicycle Master Plan Implementation	**$119,100**	$23,223	$95,877	
215	City of Oakland	Park Boulevard Bike and Pedestrian Path	**$3,094**	$100	$2,994	
225	City of Piedmont	Bicycle Safety Improvements	**$460**	$4	$456	
226	City of Piedmont	Grand Avenue Improvements	**$851**	$114	$737	
227	City of Piedmont	Highland Avenue Improvements	**$800**	$111	$689	
233	City of Pleasanton	Arroyo Mocho Trail Construction	**$10,000**	$0	$10,000	
238	City of Pleasanton	Foothill Road Bike Lane Plan and Construction (I-580 ro Verona Road)	**$2,200**	$0	$2,200	
250	City of San Leandro	San Leandro Creek Trail	**$33,421**	$53	$33,368	
262	City of Union City	Alvarado Niles Road Sidewalks	**$1,500**	$181	$1,319	
272	City of Union City	Horner Street Sidewalk Construction	**$500**	$63	$437	
274	City of Union City	Industrial Park Sidewalk Construction	**$3,000**	$357	$2,643	
277	City of Union City	Bike/Ped Connection Over Niles Subdivision	**$20,000**	$0	$20,000	
278	City of Union City	Lowry Road Sidewalk Construction	**$2,000**	$231	$1,769	
	Subtotal New Bicycle and Pedestrian Facilities		**$1,633,258**	$72,831	$1,560,427	$443,627

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)*
	Other					
325	Alameda CTC	Affordable Student Transit Pass Program	**$375,000**	$0	$375,000	
281	City of Union City	Oakland Subdivision Acquisition	**$135,000**	$0	$135,000	
	Subtotal Other		**$510,000**	$0	$510,000	$145,196
	Planning					
322	Alameda CTC	Arterial Performance Initiative	**$200,000**	$0	$200,000	
003	AC Transit	Dumbarton Bridge Transit Expansion Study & Implementation*	**$5,000**	$0	$5,000	
005	AC Transit	Grand / MacArthur Feasibility Study	**$6,000**	$6,000	$0	
045	Caltrans	Estuary Crossing Bridge Engineering Feasibility Study	**$250**	$0	$250	
075	City of Alameda	Estuary Water Shuttle Project Study Report Equivalent	**$1,225**	$225	$1,000	
133	City of Fremont	BayTrail - South Fremont to Milpitas Connection	**$75**	$0	$75	
134	City of Fremont	Blacow Road Ped/Bike Grade Separation at BART/UPRR	**$75**	$0	$75	
143	City of Fremont	Irvington BART Station Area Plan	**$300**	$0	$300	
146	City of Fremont	Niles to City Center Bikeway with New Alameda Creek Bridge	**$150**	$0	$150	
145	City of Fremont	Scoping/Planning for Irvington Trail Connector with I-680 Bridge	**$75**	$0	$75	
206	City of Oakland	I-980 Multimodal Boulevard-2nd Transbay Tube Study	**$5,250**	$0	$5,250	
296	LAVTA	Comprehensive Operational Analysis 2020	**$353**	$0	$353	
297	LAVTA	Comprehensive Operational Analysis 2025	**$405**	$0	$405	
	Subtotal Planning		**$219,158**	$6,225	$212,933	$77,465
	Preservation Rehabilitation					
020	Alameda County	Pavement Rehabilitation at Various Locations in Unincorporated Alameda County	**$24,060**	$15,060	$9,000	
329	Alameda CTC	Bicycle and Pedestrian for Regional Projects and Trail Maintenance	**$154,000**	$0	$154,000	
014	Alameda County	Estuary Bridges Repairs	**$13,000**	$3,000	$10,000	
067	City of Alameda	Citywide Street Resurfacing	**$3,200**	$3,200	$0	
173	City of Livermore	Annual Pavement Maintenance - MTS Routes	**$98,275**	$40,750 (1)	$57,525 (1)	
175	City of Newark	Balentine Drive and Cedar Boulevard Pavement Rehabilitation	**$1,117**	$0	$1,117	
176	City of Newark	Cedar Boulevard Pavement Rehabilitation	**$1,144**	$0	$1,144	
177	City of Newark	Edgewater Drive and Lake Boulevard Pavement Rehabilitation	**$1,124**	$0	$1,124	
178	City of Newark	George Avenue Pavement Rehabilitation and Drainage Improvements	**$2,750**	$0	$2,750	
179	City of Newark	Moores Avenue and Sycamore Street Pavement Rehabilitation	**$770**	$0	$770	
180	City of Newark	Thornton Avenue Pavement Rehabilitation (I-880 to Cherry Street)	**$1,502**	$0	$1,502	
181	City of Newark	Thornton Avenue Pavement Rehabilitation (Cherry Street to Willow Street)	**$1,509**	$0	$1,509	
182	City of Newark	Thornton Avenue Pavement Rehabilitation (Willow Street - SR-84)	**$986**	$0	$986	
187	City of Newark	Zulmida Avenue Pavement Rehabilitation	**$770**	$0	$770	
195	City of Oakland	Citywide Bridge Preventive Maintenance Program	**$27,141**	$250	$26,891	
218	City of Oakland	Citywide Pedestrian Master Plan Implementation	**$45,507**	$11,000	$34,507	
217	City of Oakland	Citywide Paving Program	**$641,250**	$242,850	$398,400	
230	City of Piedmont	Sidewalk Replacement Project	**$1,400**	$1,400	$0	
231	City of Piedmont	Annual Street Paving Improvements	**$4,347**	$4,347	$0	
232	City of Pleasanton	Bernal Bridge Construction over Arroyo de la Laguna	**$4,300**	$1,700	$2,600	
236	City of Pleasanton	Dublin Canyon Widening (Bridge Section Near Canyon Meadows)	**$2,450**	$450	$2,000	
248	City of Pleasanton	West Las Positas Roadway Reconstruction (Hopyard Road to Stoneridge Drive)	**$2,250**	$50	$2,200	

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)*
256	City of San Leandro	Lake Chabot Road Stabilization	**$2,256**	$41	$2,215	
260	City of San Leandro	San Leandro Local Street Rehabilitation	**$43,700**	$13,700	$30,000	
263	City of Union City	Alvarado Boulevard Pavement Rehabilitation	**$1,321**	$163	$1,158	
265	City of Union City	Alvarado-Niles Road Pavement Rehabilitation	**$5,610**	$670	$4,940	
267	City of Union City	Central Avenue Pavement Rehabilitation	**$667**	$157	$510	
269	City of Union City	Decoto Road Pavement Rehabilitation	**$2,207**	$337	$1,870	
271	City of Union City	Dyer Road Pavement Rehabilitation	**$2,202**	$332	$1,870	
288	City of Union City	Union City Boulevard Pavement Rehabilitation	**$3,527**	$535	$2,992	
289	City of Union City	Whipple Road - Pavement Rehabilitation (Phase 1)	**$552**	$132	$420	
290	City of Union City	Whipple Road - Pavement Rehabilitation (Amaral Street to Mission Boulevard)	**$1,987**	$304	$1,683	
304	Port of Oakland	Airport Drive Resurfacing	**$12,880**	$15	$12,865	
	Subtotal Preservation Rehabilitation		**$1,109,760**	$340,443	$769,317	$6,901
	Routine Operations and Maintenance					
327	Alameda CTC	Paratransit Program	**$232,000**	$0	$232,000	
328	Alameda CTC	Transit Operations Service Augmentation	**$1,056,000 (1)**	$0	$1,056,000 (1)	
126	City of Emeryville	Emery Go Round Operations	**$90,220**	$79,670	$10,550	
197	City of Oakland	Broadway Shuttle Operations	**$26,755**	$1,465	$25,290	
293	LAVTA	Atlantis Mainteance and Operations Facility Phase 3	**$46,464**	$15,765	$30,699	
299	LAVTA	Administration and Operations Facility Improvements (Rutan Court)	**$1,096**	$0	$1,096	
300	LAVTA	Training Video	**$25**	$0	$25	
	Subtotal Routine Operations and Maintenance		**$1,452,560**	$96,900	$1,355,660	$133,367
	Safety and Security					
011	Alameda County	Crow Canyon Road Safety Improvements	**$3,800**	$900	$2,900	
015	Alameda County	Foothill Road Safety Improvements in the vicinity of Sunol	**$2,650**	$750	$1,900	
326	Alameda CTC	Safe Routes To School	**$40,000**	$0	$40,000	
154	City of Fremont	Vargas Road Improvements	**$4,235**	$135	$4,100	
019	Alameda County	Patterson Pass Road Safety Improvements	**$6,500**	$1,200	$5,300	
023	Alameda County	Tesla Road Safety Improvements Phase II	**$6,500**	$1,500	$5,000	
039	Alameda County	Vasco Road Safety Improvement Phase II	**$24,000**	$4,000	$20,000	
074	City of Alameda	Traffic Calming Devices at Various Locations	**$620**	$0	$620	
079	City of Albany	Cornell Avenue Safe Routes to School	**$1,490**	$37	$1,453	
098	City of Berkeley	Ohlone Greenway and Intersection Improvement Project	**$6,321**	$0	$6,321	
099	City of Berkeley	Citywide Pedestrian Plan Safety Improvements Program	**$29,409**	$0	$29,409	
136	City of Fremont	Citywide Freeway Interchange Safety and Access Upgrades	**$75**	$0	$75	
209	City of Oakland	LAMMPS Phase 2 Improvements	**$20,022**	$4,562	$15,460	
228	City of Piedmont	Oakland Avenue Pedestrian Improvements	**$855**	$112	$743	
229	City of Piedmont	Pedestrian Safety Improvements	**$694**	$168	$526	
235	City of Pleasanton	Freeway Overcrossing Improvements for Bicyclists (8 Interchanges)	**$1,750**	$50	$1,700	
239	City of Pleasanton	Foothill Road S-Curve Modification (Muirwood Drive North to Highland Oaks Drive)	**$4,600**	$0	$4,600	
252	City of San Leandro	Downtown Pedestrian Lighting Improvements	**$2,850**	$0	$2,850	
283	City of Union City	Railroad Crossing Improvements	**$3,000**	$363	$2,637	
	Subtotal Safety and Security		**$159,371**	$13,777	$145,594	$22,457

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)*
Travel Demand Management						
018	Alameda County	Alameda County Parking Demand and Management Strategy Study	**$175**	$0 (1)	$175 (1)	
320	Alameda CTC	Countywide TDM Implementation	**$25,000**	$0	$25,000	
048	City of Alameda	Alameda Point Transportation Demand Management Plan	**$5,000**	$750	$4,250	
111	City of Berkeley	West Berkeley Shuttle (2)	**$49,803**	$36,478	$13,325	
121	City of Emeryville	Door to Door Paratransit Shuttle (8 to Go) (2)	**$3,129**	$189	$2,940	
127	City of Emeryville	North Hollis Parking and TDM Program (2)	**$1,285**	$25	$1,260	
164	City of Hayward	Comprehensive Parking Management (2)	**$1,536**	$85	$1,451	
166	City of Hayward	First/Last-Mile BART Shuttle (2)	**$55,985**	$350	$55,635	
210	City of Oakland	Library Shuttle Program (2)	**$6,156**	$250	$5,906	
213	City of Oakland	Citywide Neighborhood Bus Shuttle Program (NBS) (2)	**$24,100**	$1,200	$22,900	
216	City of Oakland	Citywide Parking Management Program	**$16,574**	$0 (1)	$16,574 (1)	
221	City of Oakland	Implementation Program for Citywide Safe Routes to School	**$133,379**	$12,941	$120,438	
203	City of Oakland	Transportation Data Management Program	**$995**	$0	$995	
257	City of San Leandro	LINKS Shuttle Service	**$4,086**	$2,818	$1,268	
	Subtotal TDM		**$327,202**	$55,086	$272,116	$17,374
	TOTAL Programmatic		**$7,912,371**	**$844,112**	**$7,068,258**	**1,138,574**

* Initial funding by Programmaic category was based on the total Programmatic request of $2.94 B and the total available balance of $1.138 B in Regional Discretionary funding (Total $2.65 B - Initial funding proposed for Projects $1.511 B) and assiging the available funds proportionate to the request.

Changes Made to September 24, 2015 Draft List

(1) Project sponsor provided corrected project information for one or more: project cost, programmed funding, and/or funding request.

(2) Moved shuttle projects to correcy subcategory (TDM).

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Table 5 - Final Alameda County Submittal to PBA 2040 - Projects

CTP Index	Sponsor	Project title	Total cost ($ 000s)	Programmed Funding ($ 000s)	Requested Funding ($ 000s)	Requested Local Discretionary Funding ($ 000s)	Funding Proposed for "Regional Discretionary" ($ 000s)**	Fund Eligibility* RTIP	ATP	STP /CMAQ
	Arterial Projects (Improvements)									
016	Alameda County	Fruitvale Avenue (Miller Sweeney) Lifeline Bridge Project* (1)	**$71,000**	$0	$71,000	**$35,500**	**$35,500**			x
112	City of Dublin	Dougherty Road Widening	**$22,875**	$12,302 (2)	$10,573 (2)	**$5,287 (2)**	**$5,287 (2)**	x		x
115	City of Dublin	Dublin Boulevard Widening - Sierra Court to Dublin Court	**$5,824**	$2,912	$2,912	**$1,456**	**$1,456**	x		x
120	City of Dublin	Tassajara Road Widening from N. Dublin Ranch Drive to City Limit	**$43,721**	$1,800	$41,921	**$20,961**	**$20,961**			x
132	City of Fremont	Auto Mall Parkway Widening and Improvements (1)	**$26,601**	$0	$26,601	**$13,301**	**$13,301**	x		x
140	City of Fremont	Fremont Boulevard Widening (I-880 to Grimmer) (1)	**$9,950**	$0	$9,950	**$4,975**	**$4,975**	x		x
141	City of Fremont	Grimmer Boulevard Greenway (1)	**$10,500**	$0	$10,500	**$5,250**	**$5,250**			x
144	City of Fremont	Kato Road Widening (Warren Avenue to Milmont Drive) (1)	**$5,700**	$4,600	$1,100	**$550**	**$550**			x
151	City of Fremont	SR-84 Mowry Avenue Widening (Peralta Blvd to Mission Blvd) (1)	**$45,000**	$0	$45,000	**$22,500**	**$22,500**	x		x
152	City of Fremont	SR-84 Peralta Boulevard Widening (Fremont Blvd to Mowry Ave) (1)	**$13,400**	$0	$13,400	**$6,700**	**$6,700**	x		x
185	City of Newark	Thornton Avenue Widening (Gateway Boulevard to Hickory Street)	**$14,405**	$0	$14,405	**$7,203**	**$7,203**			x
202	City of Oakland	Telegraph Avenue Complete Streets	**$16,727**	$0	$16,727	**$8,364**	**$8,364**			x
200	City of Oakland	West Grand Avenue Complete Streets Project (3)	**$20,151**	$50	$20,101	**$10,051**	**$10,051**			x
237	City of Pleasanton	El Charro Road Extension (Stoneridge Drive to Stanley Boulevard)	**$59,000**	$300	$58,700	**$29,350**	**$29,350**			x
266	City of Union City	Union City Boulevard Widening (Whipple to City Limit)	**$15,000**	$1,749	$13,251	**$6,626**	**$6,626**	x		x
292	City of Union City	Whipple Road Widening (BART track to Mission Boulevard)	**$30,000**	$3,489	$26,511	**$13,256**	**$13,256**	x		x
	Subtotal Arterial Projects (Improvements)		$409,854	$27,202	$382,652	$191,326	$191,326			
	Arterial Projects (Gap Closures)									
026	Alameda CTC	I-880 to Mission Boulevard East-West Connector	**$230,514**	$23,508	$207,006	**$103,503**	**$103,503**	x		x
114	City of Dublin	Dublin Boulevard - North Canyons Parkway Extension	**$79,589**	$3,446	$76,143	**$38,072**	**$38,072**			
	Subtotal Arterial Projects (Gap Closures)		**$310,103**	$26,954	$283,149	$141,575	$141,575			
	Highway Projects (Interchanges & Crossings)									
031	Alameda CTC	I-80 Gilman Street Interchange Improvements	**$38,388**	$25,392	$12,996	**$6,498**	**$6,498**	x		
033	Alameda CTC	I-880 Broadway/Jackson Interchange Improvements	**$218,799**	$77,500	$141,299	**$8,101**	**$133,198**	x		
035	Alameda CTC	I-880 Industrial Parkway Interchange Reconstruction	**$52,641**	$44,000	$8,641	**$4,321**	**$4,321**	x		
036	Alameda CTC	I-880 Whipple Road Interchange Improvements	**$73,653**	$60,000	$13,653	**$6,827**	**$6,827**	x		
123	City of Emeryville	Ashby I-80 Interchange with Bicycle and Pedestrian Ramps	**$54,800**	$52,100	$2,700	**$1,350**	**$1,350**	x		
160	City of Hayward	I-880 A Street Interchange Reconstruction	**$47,833**	$42,500	$5,333	**$2,667**	**$2,667**	x		
158	City of Hayward	SR-92/Clawiter Road/Whitesell Street Interchange Improvements	**$55,204**	$0	$55,204	**$27,602**	**$27,602**	x		
246	City of Pleasanton	I-680 Overcrossing Widening and Improvements (at Stoneridge Drive)	**$17,000**	$0	$17,000	**$8,500**	**$8,500**	x		
247	City of Pleasanton	I-680 Sunol Interchange Modification	**$17,400**	$400	$17,000	**$8,500**	**$8,500**	x		
242	City of Pleasanton	Santa Rita Road I-580 Overcrossing Widening	**$9,400**	$0	$9,400	**$4,700**	**$4,700**	x		
244	City of Pleasanton	Stoneridge Drive Widening (east of Johnson Drive and I-680 Interchange)	**$16,100**	$100	$16,000	**$8,000**	**$8,000**	x		x
	Subtotal Highway Projects (Interchanges & Crossings)		**$601,218**	$301,992	$299,226	$87,065	$212,162			
	Transit Oriented Development Projects									
199	City of Oakland	Coliseum City TOD Infrastructure	**$401,296**	$3,500	$397,796	**$20,000**	**$377,796**			x
198	City of Oakland	Coliseum City Transit Hub	**$169,416**	$9,350	$160,066	**$40,000**	**$120,066**			x
	Subtotal Transit Oriented Development Projects		**$570,712**	$12,850	$557,862	$60,000	$497,862			
	Transit Projects									
069	City of Alameda	Ralph Appezzato Memorial Parkway BRT	**$9,581**	$20	$9,561	**$4,781**	**$4,781**			x
196	City of Oakland	Broadway Shuttle Expansion	**$243,297**	$10,000	$233,297	**$0**	**$233,297**			x
	Subtotal Transit Projects		**$252,878**	$10,020	$242,858	$4,781	$238,078			
	Three Major Trail Development Program									
025	Alameda CTC	East Bay Greenway: Lake Merritt to South Hayward	**$149,372**	$6,156	$143,216	**$71,608**	**$71,608**		x (4)	
117	City of Dublin	Iron Horse Trail Crossing (old SPRR ROW) at Dublin Boulevard	**$11,153**	$1,050	$10,103	**$5,052**	**$5,052**		x (4)	
118	City of Dublin	Iron Horse Trail Crossing at Dougherty Road	**$11,451**	$0	$11,451	**$5,726**	**$5,726**		x (4)	
135	City of Fremont	East Bay Greenway/Rails to Trails - Central Park to Alameda Creek	**$11,985**	$3,115	$8,870	**$4,435**	**$4,435**		x (4)	
170	City of Livermore	Livermore Iron Horse Trail	**$20,390**	$2,459 (2)	$17,931 (2)	**$8,966**	**$8,966**		x (4)	
240	City of Pleasanton	Iron Horse Trail Bridge at Arroyo Mocho	**$2,200**	$0	$2,200	**$1,100**	**$1,100**		x (4)	
	Subtotal Three Major Trail Development Program		**$206,551**	$12,780	$193,771	$96,886	$96,886			
	Local Arterial Network Gap Closure									
053	City of Alameda	Clement Avenue East Extension To Tilden Way	**$5,182**	$0	$5,182	**$2,591**	**$2,591**			x

054	City of Alameda	Clement Avenue West Extension (Sherman Street to Grand Street)	**$5,446**	$0	$5,446	**$2,723**	**$2,723**			x
063	City of Alameda	Mitchell Street Extension Project	**$7,670**	$0	$7,670	**$3,835**	**$3,835**			x
119	City of Dublin	Scarlett Drive Extension	**$20,264**	$1,100	$19,164	**$9,582**	**$9,582**			x
	Subtotal Local Arterial Network Gap Closure		**$38,562**	$1,100	$37,462	$18,731	$18,731			
	I-580 Corridor Freeway Improvements									
116	City of Dublin	I-580 Interchange Improvement at Hacienda/Fallon Road - Phase 2	**$52,332**	$1,400	$50,932	**$25,466**	**$25,466**	x		
168	City of Livermore	I-580 First Street Interchange Improvements	**$52,080**	$39,050 (2)	$13,030 (2)	**$6,515**	**$6,515**	x		
169	City of Livermore	I-580 Greenville Road Interchange Improvements	**$57,965**	$41,395 (2)	$16,570 (2)	**$8,285**	**$8,285**	x		
172	City of Livermore	I-580 SR-84/Isabel Interchange Improvements Phase 2	**$35,700**	$25,650	$10,050	**$5,025**	**$5,025**	x		
174	City of Livermore	I-580 Vasco Road Interchange Improvements	**$69,300**	$49,850	$19,450	**$9,725**	**$9,725**	x		
	Subtotal I-580 Corridor Freeway Improvements		**$267,377**	$157,345	$110,032	$55,016	$55,016			
	I-880 Corridor Freeway Improvements									
161	City of Hayward	I-880 Winton Avenue Interchange Improvements	**$38,960**	$4,480 (2)	$34,480 (2)	**$17,240**	**$17,240**	x		
190	City of Oakland	42nd Ave & High St Access Improvement at I-880 On/Off Ramp	**$18,042**	$7,938	$10,104	**$5,052**	**$5,052**	x		
	Subtotal I-880 Corridor Freeway Improvements		**$57,002**	$12,418	$44,584	$22,292	$22,292			
	Union City Rail Program - Capitol Corridor Coast Line & UC Intermodal Station									
276	City of Union City	Union City Intermodal Station Phase 4	**$75,000**	$0	$75,000	**$37,500**	**$37,500**	x		x
	Subtotal Union City Rail Program		**$75,000**	$0	$75,000	$37,500	$37,500			
	TOTAL Projects		**$2,789,257**	**$562,661**	**$2,226,596**	**$715,170**	**$1,511,426**			

*Projects may be eligible for more fund sources than indicated

**Approach for Initial funding source identification - Assign local measures discretionary funds towards 50% of total fund request except where sponsors specifically identified "Other Funds" for over half of fund request, in which case original

Changes Made to September 24, 2015 Draft List

(1) Moved project to correct subcategory (Arterial Projects - Improvements).

(2) Project sponsor provided corrected project information for one or more: project cost, programmed funding, and/or funding request.

(3) Project moved from programmatic category, since it requires air quality conformity analysis (road diet).

(4) Corrected project fund eligibility (ATP)

DATE:	October 5, 2015
SUBJECT:	Congestion Management Program (CMP): Approval of 2015 CMP, Implementation of Travel Demand Management Element, and Annual Conformity Findings
RECOMMENDATION:	Approve the 2015 CMP, augmentation and extension of the Travel Demand Management Program contract for the Guaranteed Ride Home program, and the FY2014-15 CMP Conformity Findings.

Summary

As the congestion management agency (CMA) for Alameda County, Alameda CTC is required to biennially update and implement the legislatively mandated Congestion Management Program (CMP) that identifies strategies to address congestion issues in Alameda County. Alameda CTC's CMP includes forward-looking comprehensive strategies for congestion management that improve multimodal mobility and better connect transportation and land use in the county. Alameda CTC seeks approval for the updated 2015 CMP, an extension of a travel demand management (TDM) program that is part of the CMP requirement, and the annual findings regarding local jurisdictions' conformance with implementation of the CMP elements.

The CMP is required to incorporate five key elements: a designated CMP roadway network, level of service monitoring, a multimodal performance element, a land use analysis program, and a capital improvement program. The last update to the CMP was completed in October 2013, which was a result of a comprehensive review of Alameda County's CMP and a detailed update to various elements. Considering the many legislative efforts related to the CMP currently underway (Senate Bill 743, Assembly Bills 1098 and 779), which could fully or partly change the CMP and its requirements, the 2015 update to the CMP is a focused update only to incorporate progress on the implementation of various CMP elements that occurred in the last two years.

The updated CMP document is available on Alameda CTC's Congestion Management Program web page. Once the Commission adopts the 2015 CMP, Alameda CTC will forward the document to the Metropolitan Transportation Commission (MTC) to meet the MTC requirement for CMP Conformity and continue implementation of the TDM element through the Guaranteed Ride Home Program and other programs at Alameda CTC.

Discussion

State CMP legislation requires biennial updates, and during odd-number years, Alameda CTC develops and updates a Congestion Management Program for Alameda County to monitor the performance of the county's transportation system, develop strategies to address congestion and improve the performance of a multimodal system, and strengthen the integration of transportation and land use planning. The following are the required elements of the CMP:

- Roadway Monitoring: Monitor congestion levels against the level of service (LOS) standards established for the county's designated CMP roadway system. If roadway LOS standards are not maintained in the CMP roadway system, a deficiency plan is required that defines how improvements will be implemented to bring the LOS to an acceptable standard.
- Multimodal Performance Measures: Evaluate the region's multimodal transportation system against adopted performance measures.
- Transportation Demand Management: Promote alternative transportation strategies with a transportation demand management element, also called travel demand management (TDM).
- Land Use Impact Analysis: Analyze the effects of local land use decisions on the regional transportation system. Develop and maintain a travel demand model to assess the land use impact.
- Capital Improvement Program: Prepare a capital improvement program that maintains or improves the performance of the transportation system.

2015 Update to CMP Elements

Unlike prior updates to the CMP, the 2015 update is a focused, basic update only to incorporate the implementation results for various CMP elements that occurred since the adoption of the last CMP in October 2013. This focused update approach was triggered by three ongoing legislative efforts, Senate Bill 743 and Assembly Bills 1098 and 779, which are proposing to make changes to either all or part of the Congestion Management Program. Until SB 743 is implemented or AB 1098 or AB 779 are passed, any major update to the CMP or one of the five required elements may not be productive. Alternatively, Alameda CTC is proactively working with the other CMAs in the region and MTC to develop recommendations to inform legislative actions for a meaningful CMP that considers the relevant aspects of the current CMP and aligns with the environmental protection goals across all levels of government.

The following are the highlights of the updates made to the CMP elements as part of the 2015 CMP update:

- Level of Service Monitoring—Incorporated the 2014 LOS monitoring results of the CMP network, and no new deficiency plans were identified.
- Multimodal Performance Element—Reviewed and incorporated an inventory of various performance measures being monitored across many planning efforts.
- Travel Demand Management—Incorporated the launch of a comprehensive TDM website (Commute Choices) and made progress on the continued implementation of the Guaranteed Ride Home program.
- Travel Demand Model—Updated key features of the model information with the new model updated in August 2014 including the MTC Conformance approval.
- Capital Improvement Program—Incorporated the Comprehensive Investment Plan, a significant effort by Alameda CTC that establishes a short-range investment strategy by establishing a list of near-term priority improvements that consider all fund sources and align with the Countywide Transportation Plan.

The Capital Improvement Program element also includes a list of Alameda County projects for the State Transportation Improvement Program (STIP). MTC is responsible for developing the region's funding priorities for the Regional Transportation Improvement Program (RTIP) and will incorporate the proposed county STIP projects within the CMP to develop the region's RTIP and will submit them to the California Transportation Commission for adoption into the STIP. However, since the 2016 STIP revenue projection statewide has dramatically decreased (only $46 million is available compared to $282 million for the prior cycle), the 2016 RTIP provides no new project capacity to the nine-county region including Alameda County. Therefore, no new STIP projects were proposed from Alameda County for the 2016 STIP cycle.

Update on Implementation CMP Elements

Travel Demand Management Element – Guaranteed Ride Home Program

The Alameda County Guaranteed Ride Home (GRH) program is one TDM measure that Alameda CTC undertakes to meet state requirements in the CMP and to reduce greenhouse gas emissions as required by state legislation, Senate Bill 375 and Assembly Bill 32. The GRH program is a TDM strategy that encourages people to reduce their vehicle trips by offering them a ride home for emergency situations or unscheduled overtime, when they take alternative modes of transportation to work. In January of 2014, GRH changed from a voucher-based program to a reimbursement program. A mandatory re-enrollment in the program also occurred at this time to ensure an updated database and better tracking of actual enrollment amounts.

The 2014 Annual Report for the program states that the GRH program enrollment was 2,179 employees in Alameda County. The program supported the reduction of 157,438

one-way vehicle trips in 2014, or 1,514 vehicle roundtrips per week. During 2014, 37 rides were taken as part of the program. This represents about 2 percent of eligible rides that employees could have taken and illustrates how this program performance as a type of "insurance" for people who travel on non-auto, single driver modes of transportation .

Since its inception, the GRH program has been funded by the Transportation Fund for Clean Air (TFCA) program. Alameda CTC contracted with Nelson/Nygaard Consulting Associates to provide Guaranteed Ride Home program operational services on November 1, 2012 (contract A12-0027) with a contract amount of $110,750 for a one-year period until November 30, 2013, with an option to extend the agreement up to five years incrementally until June 30, 2017. The Commission approved two one-year extensions to cover a period until November 30, 2015 for a total additional contract amount of $278,353. Alameda CTC is now proposing the final extension on the contract until the end of June 30, 2017. Staff has negotiated a budget and a scope of work with Nelson/Nygaard for the period until June 30, 2017 for the GRH program operations and associated program enhancements, and seeks Commission approval for the extension through June 2017 with an associated budget of $72,617, which will bring the total contract amount to $350,970. As a result of the five-year maximum term under the competitive bid, Alameda CTC will put the contract out for a completive request for proposals for the next contract.

2015 Annual CMP Conformity Findings

Annually, local jurisdictions must comply with four elements of the CMP to be found in compliance. Non-conformance with the CMP requirements means that respective local jurisdictions are at a risk of losing Proposition 111 gas tax funding. The four elements are:

1. Level of Service Monitoring Element: Prepare Deficiency Plans and Deficiency Plan Progress Reports, as applicable;
2. Travel Demand Management Element: Complete the TDM Site Design Checklist;
3. Land Use Analysis Element:
    a. Submit to Alameda CTC all Notices of Preparations, Environmental Impact Reports, and General Plan Amendments;
    b. Review the allocation of Association of Bay Area Governments' land use projections to Alameda CTC's traffic analysis zones;
    c. Provide a list of land use approvals from the previous fiscal year and a copy of the most recent state Housing Element Progress Report; and
4. Pay annual fees.

In mid-September 2015, Alameda CTC contacted all Alameda County jurisdictions for the necessary documentation to determine CMP conformity for fiscal year 2014-2015 (FY2014-15). Documents were requested by October 1, 2015. Staff will work with the jurisdictions to finalize

all documentation, and final conformity will be presented at the Commission's meeting on October 22, 2015.

Attachment A summarizes the status of conformance documentation by jurisdiction. Staff will hand out an updated Attachment A at the October 8th ACTAC meeting and at the October 12th PPLC meeting. The conformance elements and related activities undertaken to establish conformance are described as follows.

Level of Service Monitoring Element

The following Deficiency Plans are active, and status reports have been requested. No new deficiency plans were required based on the 2014 level of service monitoring results.

1. **SR-260 Posey Tube Eastbound to I-880 Northbound Freeway Connection**
   Lead jurisdiction: City of Oakland
   Participating jurisdictions: City of Alameda and City of Berkeley
2. **SR-185 (International Boulevard) Between 46th and 42nd Avenues**
   Lead Jurisdiction: City of Oakland
   Participating jurisdictions: City of Alameda
3. **Mowry Avenue Eastbound from Peralta Boulevard to SR-238 (Mission Boulevard)**
   Lead jurisdiction: City of Fremont
   Participating jurisdictions: City of Newark

Travel Demand Management Element

Jurisdictions were provided the Site Design Checklists to update.

Land Use Analysis Element

- *Development project review*: Jurisdictions are reviewing a listing of land use projects that Alameda CTC had reviewed and commented on during FY2014-15. Quarterly updates were presented to facilitate and inform this annual conformity process, and the last quarterly update on the land use projects contained projects reviewed until end of April 30, 2015.
- *Land use forecast review*: Jurisdictions reviewed Plan Bay Area 2013 (Sustainable Communities Strategy) land use allocations as part of the Alameda Countywide Travel Demand Model update completed in August 2014.
- *Land use database*: As part of developing the 2013-2014 Annual Performance Report, Alameda CTC requested that jurisdictions provide data on land use approvals in January 2015. Attachment A shows the jurisdictions that provided information on developments issued entitlements between July 1, 2013 and June 30, 2014.

Based upon approval by the Commission, Alameda CTC will submit the 2015 CMP to MTC to meet the MTC CMP Conformity requirements, and implementation of GRH program will continue.

Fiscal Impact: The fiscal impact for approving this item is $72,617 for the GRH program, which was included in the budget adopted for FY2015-16 as part of the Alameda CTC approved 2015 TFCA program in September 2015.

Attachments

A. Draft FY2014-15 CMP Conformance

Staff Contacts

Tess Lengyel, Deputy Director of Planning and Policy

Saravana Suthanthira, Senior Transportation Planner

Laurel Poeton, Assistant Transportation Planner

Daniel Wu, Assistant Transportation Planner

Table 1
2015 CMP CONFORMANCE
Land Use Analysis, Site Design, Payment of Fees and Deficiency Plans

	Land Use Analysis Program			TDM Element	Payment of Fees	Level of Service Element	Meets All Requirements
Jurisdiction	GPA & NOP Submittals	Land Use Forecast Review*	Land Use Approval Information**	Site Design Checklist	Payments thru 4th Quarter FY 13/14	Deficiency Plan Progress Reports or Concurrence	
Alameda County		Yes	Yes		Yes	N/A	
City of Alameda		Yes	Yes		Yes		
City of Albany		Yes	Yes		Yes	N/A	
City of Berkeley		Yes	Yes		Yes		
City of Dublin		Yes	Yes		Yes	N/A	
City of Emeryville		Yes	Yes		Yes	N/A	
City of Fremont		Yes	Yes		Yes		
City of Hayward		Yes	Yes		Yes	N/A	
City of Livermore		Yes	Yes		Yes	N/A	
City of Newark		Yes	Yes		Yes		
City of Oakland		Yes	Yes		Yes		
City of Piedmont		Yes	Yes		Yes	N/A	
City of Pleasanton		Yes	Yes		Yes	N/A	
City of San Leandro		Yes	Yes		Yes	N/A	
City of Union City		Yes	Yes		Yes	N/A	

N/A indicates that the city is not responsible for any deficiency plan in the past fiscal year.
* This requirement has been met through jurisdictions review of land use allocation in 2014 travel demand model update
**Jurisdictions provided land use approval information in response to request in January 2015

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DATE:	October 5, 2015
SUBJECT:	Transportation Fund for Clean Air (TFCA) FY 2015-16 Program
RECOMMENDATION:	Approve the TFCA FY 2015-16 Program

Summary

Transportation Fund for Clean Air (TFCA) County Program Manager funding is generated by a vehicle registration fee collected by the Bay Area Air Quality Management District (Air District) to fund eligible projects that result in the reduction of motor vehicle emissions. For fiscal year (FY) 2015-16, a total of $2.038 million is available to program by the Alameda CTC. Staff recommends the Commission approve the FY 2015-16 TFCA Program, as detailed in Attachment A.

Background

TFCA funding is generated by a regional four dollar vehicle registration fee collected by the Air District. Through the TFCA County Program Manager (CPM) fund, forty percent of this revenue is redirected back to the counties from which it was collected. The remaining sixty percent is administered directly by the Air District through the Regional TFCA program. As the TFCA County Program Manager for Alameda County, the Alameda CTC is responsible for annually programming the revenue generated in Alameda County for this program. The program is subject to the requirements of the Air District-approved CPM Policies, through which five percent of new revenue is set aside for the Alameda CTC's administration of the TFCA program.

TFCA projects are to result in the reduction of motor vehicle emissions. Eligible projects are to achieve "surplus" emission reductions beyond what is currently required through regulations, ordinances, contracts, or other legally binding obligations. Projects typically funded with TFCA include shuttles, bicycle lanes and lockers, signal timing and trip reduction programs. Projects proposed for TFCA funding are required to meet the eligibility and cost-effectiveness requirements of the TFCA program.

Per the Alameda CTC TFCA Guidelines, 70 percent of the available funds are to be allocated to the cities/county based on population, with a minimum of $10,000 to each jurisdiction. The remaining 30 percent of funds are to be allocated to transit-related projects on a discretionary basis. A jurisdiction may borrow against its projected future share in order to receive more funds in the current year, which can help facilitate the required annual programming of all available funds.

FY 2015-16 Program

A total of $2.038 million of TFCA funding is available for FY 2015-16. The annual call for projects was released in May 2015 and applications were due in June. Projects were evaluated on an individual basis for program eligibility and cost-effectiveness, in conformance with current Air District Policies and guidance. As typical for this program, after the initial round of project evaluations, it was necessary to extend the application period in order to identify enough cost-effective projects for a program recommendation that programs all available funds. The recommended FY 2015-16 Program is detailed in Appendix A.

The recommended funding amounts for all shuttle projects reflects a pending exception to the current Air District CPM Policies, which establish the maximum cost-effectiveness value for shuttle projects at $125,000 of TFCA per ton of emissions reduced ($125,000 TFCA/ton). Air District staff proposes to increase the maximum cost effectiveness for shuttles to $175,000 TFCA/ton, in order to align it with the Air District's current limit under the Regional TFCA program. The exception request is scheduled for consideration by the Air District Board in November 2015. On the off-chance the exception is denied, the recommended amounts for the shuttle projects will be adjusted downwards accordingly and the remaining difference (estimated at a total of $153,000) would be reprogrammed in FY 2016/17.

Next Steps

The Alameda CTC is required to provide a Commission–approved program of projects to the Air District by November 6, 2015. The Alameda CTC will then enter into project-specific funding agreements with project sponsors. Once a funding agreement is executed, eligible project costs as of July 1, 2015 will be eligible for reimbursement.

Fiscal Impact: TFCA funding is made available by the Air District and costs associated with TFCA projects, and the Alameda CTC's administration of the TFCA program, are included in the Alameda CTC's 2015-16 budget.

Attachments

A. TFCA County Program Manager Fund, FY 2015-16 Program

Staff Contacts

James O'Brien, Interim Deputy Director of Programming and Allocations

Jacki Taylor, Program Analyst

TFCA County Program Manager Fund, FY 2015-16 Program

70% Cities/County Share

Sponsor	Project Name	Project Description	Total Project Cost	Amount Requested	TFCA Share (of FY15-16 fund estimate)	TFCA Cost-effectiveness ($ TFCA/ton)	TFCA Recommended [1]	Notes
Alameda County	East Castro Valley Boulevard Class II Bicycle Lanes	Install Class II bike lanes on East Castro Valley Boulevard from Five Canyons Parkway to Villareal Drive, in Castro Valley. Project closes a 0.7 mile gap in an existing 7.8 mile Class 2 facility originating from the Castro Valley BART Station.	$ 362,000	$ 338,000		$ 88,668	**$ 62,000**	
Alameda County	Line 97 Corridor Improvements (Arterial Component)	Arterial management improvements on Hesperian Blvd, between W. A St to Springlake Dr., in unincorporated Alameda County. This is a segment of an overall Line 97 Corridor project, implemented by AC Transit, which includes implementing segments of Adaptive Traffic Control Systems (ATCS), corridor-wide Transit Signal Priority (TSP) at 61 intersections, signal coordination, relocation of key bus stops from near side to far side, and real-time information along a 13-mile corridor, from Bayfair BART to Union City BART.		$ 44,000	$ 338,915	$ 88,393	**$ 44,000**	Funding to be programmed to AC Transit's Line 97 Corridor project.
Alameda CTC	Countywide Bicycling and Carpool Promotion Programs	Expansion of the Alameda CTC's TDM program to include bicycling and carpool promotion. Includes funding for: (1) Alameda CTC's existing bicycling promotion program to promote bicycling around Bike to Work Day, including the "I Bike" campaign. Requesting $60K for FYs 2015-16 and 2016-17; (2) a pilot countywide carpool promotion program focused towards commuters traveling in and through Alameda County. Includes corridor-specific education and outreach efforts to promote the benefits of carpooling and the use of carpooling matching programs. Requesting $150K for FYs 2015-16 and 2016-17.	$ 210,000	$ 210,000	NA	$ 44,285	**$ 210,000**	See Note 2
Albany	Marin Ave Class II Bicycle Lane Gap Closure	Install 0.16 mile of Class 2 bike lanes on Marin Ave from Cornell Ave to San Pablo Ave. Project will close a gap in existing bike lanes on Marin Ave, resulting in a continuous Class I and II connection from the Ohlone Greenway to the Bay Trail.	$ 1,022,187	$ 100,000	$ 16,896	$ 89,766	**$ 95,000**	
Berkeley	Berkeley Citywide Bicycle Parking Program	Installation of 160 bike racks and 12 bike corrals in Berkeley that will accommodate a total of 534 bikes. Project includes purchase and installation of bike racks and mounting hardware, as well as installation of bollards, striping, signage and curb stops for the 12 bicycle corrals.	$ 137,000	$ 137,000	$ 45,503	$ 74,206	**$ 137,000**	
Dublin	San Ramon Rd. Arterial Management	Traffic Signal Coordination/TSP improvements along San Ramon Road from I-580 on ramps on San Ramon Boulevard past Vomac Rd to City Limits, including signal coordination for 5 traffic signals, update 5 traffic signal controllers for current and future TSP, and TSP for 3 intersections along the corridor. Project coordinated with installation of bicycle loop detectors and narrowing of the roadway to accommodate buffered bike lanes.	$ 267,000	$ 267,000	$ 195,249	$ 89,793	**$ 146,352**	Requires a four-year expenditure period with 2-year post-project data collection.
Oakland	Oakland Broadway "B" Shuttle off-Peak Weekday Operations	The free Broadway Shuttle (the "B") operates between the Jack London Oakland Amtrak Station and Grand Avenue at 11-16 minute frequencies. The TFCA request is to fund weekday off-peak service, 10am-3pm which will complement a current regional TFCA grant for eligible weekday, peak-hour service, 7am-10am and 3pm-7pm, for FY 2015-16.	$ 630,930	$ 242,000	$ 56,804	$ 173,903	**$ 210,000**	See Note 1
Oakland	CityRacks Citywide Bike Rack Program	Phase 12 of the City of Oakland's ongoing CityRacks citywide bike rack program. Funding is for the purchase and installation of a minimum of 400 publically-accessible bicycle parking spaces.	$ 124,000	$ 124,000		$ 89,665	**$ 124,000**	
Pleasanton	Pleasanton Trip Reduction Program	The program consists of a suite of employer-based, residential-based and school-based programs that promote trip reduction and commute alternatives. Request is for FYs 2015-16 and 2016-17 program operations.	$ 184,000	$ 88,000	$ 43,631	$ 89,681	**$ 53,000**	
San Leandro	LINKS Shuttle	LINKS Shuttle operates between San Leandro BART and West San Leandro every 20 minutes, Monday through Friday, during peak commute hours from 5:45am to 9:45am and 3:00pm to 7:00pm. The route was recently revised into separate North and South loops. Request is for FYs 2015-16 and 2016-17 program operations.	$ 1,334,000	$ 74,000	$ 269,228	$ 172,309	**$ 50,000**	See Note 1
Union City	Line 97 Corridor Improvements (Arterial Component)	Arterial management improvements on Alvarado-Niles Road from Almaden Blvd to Hartnell St. A segment of an overall Line 97 Corridor project, implemented by AC Transit, which includes implementing segments of Adaptive Traffic Control Systems (ATCS), corridor-wide Transit Signal Priority (TSP) at 61 intersections, signal coordination, relocation of key bus stops from near side to far side, and real-time information along a 13-mile corridor, from Bayfair BART to Union City BART.	$ 203,000	$ 36,000	$ 342,282	$ 85,926	**$ 36,000**	Funding to be programmed to AC Transit's Line 97 Corridor project.
		Subtotal Cities/County (70%) Requested		**$ 1,660,000**			**$ 1,167,352**	
		TFCA 70% Fund Estimate		$ 2,062,726			$ 2,062,726	
		Difference		*$ 402,726*			$ 895,374	

TFCA County Program Manager Fund, FY 2015-16 Program

30% Transit Discretionary Share

Sponsor	Project Name	Project Description	Total Project Cost	Amount Requested	TFCA Share	TFCA Cost-effectiveness	TFCA Recommended [1]	Notes
AC Transit	Line 97 Corridor Improvements (Transit Signal Prioritization Component)	Project includes implementing segments of Adaptive Traffic Control Systems (ATCS), corridor-wide Transit Signal Priority (TSP) at 61 intersections, signal coordination, relocation of key bus stops from near side to far side, and real-time information. Improvements along a 13-mile corridor, from Bayfair BART to Union City BART, along (1) Hesperian Boulevard in San Leandro, unincorporated Alameda County, and Hayward; and (2) Union City Boulevard, Alvarado-Niles Road and Decoto Road in Union City.	$ 6,188,000	$ 200,000	NA	$ 85,939	**$ 148,000**	Funds for TSP component. Funds for signal timing scope in Union City and unincorporated Alameda Co. are shown above.
BART	West Oakland Station Bicycle Lockers	The project will install a total of 110 new bike parking spaces at the West Oakland BART Station. A new bike locker plaza at the West Oakland station near the station's fare gates will provide 88 shared use electronic BikeLink locker spaces. In addition to the new lockers, bike racks located on the main plaza will be reconfigured and racks will be added to accommodate 22 additional bikes.	$ 417,000	$ 55,000	NA	$ 80,345	**$ 55,000**	
CSU East Bay	CSUEB/Hayward BART - 2nd Shuttle Operations	Service provides a second free shuttle between California State University East Bay campus and the Hayward BART Station, 7am - 7 pm, M-F. Request is for FYs 2015-16 and 2016-17 operations.	$ 267,378	$ 123,000	NA	$ 123,663	**$ 123,000**	See Note 1
Alameda CTC	Guaranteed Ride Home and Transportation Demand Management Information Services	The Alameda County Guaranteed Ride Home Program (GRH) is a countywide program that provides a "guaranteed ride home" to program registrants in case of an emergency when they use alternative modes to commute to work in Alameda County. The Transportation Demand Management (TDM) information program promotes commute alternatives, though various mediums including the Alameda CTC's Commute Choices website and "I Bike" information campaign. Request is for FYs 2015-16 and 2016-17 program operations.	$ 270,000	$ 270,000	NA	$ 32,838	**$ 270,000**	
LAVTA	LAVTA Rte 30 BRT Operations	LAVTA Rte 30 Rapid provides feeder service for key commute areas in Livermore, Dublin and Pleasanton . Service area incudes: Livermore ACE rail station, Dublin/Pleasanton BART Station, Lawrence Livermore and Sandia National Labs, and other employment centers. Request is for FYs 2015-16 and 2016-17 Operations.	$ 6,520,000	$ 400,000	NA	$ 174,468	**$ 275,000**	See Note 1
		Subtotal Transit Discretionary (30%) Requested		**$ 1,048,000**			**$ 871,000**	
		TFCA 30% Fund Estimate		$ (24,374)			$ (24,374)	
		Difference		*$ (1,072,374)*			*$ (895,374)*	

TFCA Category	Amount Available (Fund Estimate)	Amount Requested	TFCA Recommended [1]	Difference (Fund Estimate vs. Recommended)
Subtotal 70% Cities/County	$ 2,062,726	$ 1,660,000	$ 1,167,352	$ 895,374
Subtotal 30% Transit	$ (24,374)	$ 1,048,000	$ 871,000	$ (895,374)
Totals	**$ 2,038,352**	**$ 2,708,000**	**$ 2,038,352**	**$ -**

Notes:

1) The amount recommended reflects the Air District's proposal to increase the TFCA CPM Program's cost-effectiveness maximum for shuttles from $125K TFCA/ton to $175K TFCA/ton, which is the current maximum for shuttles under the Regional TFCA program. The Air District Board will consider this request in November 2015. If the exception is not approved, the resulting $153K difference will be reprogrammed in FY 2016-17.

2) Project is proposed to be funded proportionally from the 70% cities/county shares.

DATE:	October 5, 2015
SUBJECT:	Alameda County Federal Inactive Projects List: September 2015 Update
RECOMMENDATION:	Receive an update on the September 2015 Alameda County Federal Inactive Projects.

Summary

Federal regulations require that agencies receiving federal funds invoice against their obligations at least once every six months. Projects that do not have invoicing activity over a six month period are placed on the Inactive Obligation list, and those projects are at risk of deobligation of the project's federal funds unless Caltrans and the Federal Highways Administration (FHWA) receive an invoice. Caltrans is tracking inactive obligations, and updating a list of inactive projects every week. If Caltrans and FHWA do not receive adequate invoicing or justification for the project's inactivity, the project may be deobligated.

Background

In response to FHWA's new guidance for processing Inactive Obligations, Caltrans developed new guidelines for managing federal inactive obligations. The new guidelines treat all federal-aid as well as the American Recovery and Reinvestment Act (ARRA) inactive projects equally. In order to manage changes more proactively Caltrans changed the management of "inactive projects" as follows:

- If the Department does not receive an invoice for more than six months, the project will be deemed "inactive" and posted on the Department's website. Local Agencies will be notified the first time projects are posted.
- If the Department does not receive an invoice within the following six months (12 months without invoicing), the Department will deobligate the unexpended balances.
- It is the responsibility of the Local Agencies to work in collaboration with their respective District Local Assistance Engineer's to ensure their projects are removed from the inactive list to avoid deobligation.
- The Inactive project listing is posted at the following website and will be updated weekly: http://www.dot.ca.gov/hq/LocalPrograms/Inactiveprojects.htm

Fiscal Impact: There is no fiscal impact.

Attachments

A. Alameda County List of Federal Inactive Projects Report Dated 09/22/15

Staff Contact

James O'Brien, Interim Deputy Director of Programming and Allocations

Vivek Bhat, Senior Transportation Engineer

ALAMEDA COUNTY LIST OF INACTIVE OBLIGATIONS

5.2A

UPDATED BY CALTRANS ON 09/22/2015

Updated on 09/22/2015

Project No (newly added projects highlighted in GREEN)	Status	Agency/District Action Required	Prefix	Agency	Description	Latest Date	Authorization Date	Last Expenditure Date	Last Action Date	Total Cost	Federal Funds	Expenditure Amt	Unexpended Bal	FHWA Deobligation Deadline (12 months after last expenditure)
5014038	Inactive	Invoice under review by Caltrans. Monitor for progress.	HSIPL	Alameda	PARK STREET, PARK STREET DRAW BRIDGE TO ENCINAL AVE, INSTALL LEFT TURN LANES PHASE, UPGRADE SIGNALS	8/12/2014	1/18/2012	8/12/2014	5/13/2015	$964,300.00	$733,400.00	$15,686.52	$717,713.48	8/12/2015
5050040	Inactive	Invoice under review by Caltrans. Monitor for progress.	HSIPL	Hayward	WEST "A" STREET: HATHAWAY AVE TO S GARDEN AVE, CONSTRUCT MEDIANS, INSTALL FLASHING BEACONS	9/11/2014	2/18/2014	9/11/2014	9/11/2014	$258,262.00	$161,000.00	$17,301.63	$143,698.37	9/11/2015
5933113	Inactive	Final Invoice under review by Caltrans. Monitor for progress.	HPLUL	Alameda County	162ND. AVE. - LIBERTY ST. TO E.14TH. IN ALAMEDA COUNTY, SIDEWALK IMPROVMENTS.	9/9/2014	8/1/2011	9/9/2014	9/9/2014	$135,000.00	$108,000.00	$107,999.96	$0.04	9/9/2015
5012096	Future	Records indicate project is in Final Voucher. District to verify.	HSIPL	Oakland	WEST GRAND AVE @ MARKET ST; MACARTHUR BLVD @ FRUITVALE AVE; MARKET ST @ 55TH, INSTALL LEFT TURN LANE	12/11/2014	6/30/2011	12/11/2014	12/11/2014	$269,112.00	$222,930.00	$210,740.81	$12,189.19	12/11/2015
5012097	Future	Records indicate project is in Final Voucher. District to verify.	HSIPL	Oakland	CITYWIDE INTERSECTIONS (14 LOCATIONS), COUNTDOWN PED. X-SIGNALS	12/11/2014	7/8/2011	12/11/2014	12/11/2014	$116,018.00	$80,640.00	$35,655.85	$44,984.15	12/11/2015
5041036	Future	Submit invoice to District by 11/20/2015	CML	San Leandro	SAN LEANDRO BLVD. STREETSCAPE FROM WILIAMS ST. TO DAVIS ST., PED. CROSSING, BIKE RACKS, BUS SHELTER	12/29/2014	12/21/2010	12/29/2014	12/29/2014	$5,517,198.00	$4,610,000.00	$4,517,800.00	$92,200.00	12/29/2015
5041040	Future	Submit invoice to District by 11/20/2015	SRTSLNI	San Leandro	MULTIPLE SCHOOLS IN SAN LEANDRO, TRAFFIC SAFETY EDUCATION PROGRAM	10/16/2014	3/22/2012	10/16/2014	10/16/2014	$410,000.00	$410,000.00	$362,718.07	$47,281.93	10/16/2015
5322030	Future	Records indicate project is in Final Voucher. District to verify.	HSIPL	Fremont	MOWRY AVE. AND OVERACKER INTERSECTION ., INSTALL RAISED MEDIAN AND IMPROVE DELINEATION	12/29/2014	11/28/2007	12/29/2014	12/29/2014	$221,000.00	$198,900.00	$169,212.70	$29,687.30	12/29/2015
5322036	Future	Records indicate project is in Final Voucher. District to verify.	HSIPL	Fremont	PASEO PADRE PKWY: DECOTO-FREMONT & THORNTON-WALNUT, REPL CONC LT POLES W/ ALUM. POLES	12/17/2014	4/8/2009	12/17/2014	12/17/2014	$203,159.00	$182,843.00	$174,736.77	$8,106.23	12/17/2015
5933028	Future	Submit invoice to District by 11/20/2015	STPLZ	Alameda County	OAKLAND ESTUARY (FRUITVALE AV) BR NO 33C-0147, SEISMIC RETROFIT	12/11/2014	9/1/1996	12/11/2014	12/11/2014	$561,250.00	$488,021.00	$473,453.03	$14,567.97	12/11/2015
6273062	Future	Submit invoice to District by 11/20/2015	HPLUL	Alameda County Congestion Management Agency	WEBSTER ST., SR260 & SR61, INSTALL CCTV,VIDEO DETECTION, PREEMTION FOR ER VEH	11/18/2014	9/8/2011	11/18/2014	11/18/2014	$809,400.00	$359,960.00	$289,162.37	$70,797.63	11/18/2015
6480006	Future	Submit invoice to District by 11/20/2015	STPCML	Alameda County Transportation Commission	ALMEDA COUNTY- COUNTYWIDE, IMPLEMENT SR2S PROGRAM TO ENABLE AND ENCOURAGE CH	11/18/2014	10/24/2013	11/18/2014	11/18/2014	$6,409,050.00	$5,673,065.00	$504,619.29	$5,168,445.71	11/18/2015
6480007	Future	Submit invoice to District by 11/20/2015	STPL	Alameda County Transportation Commission	ALAMEDA COUNTY - COUNTYWIDE, COMMUNITY -BASED TRANSPORTATION PLAN UPDATES	11/4/2014	10/29/2013	11/4/2014	11/4/2014	$593,750.00	$475,000.00	$5,460.74	$469,539.26	11/4/2015
6481001	Future	Submit invoice to District by 11/20/2015	CML	Alameda County Waste Management Authority	BAY AREA WIDE, EDUCATION AND OUTREACH FOR CLIMATE ACTION	11/28/2014	8/24/2011	11/28/2014	11/28/2014	$980,000.00	$867,000.00	$806,544.62	$60,455.38	11/28/2015

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METROPOLITAN TRANSPORTATION COMMISSION

JOINT PARTNERSHIP LOCAL STREETS AND ROADS / PROGRAMMING AND DELIVERY WORKING GROUP MEETING
101 - 8th St., **1st Floor, Auditorium**
Monday, September 21, 2015
9:30 a.m. – 12:00 p.m.

AGENDA

Topic	Estimated Time
LSRWG - Focused Discussion Items	**9:30 a.m.**
1. Review of Working Group Minutes*	5 min
• Partnership Local Streets and Roads Working Group – June 3, 2015* *(Nancy Adams, LSRWG Chair)*	
2. Discussion Items:	
A. 2015 LSRWG Work Plan Discussion*	20 min
Joint LSRPDWG Items	**10:00 a.m.**
1. Introductions *(Seana Gause, PDWG Chair)*	5 min
2. Informational Items: *("Memo Only" unless otherwise noted)*	
A. Federal Programs Delivery Update* *(Marcella Aranda; maranda@mtc.ca.gov)*	10 min
i. Proposed FFY2015-16 Annual Obligation Plan for Federally Funded Projects** *(Adam Crenshaw; acrenshaw@mtc.ca.gov)*	
B. TIP Update* *(Adam Crenshaw; acrenshaw@mtc.ca.gov)* *(View the Final 2015 TIP at http://www.mtc.ca.gov/funding/tip/index.htm)*	5 min
C. PMP Certification Status* *(Current PMP Certification status is available online at: http://mtc.ca.gov/services/pmp/).*	
3. Discussion Items:	
A. Plan Bay Area 2040:	60 min
i. Draft LSR Needs Assessment** *(Theresa Romell; tromell@mtc.ca.gov)*	
ii. Draft Revenue Forecast** *(Bill Bacon; wbacon@mtc.ca.gov)*	
B. Other Discussion Items *(All)*	5 min
i. State/Federal Program Announcements	
a. Caltrans Planning Grant Information FY16-17* *(Caltrans released the Fiscal Year 2016-2017 round of federal and state planning grants on August 17, 2015.* ***Applications are due to Caltrans on October 30, 2015)***	
b. Pavement Collection for NHS* *(When MAP-21 expanded the National Highway System, many local roads classified as principal arterials got added into the Enhanced NHS and came under the MAP-21 performance requirements. To comply with the new NHS performance requirement, the state must collect NHS route pavement condition data.)*	
c. Program Update for the Rubberized Pavement Grant Program* *(CalRecycle's* ***Rubberized Pavement Grant Program*** *anticipates releasing the FY 2015-16 applications in late September 2015.)*	

LSRWG Chair: Nancy Adams, Santa Rosa
PDWG Chair: Seana Gause, SCTA

MTC Staff Liaison: Theresa Romell; Kenneth Kao
Meeting Manager: Marcella Aranda

d. Draft Office Bulletin – Bridge Investment Credit*
(This Draft OB is to provide instructions on a new program, the Bridge Investment Credit (BIC), soon available to local agencies using Highway Bridge Program (HBP) funding)

e. DLA-OB 15-03 "Right of Way Certification"*
(Office Bulletin 15-03 "Right of Way Certification" was posted to the Local Assistance LAPM Publications website at http://www.dot.ca.gov/hq/LocalPrograms/DLA_OB/DLA_OB.htm)

PDWG - Focused Discussion Items **11:30 a.m.**

1. Review of Working Group Minutes 5 min

- Partnership Programming and Delivery Working Group – June 15, 2015* *(Seana Gause, PDWG Chair)*

2. Discussion Items:

A. Active Transportation Program Update *(Kenneth Kao, kkao@mtc.ca.gov)* 10 min

B. 2016 STIP Update* *(Kenneth Kao, kkao@mtc.ca.gov)* 10 min
(Excerpts from the presentation at the Programming and Allocations Committee on September 9, 2015. The full presentation is available online at: https://mtc.legistar.com/View.ashx?M=F&ID=4005937&GUID=3B8EAFBF-1A8A-4E21-AF7C-BF8EFA0D7CD8)

C. FES Discussion (Jean Higaki, San Mateo C/CAG) 30 min

3. Recommended Agenda Items for Next Meeting: (All) **5 min**

The next meeting of the Bay Area Partnership Board has been confirmed as noted below:

Friday, October 9; 1:00 PM – 3:00 PM; MTC, 101-8th Street, Oakland (Auditorium)