Transportation Authority of Marin

Final Report

Central and Southern Marin Transit Study

June 25, 2009

HDR

Accepted by the TAM Commission on June 25, 2009

TABLE OF CONTENTS

EXECUTIVE SUMMARY ES-1

CHAPTER 1: INTRODUCTION 1

1.1 Work Scope and Study Goals 1

CHAPTER 2: EXISTING CONDITIONS ANALYSIS 3

2.1 Summary of Existing Conditions Analysis (Full Tech Memo in Appendix 1) 3

2.1.1 Existing Transit Service 3

2.1.2 Transit Hub and Corridor Facilities 11

2.1.3 Corridor Travel Conditions 13

2.1.4 Travel Forecasts & Transit Demand Projections 23

2.1.5 Summary of Key Existing Conditions Analysis Findings 26

CHAPTER 3: DEVELOPMENT OF PROGRAM OF IMPROVEMENTS 29

3.1 Initial Improvement Concepts 29

3.2 Evaluation of Initial Improvement Concepts 31

3.3 Finalized List of Improvement Concepts 33

3.4 Stakeholder Input 34

CHAPTER 4: DESCRIPTION OF APPLICABLE IMPROVEMENTS 35

4.1 Multi-Modal Green Hubs 35

4.2 Hwy 101 Key Pads & Ramps Transit Program 39

4.3 Arterial Speed and Reliability Program 45

4.4 Local Stop Quality Enhancement Program 48

4.5 Key Bidirectional Corridor Enhancements 50

4.6 Capital and Operating Costs of Improvements 53

CHAPTER 5: BENEFIT ASSESSMENT OF IMPROVEMENTS 60

5.1 Multi-Modal Green Hubs 63

5.1.1 Anticipated Green Hub Benefits 63

5.1.2 Assessment of Benefits of the Green Hubs Program 64

5.2 Hwy 101 Key Pads and Ramp Transit Program 66

5.2.1 Anticipated Bus Pad/Ramp Transit Priority Improvement Program Benefits 66

5.2.2 Assessment of Benefits of the Bus Pad/Ramp Transit Priority Program 67

5.3 Arterial Speed and Reliability Program 68

5.3.1 Anticipated Arterial Speed and Reliability Improvement Program Benefits 69

5.3.2 Assessment of Benefits of the Arterial Speed and Reliability Improvements 70
5.4 Local Stop Quality Enhancement Program 71
5.4.1 Anticipated Local Stop Quality Enhancement Program Benefits 71
5.4.2 Assessment of Benefits of the Local Stop Quality Enhancement Program 71
5.5 Key Bidirectional Corridor Enhancements 72
5.6 Summary of Benefits 72
CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS 74
6.1 Conclusions 74
6.1.1 Implementation and Jurisdiction 76
6.2 Study Recommendations 78
6.2.1 Funding and Program Implementation 80
6.2.2 Recommended Pilot Program 85
6.2.3 Prioritized Action Recommendations 85
6.2.4 Timeline for Recommendations 88
APPENDIX 1: EXISTING CONDITIONS ANALYSIS REPORT A1-0
APPENDIX 2: STREETCAR FEASIBILITY DISCUSSION A2-0
APPENDIX 3: SUMMARY OF EXISTING BUS STOP CONDITIONS & POLICIES. A3-0
APPENDIX 4: STAKEHOLDER COMMENTS AND RESOLUTION & WORKSHOP MATERIALS A4-0

LIST OF FIGURES

Figure ES-1 Summary of Initial Improvement Concepts Analysis ES-5
Figure ES-2 Programs Provide Interrelated Benefits to Each Other ES-9
Figure ES-3Prioritized Transit Improvement Detailed Recommendations and Evaluation ES-14
Figure ES-4 Prioritized Transit Improvement Programs and TAM Board Action Recommendations ES-15
Figure ES-5 Central and Southern Marin Transit Study TIMELINE OVERVIEW OF RECOMMENDATIONS ES-16
Figure 2.1 GGT and Marin Transit Route Map for Central and Southern Marin Study Area ... 4
Figure 2.2 Corte Madera-San Anselmo/Fairfax Transit Corridor: 2018 Population 18
Figure 2.3 San Rafael-San Anselmo/Fairfax Transit Corridor: 2018 Population 19

Figure 2.4 Mill Valley-Sausalito Transit Corridor: 2018 Population 20
Figure 2.5 Larkspur-San Anselmo/Fairfax Transit Corridor: 2018 Population 21
Figure 2.6 Tiburon-E. Blithedale-Mill Valley Transit Corridor: 2018 Population 22
Figure 3.1 Process for Developing List of Potential Improvements 30
Figure 4.1 Potential Green Hub Locations 36
Figure 4.2 Locations of HWY 101 Transit Pads in Central and Southern Marin 40
Figure 4.3 Option 1 Diagram 42
Figure 4.4 Option 2 Diagram 43
Figure 4.5 Option 3 Diagram 44
Figure 4.6 Potential Local Bus Stop Enhancement Locations 49
Figure 4.7 Typical Multi-Modal Green Hub 55
Figure 4.8 Hwy 101Bus Pad/Ramp Improvement, Typical (Based on Tiburon Wye, NB) 56
Figure 4.9 Hwy 101Bus Pad/Ramp Improvement, Typical (Based on Tiburon Wye, SB) 57
Figure 4.10 Local Stop Enhancement, Typical (Based on Tiburon Blvd./Lyford Rd Location 58
Figure 5.1 Programs Provide Interrelated Benefits to Each Other 59
Figure 6.1 Prioritized Transit Improvement Programs and TAM Board Action Recommendations 86
Figure 6.2 Prioritized Transit Improvement Detailed Recommendations and Evaluation 87
Figure 6.3 Central and Southern Marin Transit Study TIMELINE OVERVIEW OF RECOMMENDATIONS 89

LIST OF TABLES

Table ES-1 Initial Central and Southern Marin Transit Study Improvement Concepts ES-3
Table ES-2 Aggregated Benefits ES-10
Table ES-3 Summary of Benefits by Typical Individual Site ES-10
Table ES-4 Summary of Agencies and Jurisdictions Potentially Involved in Planning and Implementation of Central and Southern Marin County Transit Enhancements ES-12
Table 2.1 GGT Bus service: Annual Ridership for Selected Basic and Commute Routes Serving Central and Southern Marin (2004 – 2008) 6
Table 2.2 GGT Bus Service Productivity and Farebox Recovery 6

Table 2.3 Productivity and Farebox Recovery for GGT Basic and Commute Routes Serving Central and Southern Marin (FY 2007) 7

Table 2.4 Annual Revenue Hours and Ridership for Marin Transit Local Routes Serving Central and Southern Marin (FY 2007/08) 9

Table 2.5 Productivity and Farebox Recovery for Marin Transit Local Routes Serving Central and Southern Marin (FYs 2006/07 and 2007/08) 9

Table 2.6 Typical Corridor Densities Supporting Fixed Route Transit Services 14

Table 3.1 Initial Central and Southern Marin Transit Study Improvement Concepts 31

Table 3.2 Initial Improvement Concept Evaluation Criteria 32

Table 3.3 Summary of Initial Improvement Concepts Analysis 33

Table 3.4 Finalized List of Central and Southern Marin Transit Study Enhancement Concepts 34

Table 4.1 Green Hub Design Elements 38

Table 4.2 Cost Estimate Summary of Transit Improvements 53

Table 4.3 Benefit-Cost per Transit Passenger of Improvements 54

Table 5.1 Estimated Annual Benefits of Green Hubs 65

Table 5.2 Estimated Annual Benefits of Bus Pad Improvements 68

Table 5.3 Estimated Annual Benefits of Arterial Speed and Reliability Improvements 69

Table 5.4 Estimated Annual Benefits of Local Stop Quality Enhancement Program 70

Table 5.5 Aggregated Benefits 71

Table 5.6 Summary of Benefits by Typical Individual Site 72

Table 6.1 Aggregated Benefits by Enhancement program 75

Table 6.2 Summary of Program Benefits by Typical Individual Site 76

Table 6.3 Summary of Agencies and Jurisdictions Potentially Involved in Planning and Implementation of Central and Southern Marin County Transit Enhancements 77

Table 6.4 Central and Southern Marin Transit Study RECOMMENDATIONS 79

Table 6.5 Funding Sources and Potentially Eligible Program Capital Cost Elements 80

EXECUTIVE SUMMARY

CENTRAL AND SOUTHERN MARIN TRANSIT STUDY

Chapter 1: Introduction

1.1 Work Scope and Study Goals

In July 2008, the Transportation Authority of Marin (TAM) approved the final work scope for the Central and Southern Marin Transit Study. The Study formally commenced in September 2008, and was jointly funded by the Golden Gate Bridge District, Marin County Transit District and TAM. The purpose of the study was to:

1. Develop an incremental program of feasible and fundable improvements to U.S. 101-oriented trunk line bus service.
2. Identify opportunities for transit to serve as effective feeders for both ferry and regional commute bus services.

The outcomes of the Central and Southern Marin Transit Study are intended to both provide a strategic blueprint for coordinated transportation improvements in Southern Marin, and to provide a prioritized listing of feasible projects designed to improve the effectiveness and attractiveness of public transit along Southern Marin's Highway 101 corridor. A parallel task examined the potential for streetcar service on the Mill Valley-Sausalito corridor, documented in the Task 5A Streetcar Feasibility Discussion Report. Consistent with the goal of an implementable plan, the study horizon has been set in the relatively near term—five-ten years.

The concept of a potential large transit hub serving Central and Southern Marin was an early premise of the study. The subsequent travel demand and transit service analysis concluded that a program of localized transit infrastructure investment, widely distributed at multiple sites on all of the study corridors, would yield more effective mobility benefits for Marin residents. This is reflected in the options considered in the evaluation process and in the Study's final recommendations.

Chapter 2: Existing Conditions Analysis

Existing Transit Service: Public transit in Central and Southern Marin County is provided by Golden Gate Transit (GGT) and Marin Transit. Currently GGT operates a network of Basic and Commute Routes and Marin Transit operates Local Routes. GGT's Basic and Commute routes are designed to serve longer haul, regional inter-county commuter markets. Marin Transit's

Local routes are designed to complement GGT longer-haul services, serving intra-county commuter, student and transit dependent markets.

Service Changes: During the course of the Study, GGT implemented a series of bus service changes to improve customer service and redeploy underutilized bus to routes and times where additional capacity is needed. Marin Transit continued to implement service recommendations developed through its Short Range Transit Plan process and guided by Measure A transit priorities, which are intended to improve the attractiveness of transit service to "choice" transit markets within Marin County. Both systems meet their target performance standards for productivity and on time performance.

Transit Hub and Corridor Facilities: There are several existing transit "hubs" in Central and Southern Marin County. These can be generally categorized as transfer facilities, such as the San Rafael and Marin City Transit Centers and other key facilities serving regional ferry services. On the Hwy 101 corridor bus pads provide direct freeway access to local and regional transit.

Corridor Travel Conditions: To provide a backdrop to travel conditions and demand, the Study team undertook a local breakdown of the current (ABAG/MTC 2007) regional forecasts of population and employment growth. Demographically, and in terms of the transit market, Central and Southern Marin is one of the most stable (i.e. slowest growing) parts of the nine-county Bay Area.

At a more local level, each of the five study corridors (Corte Madera-San Anselmo/Fairfax, San Rafael-San Anselmo/Fairfax, Mill Valley-Sausalito, Larkspur-San Anselmo/Fairfax, Tiburon-E. Blithedale-Mill Valley) were analyzed for current and future population, employment, general traffic congestion and activity center growth between 2008 and 2018, the Study horizon year.

The Study Corridors all show constant population and employment levels over the next ten years, with growth of less than 3% over the entire decade. Corridor population densities are broadly in line with, or somewhat below, the current level of local service provision (30 minute peak/60 minute off-peak fixed route service). Regional and local mobility needs exist to destinations beyond each corridor, and beyond the County, on all travel corridors: these may require transit service in the future, irrespective of low residential or employment densities and land uses which support local transit services. Opportunities for significant land use change towards densities which might support higher capacity transit (such as streetcar), appear limited in the next ten years; this is especially apparent in the Mill Valley-Sausalito corridor.

Travel Demand: The aggregate demand for travel is forecast as "slower growth" in the next decade. The total number of trip ends increases by less than 15 percent for both residents and for non-resident trip attractions in all cases. The reason is that much of the area has been "built out,"

with only small sites available for redevelopment. The increases in demand tend to be to the north. While some growth is forecast to occur to/from San Francisco, the overall trend is to have more trips traveling northward in the future. Even with this shift, the overall demand of travel is not going to shift significantly.

Hwy 101 Corridor Bus Pad Capacity and Utilization: Park and ride lots and bus pad facilities are a crucial part of Marin's transit infrastructure on the Hwy 101 corridor. The Study's utilization analysis of overflow counts[1] reveal a consistent excess demand at several locations on the Hwy 101 corridor, in the order of 30% or approximately 400 spaces daily. Significantly, several bus pad locations with no formal parking provision, and poor auto access, showed 30-60 regular "overflow" demand spaces on adjacent surface streets daily.

Chapter 3: Development of Program of Improvements

3.1 Initial Improvement Concepts

An initial list of potential improvements was developed from the existing conditions (Chapter 2) in the early stages of the study.

Table ES-1 Initial Central and Southern Marin Transit Study Improvement Concepts

Initial Central and Southern Marin Transit Study Improvement Concepts	
Expanded Park and Ride Capacity	To encourage transit use by choice regional commute market.
Bus Pad Access Improvements on HWY 101	Improve pedestrian access and operating efficiency.
Arterial Corridor Transit Signal Priority (TSP) and Capacity Improvements	Decrease onboard transit travel times. Make regional and local transit mode more attractive.
Local Stop Established Minimum Facilities Improvements	Improve pedestrian/ADA access to local bus stops. Enhance bus stop amenities.
Out of Direction Travel Needs	Improve reverse commute transit service.
Major Transit Transfer Hub (new or expansion of existing)	Improve route connectivity.

[1] Counts were based on an inventory undertook by the Study team of bus pad/park and ride lot utilization in the morning peak and midday, on several weekdays in November 2008. More information can be found in Appendix 1.

3.2 Evaluation of Initial Improvement Concepts

An analysis of these improvement concepts was conducted (Chapter 3) using a set of evaluation criteria to determine their application in the study area. The criteria included Meeting Transit Efficiency and Effectiveness Goals, Facilitating Transfers, Improving Travel Times (Intra-County and Regional), Increasing Transit Usage (transit dependent and choice riders), being Cost Effective for Transit Operators, Meeting Environmental Goals, and being achievable within TAM & Agency Resources.

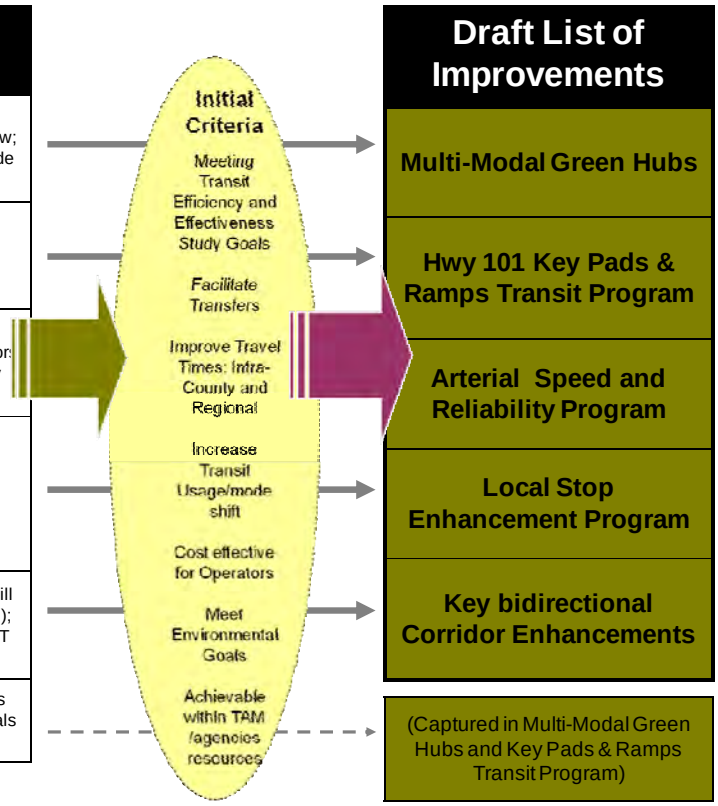
From this analysis, the list of improvement concepts was refined for further definition (Chapter 4) and evaluation (Chapter 5). The applicable Programs of Improvements that were developed are: Multi-Modal Green hubs, Hwy 101 Key Pads & Ramps Transit Program, Arterial Speed and Reliability Program, Local Stop Quality Enhancement Program, and Key Bidirectional Corridor Enhancements.

3.3 Finalized List of Improvement Concepts

Figure ES-1 summarizes the result of the evaluation of the initial improvement concepts. From this evaluation the list of improvement concepts brought forward for further definition (Chapter 4) and evaluation (Chapter 5) was reduced from six to five. The Major Transit Transfer Concept for Central and Southern Marin County was eliminated because anticipated service levels within the next five to ten years would remain at current levels and be insufficient to justify the development of a new centralized transit hub or to significantly expand an existing hub.

Figure ES-1 Summary of Initial Improvement Concepts Analysis

Improvement Concepts Reviewed with TAC 1/21/09	Analysis Conclusions
Expanded Park and Ride capacity	Shortfall of 300 spaces min. identified + 200 Kiss & Ride; no clear desire to expand capacity simply to satisfy current overflow; managed solution needed based on non-auto modes; park & ride opportunities on arterials within cities very limited
Bus Pad Access Improvements on Hwy 101	Access improvements essential to improving attractiveness / effectiveness. Limited $ means grade improvements preferred over ped grade seps and provide more effective spread of investment in Cen/So. Marin
Arterial Corridor Transit Signal Priority (TSP)/Capacity Improvements	Desirable to pursue at key locations identified by transit operators as generating delay and On Time Performance (OTP) reliability
Local Stop Established Minimum Facilities Improvements	Establish a hierarchy of local bus stops along key east/west corridors: 1. Limited stop express bus stops - minimum 2 mile spacing 2. Local bus stops - approximately 1/2 mile spacing Transfers between local and limited stop express occur along corridor at limited stop express bus stops
Out of Direction Travel Needs	Reverse Travel Corridor Enhancements needed in Sausalito-Mill Valley (although streetcar not likely to provide effective solution); E/Dtn San Rafael-San Anselmo corridor; connections to SMART NB
Major Transit Transfer Hub (new/expanded)	Service levels and transfers likely to be broadly at current levels in 5-10 years. No new "Super-hub" required; (the Ferry Terminals + SRTC are the major regional hubs)



3.4 Stakeholder Input

Stakeholder input was critical to the development, refinement, and evaluation of the five Central and Southern Marin Transit Study improvements concepts. In addition to monthly reports back to the Tam Executive Committee, Stakeholder input was obtained through:

1. A series of six TAC meetings at critical steps in the study.
2. A series of meetings with GGT and Marin Transit staff, as well as, County and city staff members and elected representatives.
3. A Public Workshop held at the Marin Center 03/26/09 (summary of input provided in Appendix 3).
4. A meeting with Caltrans District 4 staff on 04/14/09 to specifically review alternatives for the Hwy 101 Key Pad & Ramps Transit Programs enhancements.
5. A presentation to Mill Valley City Council on 06/01/09.

Chapter 4: Description of Applicable Improvements

4.1 Multi-Modal Green Hubs

Multi-Modal Green Hubs are intended as strategic transit hubs to collect and distribute passengers. Multi-Modal Green Hubs will be designed to improve transit operating efficiency and service quality, while being scaled to, and compatible with, the surrounding land uses and host communities. Seventeen potential Multi-Modal Green Hub locations have been identified in the Central and Southern Marin Transit Study area. These range from established hubs and/or park-and-ride sites like San Rafael Transit Center, San Anselmo Hub, Marin City Transit Center, the Larkspur, Tiburon, and Sausalito Ferry Terminals, Bon Air Shopping Center, Manzanita Park-and-Ride, and the Spencer Avenue Bus Pad, to a number of potential new sites including GGT's Sir Francis Drake/Olema Road bus turnaround, Fairfax (between Sir Francis Drake and Center west of Pastori), San Rafael (4th at Ida), College of Marin, Mill Valley Depot, Mill Valley Municipal Parking Lot (Miller at Evergreen), Alto Shopping Center (E. Blithedale), and the San Quentin area (Francisco at Main).

All developed Green Hubs will function as formal transfer hubs, served by limited stop express regional services and local feeder services. All sites will be designed to facilitate efficient, direct bus access. Depending on location, some outlying or HWY 101 sites will serve as intercept facilities attracting park-and-ride transit commuters and reducing single occupant vehicle traffic on the HWY 101 trunk and east/west corridors. There will be an emphasis on increased transit commuter parking and kiss-and-ride capacity at these sites. Other sites with parking capacity constraints can serve as "community" collectors serving the surrounding neighborhoods with the design emphasis on good pedestrian access, bicycle storage, as well as kiss-and-ride and taxi service capacity.

The Multi-Modal Green Hub concept provides Marin County communities with a flexible transit-oriented feature. Given the diversity of the study area, there is no single standard Green Hub design. One size certainly does not fit all situations and opportunities. Although individual facility design will depend on local site capacity and surrounding conditions, tempered by local jurisdictional preferences, each facility will be designed to maximize transit efficiency, effectiveness and attractiveness with the facility scale and range of amenities that are feasible.

4.2 Hwy 101 Key Pads & Ramps Transit Program

The current bus pad concept along the Highway 101 corridor in the study area is an effective way to provide accessibility for routes heading to and from San Francisco as they travel along the freeway. The current bus pads have been in operation for several decades. Most recently many of the pads have had some improvements such as new shelters and sidewalks. Most are situated very close to pedestrian ramps and bridges that connect both sides of the roadway, so

that a person boarding the bus in one direction is able to return in the other direction. The concept is to provide a set of operations improvements intended on improving the overall flow and accessibility and safety of these pads. The improved concepts are also to improve transit efficiency and effectiveness through better flow in the stop areas, to facilitate transfers between bus routes and other models, which would then increase transit usage and improve the overall environment.

4.3 Arterial Speed and Reliability Program

The concept is to provide a set of operation improvements intended on improving the overall flow of buses in this corridor. This includes improving travel speeds, as well as, improving the reliability (or the on-time performances) of the buses. This results in improvements to transit attractiveness and efficiency.

Complementary techniques include bus stop spacing and positioning, limited stop service, strategic geometric changes, and transit signal priority where useful. These techniques are both complementary with each other as well as with other programs. The Sir Francis Drake Corridor was identified as the most relevant for this treatment, to facilitate future enhanced bus rapid transit type service.

4.4 Local Stop Quality Enhancement Program

The key element of the Local Stop Quality Enhancement Program is to improve the attractiveness of transit to choice riders and improve overall service quality to transit dependent riders. The program can help to guide the assignment of capital funds earmarked for bus stop improvements. The Program is intended to establish a set of priority bus stops targeted for bus stop enhancements identified in local capital improvement programs. These essentially would be local bus stops located between proposed Multi Modal Green Hubs along the key east/west transit corridors in Central and Southern Marin.

The range of enhancements could include but not be limited to:

- Improved pedestrian access.
- ADA accessibility.
- Shelters and benches.
- Routing and schedule information.
- Enhanced lighting.
- Guaranteed secure bicycle parking.
- Kiss-and-ride drop off and pick up capacity.

4.5 Key Bidirectional Corridor Enhancements

Three Reverse Corridor Enhancement initiatives were identified during the Central and Southern Marin Transit Study. These included the following:

- Muir-Sausalito-Mill Valley Welcome Service
- Canal-Downtown San Rafael-San Anselmo Rapid Service
- Larkspur Area Hub Connections

These three Bidirectional Corridor Enhancements were selected because of their combined work and non-work distinct travel demand characteristics, resulting in an all day potential market for transit provision beyond the non-commute hours. (Corridors with commute only or very low level non-work demand characteristics, such as Tiburon Blvd., Belvedere, and Corte Madera/Tamalpais Dr. were excluded from this category of all day bidirectional corridor potential service.) All three are subject to further demand analysis and service planning efforts. In the case of the Larkspur Area Hub Connections initiative, further assessment will be conducted in conjunction with SMART station area planning and assessment of shuttle bus requirements.

4.6 Costs of Improvements

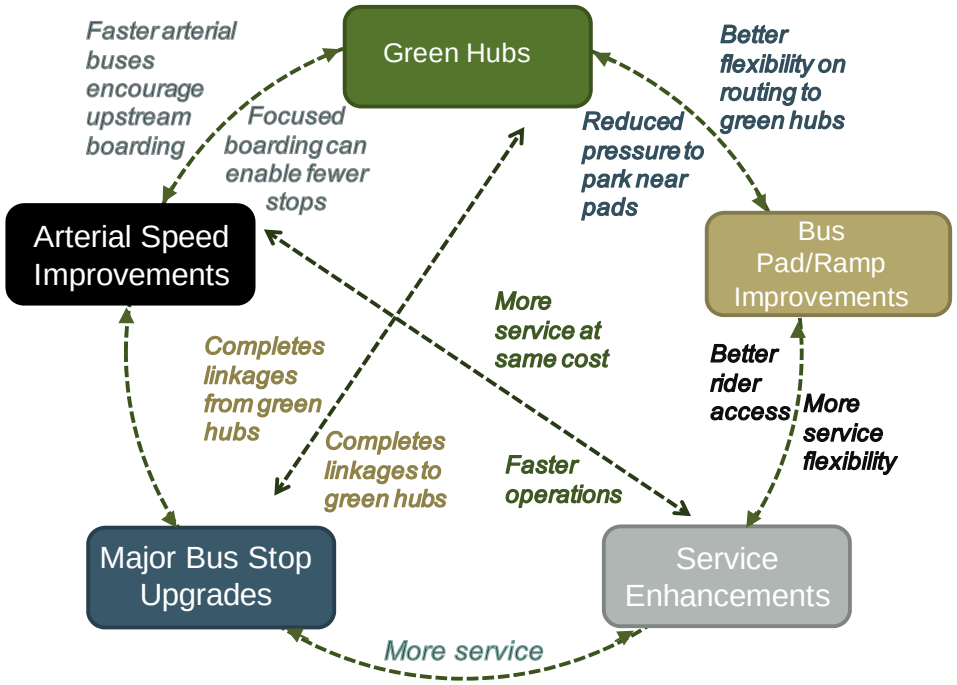
The combined total capital cost for the key transit improvements was estimated within a range, of which the mid-point would be approximately $35 million. The program elements totaled as follows (full details of the typical individual site costs are in Chapter 4 of the full report):

1. Multi-Modal Green Hubs: $5.9 Million
2. Hwy 101 Key Pads & Ramps Transit Program: $8.6 million
3. Arterial Speed and Reliability Program: $13.6 Million
4. Local Stop Quality Enhancement Program: $1.1 million
5. Key Bidirectional Corridor Enhancements: $5.8 Million

Chapter 5: Benefit Assessment of Improvements

The program elements are designed to complement one another, as described in Figure ES-2. For example, the green hubs program provides upstream parking opportunities for residents, while the arterial speed and reliability program would mean that persons who park at the upstream green hubs can make their trip faster.

Figure ES-2 Programs Provide Interrelated Benefits to Each Other



The study has assessed the potential benefits of the improvements from implementing the various elements of the program, using the following key measures:

- Annual Walk to Transit Trips Benefitted
- Annual Bicycle to Transit Trips Benefitted
- Annual Transit and Auto Trips that Park-and-Ride Benefitted
- Annual Drop-Off, Pick-up and Transferring Passengers Benefitted
- Annual Boardings Benefitted
- Annual Pedestrian Trips Benefiting by Safer At-Grade Crossings
- Annual Auto Driver/Passenger Minutes Saved
- Annual Greenhouse Gas emissions reduced (tons)

Summary of Benefits: The benefits listed here provide an illustrative picture of the various components of the program. Table ES-2 compiles these findings into a summary table. As this table shows, the annual benefit will accrue to almost 3.6 million passengers a year. About 1.5 million passengers a year will benefit from safer crossings. There will be a significant savings in auto driver minutes resulting from shifts to transit use. The estimated benefit is almost 4 million minutes a year, resulting in an estimated savings of 1,337 tons of greenhouse gas emission reduction.

Table ES-2 Aggregated Benefits

Aggregated Benefits

Category of Benefit	Green Hubs Program	Ramp TSP/ Bus Pads Improvement Program	Arterial Speed and Reliability Program	Enhanced Local Stops Program	Total Benefit
Bicycle to Transit Trips	211,600	8,500	23,600	NA	243,700
Walk to Transit Trips	1,471,300	106,600	296,000	189,200	2,063,100
Drop-Off/Pick-Up/Transfer Transit Trips	749,200	22,200	61,700	0	833,100
Total Transit Trips	2,648,900	170,800	474,300	303,100	3,597,100
Pedestrian Trips Benefiting by Safer At-Grade Crossings	1,218,700	170,800	NA	94,600	1,484,100
Auto Driver/Passenger Minutes Saved	3,187,500	205,600	465,400	NA	3,858,500
Greenhouse Gas emissions reduced (tons).	1,100	73	164	NA	1,337

The same data was examined on a typical improvement basis, shown in Table ES-3. This shows that each improvement individually yields benefit in a number of areas, and that the reduction in auto driver trips and greenhouse gas emission reduction are more comparable on a unit basis. The lowest cost benefits – the local stop enhancements – benefit the least people on a per installation basis, while the green hubs and the arterial speed and reliability improvements programs tend to benefit the most. While the bus pad improvements do not show as much of a benefit on a unit basis, it is noted that they do provide a significant benefit to safety and security – key issues which both policymakers and the public alike have identified during the Study as important non quantifiable benefits resulting from the improvements program.

Table ES-3 Summary of Benefits by Typical Individual Site

Summary of Benefits by Typical Individual Site

Category of Benefit	Typical Green Hub	Typical Ramps/ Bus Pads	Typical Arterial Speed Improvement	Typical Enhanced Local Stop
Number of Sites in Program	17	4	2	22
Bicycle to Transit Trips	12,447	2,125	11,800	NA
Walk to Transit Trips	86,547	26,650	148,000	8,600
Drop-Off/Pick-Up/Transfer Transit Trips	44,071	5,550	NA	0
Total Transit Trips	155,818	42,700	237,150	13,777
Pedestrian Users benefitted by Safer At-Grade Crossings	71,688	42,700	NA	4,300
Auto Driver/Passenger Minutes Saved	187,500	51,400	232,700	NA
Greenhouse Gas emissions reduced (tons).	65	18	82	NA

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Central and Southern Marin has a highly developed local and regional transit system that currently provides level of service which broadly match the characteristics and travel markets of the current arterial and Hwy 101 corridors. The five to ten year future is likely to see slow growth in the Study area and a flat demand for the traditional San Francisco-bound commute. The focus of the improvements is on improving the attractiveness of transit to choice and transit-dependent riders by providing the infrastructure to reduce intra-Marin transit travel times, facilitate local and regional transfers and focusing these investments directly at the users in each community across Southern Marin. Five transit improvement programs were developed in the Central and Southern Marin Transit Study:

- Multi-Modal Green Hub Program
- HWY 101 Key Pads and Ramp Transit Program
- Arterial Speed and Reliability Program
- Local Stop Enhancement Program
- Key Bidirectional Corridor Enhancements

The first four programs are highly interrelated, reinforcing overall transit efficiency, effectiveness, and marketability benefits, as well as supporting congestion management, air quality and community livability ideals. In an ideal world a comprehensive, phased corridor by corridor improvement plan would be developed and implemented that integrated elements of the Multi-Modal Green Hub, Hwy 101 Key Pads and Ramp, Arterial Speed and Reliability, and Local Stop Enhancement Programs. However, the current funding realities and multi-jurisdiction responsibilities necessitate a more modest approach to the implementation of these strategies. A realistic implementation strategy is reflected in the Central and Southern Marin Transit Study Recommendations

6.1.1 Implementation and Jurisdiction

Implementation of the five programs will involve a number of jurisdictions responsible for policy making, operations and maintenance and development. Table ES-4 provides a summary of the jurisdictions that will be involved in the implementation of the various programs. Jurisdictional involvement will vary from candidate site to candidate site depending on location and the nature of the site improvement.

Table ES-4 Summary of Agencies and Jurisdictions Potentially Involved in Planning and Implementation of Central and Southern Marin County Transit Enhancements

Enhancement Program	Jurisdictions Involved in Implementation*
Multi-Modal Green Hubs	TAM, GGT, Marin Transit, Caltrans, County of Marin, Marin College, the Cities of San Rafael, Mill Valley, Larkspur and Sausalito, the Towns of Fairfax, San Anselmo, Tiburon, as well as private property owners.
Hwy 101 Key Pads & Ramps Transit Program	TAM, GGT, Marin Transit, Caltrans, County of Marin, Town of Corte Madera.
Arterial Speed and Reliability Program	TAM, GGT, Marin Transit, Caltrans, County of Marin, the Cities of San Rafael, Larkspur and Mill Valley, and the Towns of Fairfax, San Anselmo, and Ross.
Local Stop Enhancement Program	TAM, GGT, Marin Transit, County of Marin, the Cities of San Rafael, Larkspur, Sausalito and Mill Valley, and the Towns of Fairfax, San Anselmo, Tiburon, and Ross. In some cases private developers may be involved.
Key Bidirectional Corridor Enhancements	SMART, TAM, GGT, Marin Transit, County of Marin, the Cities of San Rafael, Larkspur, Sausalito and Mill Valley, the Towns of Fairfax and San Anselmo, as well as the National Parks Service.

*** Local jurisdictional involvement will be dependent on specific improvement site location.**

6.2 Study Recommendations

The Study Benefits Assessment identified the quantifiable (hard) benefits from the development of the full five-category program of transit improvements. In addition to the quantified benefits, non-quantified factors will also influence the priority and sequence of project delivery, including Funding Availability, Project Eligibility for available funding, and Match with existing TAM and local /regional program priorities.

The recommendations within the five program categories reflect the hard and soft factors and are described in Figure ES-3. For each program category, the recommendations are structured to reflect the key steps in the chronology of taking the projects forward. Each begins with a policy action recommendation: this establishes the principle of policymaker support for each program element which has a need for the agreement or support of TAM, and where appropriate, the other relevant partners.

6.2.1 Funding and Program Implementation

The Study Recommendations were subject to a review of potential existing revenue sources and project elements that might be eligible for those sources at Federal, State and Regional/Local levels, excluding TAM's existing expenditure program, which is fully committed. Further details are available in the final report. These factors were incorporated.

6.2.2 Recommended Pilot Programs

Two Pilot Programs are also contained within the overall recommendations, for the Multi Modal Green Hubs and the Key Pads and Ramps Program. These Pilot Programs have emerged during the latter part of the Study as potential early implementation opportunities with willing local partners. They also provide an opportunity to test the transit improvement concepts with current Golden Gate and Marin Transit services at a limited number of local sites which can incorporate all elements of each facility. The Pilot sites also enable the participating agencies to refine these working concepts before their wider rollout across Central and Southern Marin.

6.2.3 Prioritized Action Recommendations

The Study scope sought prioritized recommendations for both TAM and its participating partner agencies. The full list of recommendations was subject to an evaluation using the criteria of funding availability, expressions of agency and/or jurisdictional interest and the findings from the Study Benefits Assessment relating to ridership, travel time, greenhouse gas emissions cost per trip. Figure ES-3 provides the summary of the results of this evaluation as they relate to the five program categories and the specific TAM Board Action Recommendations. Figure ES-4 summarizes a prioritized list of TAM Board Action Recommendations. The detailed recommendations were also evaluated and prioritized within the individual Transit Improvement Programs.

6.2.4 Timeline for Recommendations

Policymaker support or adoption of the program elements are assumed to be the first step which could be completed within six to nine months of the completion of this Study in mid-2009. The subsequent recommendations are broadly chronological, and only indicative, since individual jurisdictions may choose to move forward at a pace which suits their priorities and funding readiness. For additional clarity, a timeline overview for the five program category recommendations is described in Figure ES-5 on the following page.

The Study Recommendations, including the Pilot Programs, when implemented in their entirety, will deliver:

- ***Significant mobility improvements for those dependent on transit for their daily needs***
- ***The best possible opportunity for encouraging mode shift by choice riders***
- ***A major reduction in Marin's carbon footprint through the building blocks of a sustainable transit system***

Figure ES-3 Prioritized Transit Improvement Detailed Recommendations and Evaluation

					Detailed Evaluation Based On Individual Site Improvements					
Program Element	**Program PRIORITY**	***TAM Board Recommended Action***	**Recommendations** (all Responsible Agencies)	Individual Element PRIORITY	**Funding Readiness***	**Expressions of Local Interest**	**Greatest Ridership Impact**	**Auto Driver/Passenger Travel Time Savings**	**Greenhouse Gas Emissions Reductions**	**Cost/One Way Passenger Trip****
Multi Modal Green Hubs	❶	*Approve recommendation to support two Pilot Programs with the paticipating jurisdictions and Transit Operators .(e.g. City of Mill Valley identifying preferred locations for Pilot Program of initial two Multi Modal Green Hubs .)*	MMGH1 Support a Multi Modal Green Hubs program as a key component of future transit infrastructure in Central & Southern Marin	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation
			MMGH2 Prioritize the development of the Multi Modal Green Hubs in accordance with local jurisdictions' priorities and readiness	①	✓	✓	✓✓	✓✓	✓✓	✓✓✓
			MMGH3 Support a Multi Modal Green Hubs Pilot Program at a minimum of two sites (e.g. in Mill Valley, in collaboration with the Miller Ave. Design Study)	②	✓	✓	✓✓	✓✓	✓✓	✓✓✓
			MMGH4 Identify the Multi Modal Green Hub Pilot Program's property, access, construction and ongoing maintenance requirements	③	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓✓✓
			MMGH5 Establish a Guaranteed Transit Parking Program as a supporting element of the Multi Modal Green Hubs program	④	✓	✓	✓✓	✓✓	✓✓	✓✓✓
			MMGH6 Deliver a Multi Modal Green Hub Pilot Program of early starts at a minimum of two sites	⑤	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓✓✓
Arterial Speed and Reliability Program	❷	*Approve recommendation to support Marin County and Local Jurisdictions to undertake necessary technical analysis to establish transit priority measures on relevant segments of Sir Francis Drake Blvd.*	ASR1 Support a multi-corridor Arterial Speed and Reliability Program as a key component of future transit development in Central & Southern Marin	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation
			ASR2 Establish a working group comprising TAM, Marin Co. and local jurisdictions to develop a memorandum of understanding (MOU) governing development and implementation of the Arterial Speed and Reliability Program	①	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓
			ASR3 Agree lead agency to undertake necessary additional operational analysis to develop a first phase of a corridor system management plan	②	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓
Hwy 101 Key Pads and Ramps Program	❸	*Approve recommendation to support Caltrans and Transit Operators to undertake necessary operational and technical analysis to establish Tiburon Wye as a Pilot Program site.*	KPR1 Support a Key Bus Pads Development Program as a key component of future transit infrastructure in Central & Southern Marin	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation
			KPR2 Establish a working group comprising TAM, Caltrans and local jurisdictions to refine the operational concept for enhanced bus pads and ramps	①	✓	✓	✓	✓	✓	✓✓
			KPR3 Establish Key Bus Pads Pilot Program at a minimum of one site (e.g. Tiburon Wye or Paradise)	②	✓	✓	✓	✓	✓	✓✓
			KPR4 Undertake the necessary Caltrans processes (PSR, PA/ED) to deliver first Key Bus Pads Development Program site	③	✓	✓	✓	✓	✓	✓✓
			KPR5 Deliver the first Key Bus Pads Pilot Program site project (e.g. Tiburon Wye or Paradise)	④	✓	✓	✓	✓	✓	✓✓
Local Stop Enhancement Program	❹	*Approve recommendation to participate as a member of Technical Advisory Committee (TAC) member in Local Stop Enhancement Program and assist in development of funding program.*	LSE1 Support a Local Stop Enhancement Program as a key component of future transit infrastructure in Central & Southern Marin	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation
			LSE2 Develop a priority list of local stops for enhancement in accordance with local jurisdictions' priorities, in coordination with Golden Gate Transit and Marin Transit	①	✓	✓	✓	✓	✓	✓✓✓
			LSE3 Adopt an Enhanced Local Stops amenities policy, accordance with Golden Gate Transit and Marin Transit local stop policies	②	✓	✓	✓	✓	✓	✓✓✓
			LSE4 Deliver Local Stop Enhancement Program, accordance with Golden Gate Transit and Marin Transit bus stop policies	③	✓	✓	✓	✓	✓	✓✓✓
Key (Bidirectional) Corridor Enhancements	(Further Study Prior to Implementation)	*Approve recommendation to support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor*	KCE1 Support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	(Not Evaluated)	(Not Evaluated)	(Not Evaluated)	(Not Evaluated)
			KCE2 Undertake a Market Demand Analysis for additional transit service on the Mill Valley-Sausalito Welcome Corridor	①	✓	✓				
			KCE3 Based on the results of demand analysis, develop 2-year pilot of an enhanced transit service (potentially seasonal) on the Mill Valley-Sausalito Welcome Corridor, connecting local service with Muir Woods and Fort Baker services	②	✓	✓				
			KCE4 Prepare a Canal-San Anselmo Corridor transit development plan for increased service on the corridor	③	✓	✓				
			KCE5 Prepare a Station Transit Facilities and Service Plan in conjunction with SMART for future service linking the Larkspur SMART station, the Sir Francis Drake corridor and Larkspur Landing/Golden Gate Ferry Terminal	④	✓	✓				

Low	Medium	High
✓	✓✓	✓✓✓
Relative Ratings		

*Meet current funding eligibility requirements

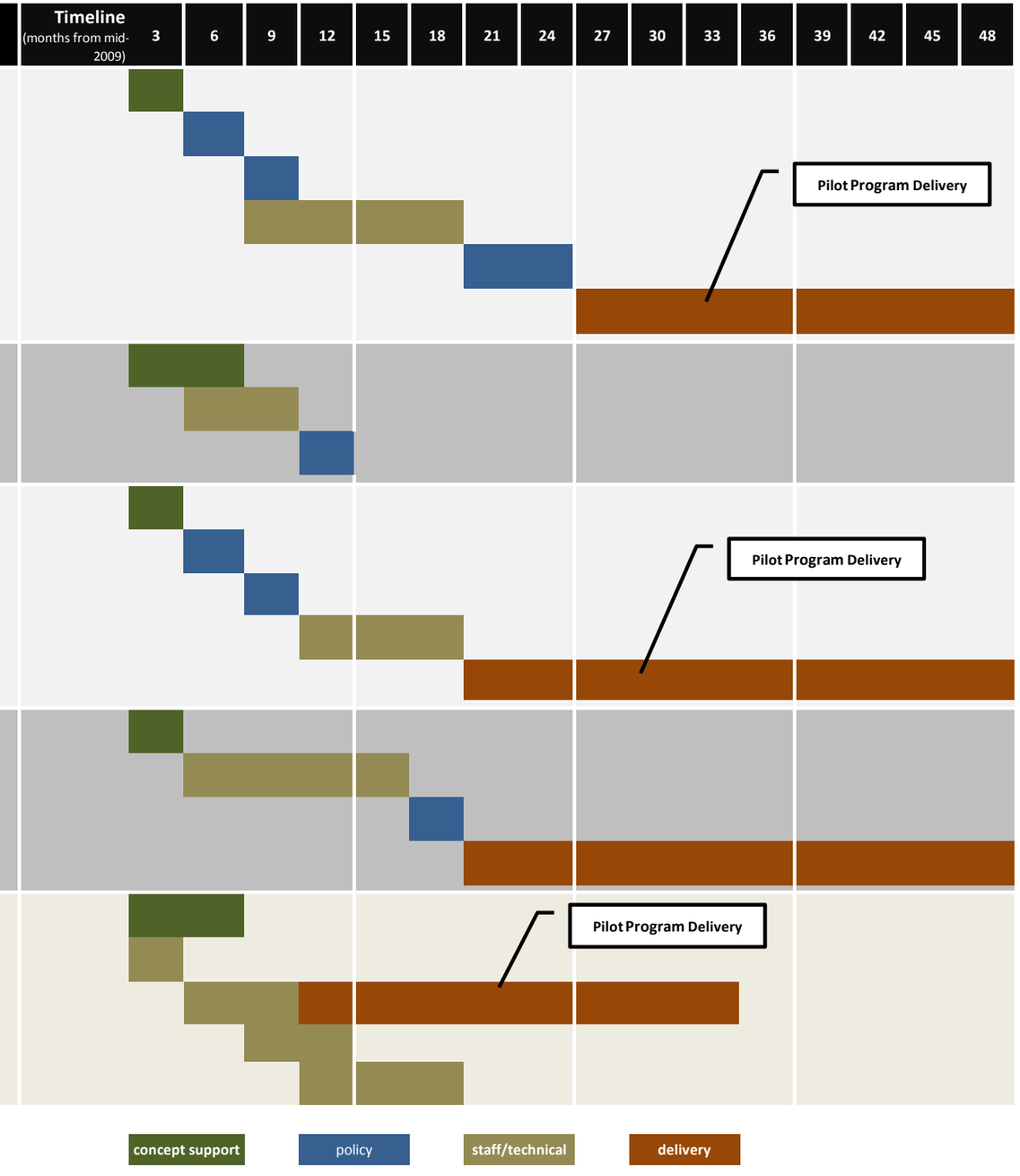
** Lower the cost the higher the rating.

Figure ES-4 Prioritized Transit Improvement Programs and TAM Board Action Recommendations

Program Element	Program PRIORITY	*TAM Board Recommended Action*
Multi Modal Green Hubs	❶	*Approve recommendation to support two Pilot Programs with the paticipating jurisdictions and Transit Operators .(e.g. City of Mill Valley identifying preferred locations for Pilot Program of initial two Multi Modal Green Hubs .)*
Arterial Speed and Reliability Program	❷	*Approve recommendation to support Marin County and Local Jurisdictions to undertake necessary technical analysis to establish transit priority measures on relevant segments of Sir Francis Drake Blvd.*
Hwy 101 Key Pads and Ramps Program	❸	*Approve recommendation to support Caltrans and Transit Operators to undertake necessary operational and technical analysis to establish Tiburon Wye as a Pilot Program site.*
Local Stop Enhancement Program	❹	*Approve recommendation to participate as a member of Technical Advisory Committee (TAC) member in Local Stop Enhancement Program and assist in development of funding program.*
Key (Bidirectional) Corridor Enhancements	(Further Study Prior to Implementation)	*Approve recommendation to support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor*

Figure ES-5 Central and Southern Marin Transit Study TIMELINE OVERVIEW OF RECOMMENDATIONS

Program Element	Recommendations (all Responsible Agencies)	Participating Agency
Multi Modal Green Hubs	MMGH1 Support a Multi Modal Green Hubs program as a key component of future transit infrastructure in Central & Southern Marin	TAM
	MMGH2 Prioritize the development of the Multi Modal Green Hubs in accordance with local jurisdictions' priorities and readiness	TAM/Local/GGT/MCTD
	MMGH3 Support a Multi Modal Green Hubs Pilot Program at a minimum of two sites (e.g. in Mill Valley, in collaboration with the Miller Ave. Design Study)	TAM/City of Mill Valley/GGT/MCTD
	MMGH4 Identify the Multi Modal Green Hub Pilot Program's property, access, construction and ongoing maintenance requirements	TAM/City of Mill Valley/GGT/MCTD
	MMGH5 Establish a Guaranteed Transit Parking Program as a supporting element of the Multi Modal Green Hubs program	TAM/Local
	MMGH6 Deliver a Multi Modal Green Hub Pilot Program of early starts at a minimum of two sites	TAM/City of Mill Valley
Arterial Speed and Reliability Program	ASR1 Support a multi-corridor Arterial Speed and Reliability Program as a key component of future transit development in Central & Southern Marin	TAM/Local/GGT/MCTD
	ASR2 Establish a working group comprising TAM, Marin Co. and local jurisdictions to develop a memorandum of understanding (MOU) governing development and implementation of the Arterial Speed and Reliability Program	TAM/Marin Co./Local
	ASR3 Agree lead agency to undertake necessary additional operational analysis to develop a first phase of a corridor system management plan	TAM/Marin Co./Local
Hwy 101 Key Pads and Ramps Program	KPR1 Support a Key Bus Pads Development Program as a key component of future transit infrastructure in Central & Southern Marin	TAM/GGT/MCTD/Caltrans
	KPR2 Establish a working group comprising TAM, Caltrans and local jurisdictions to refine the operational concept for enhanced bus pads and ramps	TAM/GGT/MCTD/Caltrans
	KPR3 Establish Key Bus Pads Pilot Program at a minimum of one site (e.g. Tiburon Wye or Paradise)	TAM/GGT/MCTD/Caltrans
	KPR4 Undertake the necessary Caltrans processes (PSR, PA/ED) to deliver first Key Bus Pads Development Program site	TAM/GGT/MCTD/Caltrans
	KPR5 Deliver the first Key Bus Pads Pilot Program site project (e.g. Tiburon Wye or Paradise)	TAM/GGT/MCTD/Caltrans
Local Stop Enhancement Program	LSE1 Support a Local Stop Enhancement Program as a key component of future transit infrastructure in Central & Southern Marin	TAM/GGT/Local
	LSE2 Develop a priority list of local stops for enhancement in accordance with local jurisdictions' priorities, in coordination with Golden Gate Transit and Marin Transit	TAM/Local/GGT/MCTD
	LSE3 Adopt an Enhanced Local Stops amenities policy, accordance with Golden Gate Transit and Marin Transit local stop policies	TAM/GGT/MCTD
	LSE4 Deliver Local Stop Enhancement Program, accordance with Golden Gate Transit and Marin Transit bus stop policies	TAM/GGT/MCTD
Key (Bidirectional) Corridor Enhancements	KCE1 Support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor	TAM/Local
	KCE2 Undertake a Market Demand Analysis for additional transit service on the Mill Valley-Sausalito Welcome Corridor	MCTD/Co.
	KCE3 Based on the results of demand analysis, develop 2-year pilot of an enhanced transit service (potentially seasonal) on the Mill Valley-Sausalito Welcome Corridor, connecting local service with Muir Woods and Fort Baker services	MCTD/Local
	KCE4 Prepare a Canal-San Anselmo Corridor transit development plan for increased service on the corridor	TAM/MCTD/Local
	KCE5 Prepare a Station Transit Facilities and Service Plan in conjunction with SMART for future service linking the Larkspur SMART station, the Sir Francis Drake corridor and Larkspur Landing/Golden Gate Ferry Terminal	TAM/SMART/Local



Technical Advisory Committee

At critical steps throughout the project, the consulting team reviewed deliverables and findings with members of the Technical Advisory Committee (TAC). The TAC members served as a study steering committee, providing critical input and reviewing and commenting on all study deliverables through a series on meetings. Special thanks to:

TAC Members

Scott Anderson	Town of Tiburon
Jill Barnes	City of Mill Valley, Public Works Dept.
Rocky Birdsey	Marin CIL
Gary Broad	Town of Ross
Art Brook	Marin County
Bob Brown	City of San Rafael
Wayne Bush	City of Mill Valley, Public Works Dept.
Debra Sue Johnson	Town of Corte Madera, Public Works Dept.
Ron Downing	Golden Gate Transit
John Eells	Consultant
Rabi Elias	Town of San Anselmo, Public Works Dept.
Amanuel Haile	Marin County
Mel Jarjoura	Town of Ross, Public Works Dept.
Nancy Kaufman	City of Larkspur
Wingate Lew	Caltrans, Dist. 4
Nader Mansourian	City of San Rafael
Nick Nguyen	Town of Tiburon
Robert Pendoley	Town of Corte Madera
David Rzepinski	Marin Transit
Hamid Shamsapour	City of Larkspur, Public Works Dept.
Danielle Staude	City of Mill Valley
Eric Steger	Marin County
Craig Tackabery	Marin County
Todd Teachout	City of Sausalito
Neal Toft	City of Larkspur
Amy Van Doren	Marin Transit
Rory Walsh	City of Mill Valley
Ann Welsh	Town of Fairfax
Lisa Wight	Town of San Anselmo
Alan Zahradnik	Golden Gate Transit

Members of the TAM Executive Committee and Board also reviewed and provided feedback on the critical steps and study deliverables.

Public Outreach

A Public Workshop was held on March 26, 2009 before the TAM Board Meeting to introduce the project and concepts and allow input from other community members. The Workshop displayed visuals explaining the different concepts, had a PowerPoint presentation describing the project and the process, followed by a Question and Answer session, and provided comment cards for those who preferred to comment in a silent matter. Fifteen of the attendees signed, although many more attended. The Public Workshop Comments can be found in Appendix 3 of the Full Report.

CHAPTER 1: INTRODUCTION

1.1 Work Scope and Study Goals

In July 2008, the Transportation Authority of Marin (TAM) approved the final work scope for the Central and Southern Marin Transit Study. The Study formally commenced in September 2008, and is jointly funded by the Golden Gate Bridge District, Marin County Transit District and TAM. The purpose of the study was to:

3. Develop an incremental program of feasible and fundable improvements to U.S. 101-oriented trunk line bus service.

4. Identify opportunities for transit to serve as effective feeders for both ferry and regional commute bus services.

The Central and Southern Marin Transit Study offers an important opportunity to develop a comprehensive and implementable plan to improve the effectiveness of regional and local transit service within Southern Marin County's U.S. 101 and east-west travel corridors. The Study Area (see Fig 2.1) comprises Central and Southern Marin, from San Rafael southwards, excluding the Golden Gate National Recreation Area. The study was intended to build on the transit agencies' Short Range Transit Plan (SRTP) and the Regional Transportation Plan (RTP) processes to identify, evaluate, and present a broader base of integrated (or coordinated) U.S. 101-oriented alternatives.

The study scope also includes: the identification of strategic east-west corridor improvements, interface with future SMART rail facilities, a feasibility-level discussion of the potential for streetcar as a transit mode on the corridor between Mill Valley and Sausalito, and the preparation of a draft Project Study Report (PSR)/PSR equivalent for one or more transit hubs in Southern Marin if needed. The final work product is a phased implementation plan driven by funding capacity, value added to U.S. 101-oriented transit, and local/regional priorities. The study scope did not extend to recreational or visitor focused transit in the Study area.

The outcomes of the Central and Southern Marin Transit Study are intended to both provide a strategic blueprint for coordinated transportation improvements in Southern Marin, and to provide a prioritized listing of feasible projects designed to improve the effectiveness and attractiveness of public transit along Southern Marin's Highway 101 corridor. Consistent with the goal of an implementable plan, the study horizon has been set in the relatively near term – ten years out, to 2018.

The concept of a potential large transit hub serving Central and Southern Marin was an early premise of the study. The subsequent travel demand and transit service analysis concluded that a program of localized transit infrastructure investment, widely distributed at multiple sites on all of the study corridors, would yield more effective mobility benefits for Marin residents. This is reflected in the options considered in the evaluation process and in the Study's final recommendations.

This document is the *Central and Southern Marin Transit Study Final Report* deliverable, documenting an inventory of existing transit services and infrastructure, program improvements, benefits and implementation of the improvements, and study recommendations.

The *Final Report* was accepted by the TAM Board of Commissioners on June 25th 2009, to serve as a conclusion for the Tasks in the Study:

Task 2: Define Applicable Improvements
Task 3: Cost Benefit Evaluation of Improvements
Task 4: Program of Improvements
Task 5.a: Streetcar Corridor Feasibility Discussion (as separate Task Report)
Task 6: PSR (or PSR Equivalent) for one or more of the Transit Hubs
Task 7: Final Plan, as accepted by the agency policy boards

The *Final Report* is organized in the following six chapters and three appendices:

Chapter 2: Existing Conditions Analysis
Chapter 3: Development of Program Improvements
Chapter 4: Description of Applicable Improvements
Chapter 5: Benefit Assessment of Improvements
Chapter 6: Conclusion and Implementation
Chapter 7: Study Recommendations

Appendix 1: Existing Conditions Analysis Report
Appendix 2: Summary of Existing Bus Stop Conditions & Policies
Appendix 3: Stakeholder Comments and Resolution

CHAPTER 2: EXISTING CONDITIONS ANALYSIS

The *Existing Conditions Analysis Report*, (see Appendix 1) documents an inventory of existing transit services and infrastructure, transit service performance, planned service improvements, relevant General Plan impacts, travel forecasts, and transit ridership projections. Chapter 2 provides an overview of the *Existing Conditions Analysis Report*.

2.1 Summary of Existing Conditions Analysis (Full Tech Memo in Appendix 1)

The existing conditions overview is organized in the following five categories: Existing Transit Service, Transit Hub and Corridor Facilities, Corridor Travel Conditions, Travel Forecasts and Transit Demand Projections, and the Summary of Transit Rider Profile.

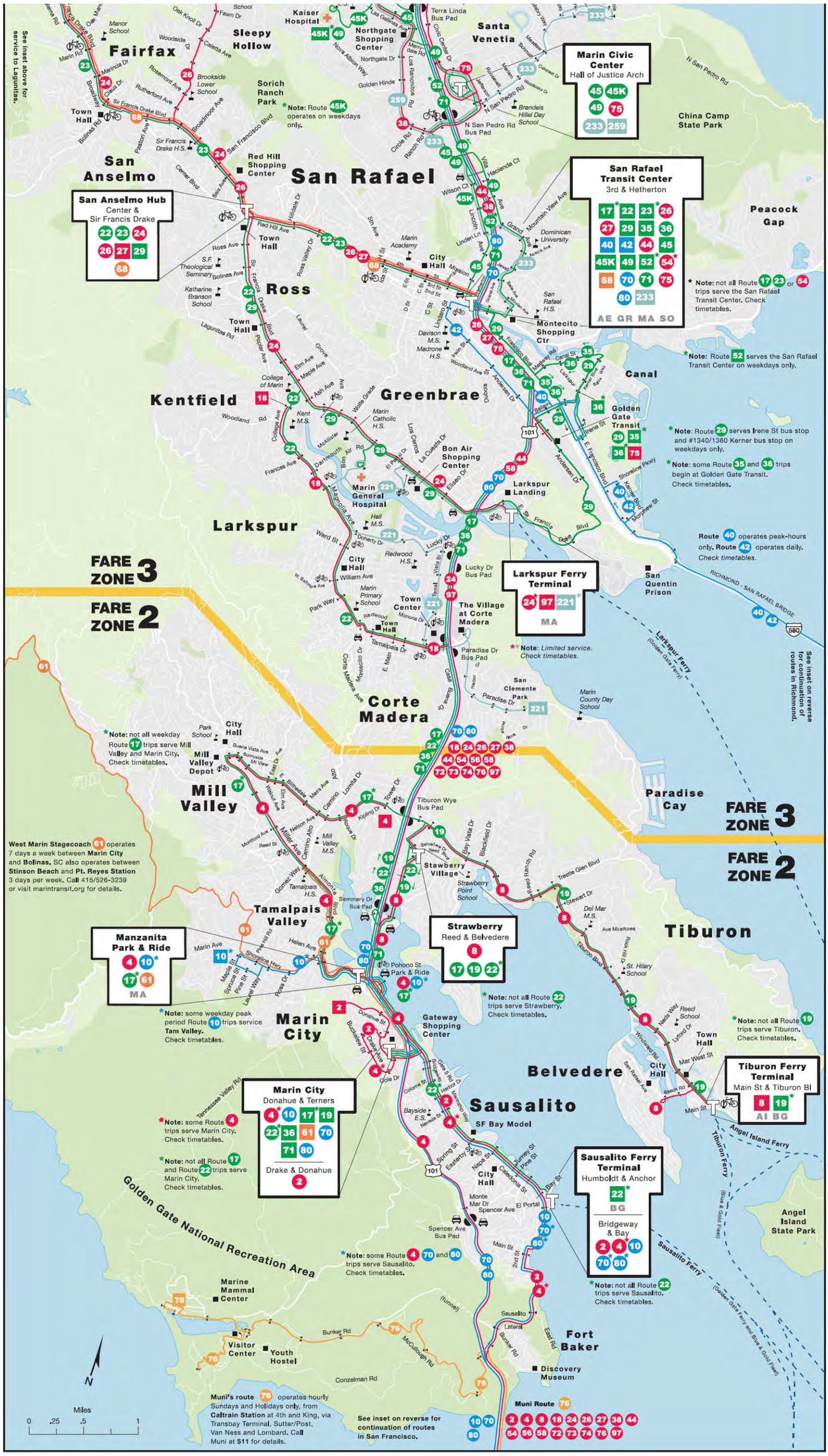
2.1.1 Existing Transit Service

Public transit in Central and Southern Marin County is provided by Golden Gate Transit (GGT) and Marin Transit. Currently GGT operates a network of Basic and Commute Routes and Marin Transit operates Local Routes:

- Basic Routes - operated by GGT providing daily service throughout the day between San Francisco, Marin, Sonoma and Contra Costa counties.
- Commute Routes - operated by GGT providing commute period service, mornings and evenings except holidays between San Francisco, Marin and Sonoma Counties.
- Local Service - operated by Marin Transit within Marin County on weekdays with limited weekend service.

GGT's Basic and Commute routes are designed to serve longer haul, regional inter-county commuter markets. Marin Transit's Local routes are designed to complement GGT longer-haul services, serving intra-county commuter, student and transit dependent markets.
Figure 2.1 provides a route map of both Golden Gate Transit and Marin Transit routes in the study area.

Figure 2.1 GGT and Marin Transit Route Map for Central and Southern Marin Study Area



GGT Revenue Hours and Ridership by Route

Based on data provided in the GGBHTD Mini-Short Range Transit Plan (FYs 2007-2016):

- 96,070 revenue hours were projected for Basic Routes for each year for the period 2008 to 2016.

- 95,778 revenue hours were projected for Commute Routes for each year for the period 2008 to 2016.

Table 2.1 provides a summary of annual ridership for GGT routes serving the Central and Southern Marin corridors for the calendar years 2004 through 2008. Ridership data is provided for Routes 2, 4, 8, 9, 10, 18, 24, 26, 27, 38, 44, 60, 70, and 80, and not provided for routes operating as express only through the Central and Southern Marin study area. With the exception of Routes 4, and 27 where there was an increase in ridership, the data indicates a decline in GGT bus ridership. This decline in bus ridership may be explained by a ridership switch to ferry service (ridership in AM peak has increased by 12 % between 2005 and 2007 and in the PM peak by 15% for the same period)[2] and local bus service, by a general reduction in commute travel between Marin County and San Francisco, and a possible mode shift back to auto usage.

[2] Findings from recent GGT Larkspur ferry passenger surveys suggest that over 30% of new ferry passengers in 2006 and 2007 were former bus riders.

Table 2.1 GGT Bus service: Annual Ridership for Selected Basic and Commute Routes Serving Central and Southern Marin (2004 – 2008)

Route	2004	2005	2006	2007	2008	% Change 2004-2008
2	79,377	69,864	69,201	65,827	67,304	-15.21%
4	329,669	321,007	334,062	328,904	366,173	11.07%
8	29046	25,228	22,965	21,618	22,087	-23.96%
9	16,725	14,179	11,929	8,925	9,208	-44.94%
10	313,473	238,627	226,634	207,890	216,172	-31.04%
18	110,296	102,725	100,892	99,187	110,145	-0.14%
24	262,065	244,996	228,989	212,021	227,648	-13.13%
26	56,970	49,461	51,478	47,514	44,493	-21.90%
27	50,501	48,047	56,326	50,962	64,593	27.91%
44	67,288	66,243	60,944	50,962	64,593	-4.00%
60	43,762	50,661	34,798	30,027	25,983	-40.63%
70	922,839	874,581	857,164	798,810	836,083	-9.40%
80	690,551	671,812	684,412	634,482	639,092	-7.45%

2008 ridership actuals provided for January through September. And projected to year end.

GGT Bus Productivity and Farebox Recovery

Table 2.2 provides a summary of productivity (passengers carried by revenue hour) and farebox recovery by GGT bus route category for the years 2005, 2006 and 2007. Although most GGT bus routes serving Central and Southern Marin have experienced a decline in ridership, overall system productivity and farebox recovery have remained fairly constant.

Table 2.2 GGT Bus Service Productivity and Farebox Recovery

Route Category	FY 2005		FY 2006		FY 2007	
	Productivity*	Farebox Recovery Ratio	Productivity	Farebox Recovery Ratio	Productivity	Farebox Recovery Ratio
Basic	20.9	28.60%	20.9	27.20%	20.3	27.00%
Commute	19.1	30.40%	18.8	28.50%	17.8	29.10%

* Passengers carried per revenue hour.

Table 2.3 provides a summary of productivity (passengers carried by revenue hour) and farebox recovery by GGT Routes 2, 4, 8, 9, 10, 18, 24, 26, 27, 38, 44, 54, 56, 58, 60, 70, 72, 73, 74, and 80 for FY 2007.

Table 2.3 Productivity and Farebox Recovery for GGT Basic and Commute Routes Serving Central and Southern Marin (FY 2007)

Route	Passengers per Revenue Hour	Farebox Recovery Ratio
2	23.1	25.0%
4	23.7	27.0%
8	15.3	16.0%
9	13.5	0.0%
10	16.7	19.0%
18	21.7	28.0%
24	18.8	25.0%
26	22.0	27.0%
27	18.8	24.0%
38	19.7	30.0%
44	14.4	19.0%
54	19.1	35.0%
56	15.8	27.0%
58	12.3	22.0%
60	12.1	15.0%
70	24.1	29.0%
72	13.5	40.0%
73	11.7	30.0%
74	14.9	37.0%
80	18.2	28.0%

Proposed Near Term GGT Service Changes

GGT has proposed a series of bus service changes to improve customer service and redeploy underutilized bus to routes and times where additional capacity is needed. The proposed service changes affecting service in the Central and Southern Marin study area include:

- *Route 8:* Discontinue one trip
- *Route 60:* Eliminate three midday service trips
- *Routes 80 and 101*: Modify Route 80 service during weekday daytime periods (approximately 6 a.m. to 7 p.m.) to eliminate stops between San Rafael and the Spencer Avenue pad stop. New express service would be referred to as Route 101. Replacement service would be provided by other GGT routes.
- *Routes 10 and 92:* Modify Route 10 service to operate on Van Ness Avenue and Lombard Street instead of along Geary Boulevard within San Francisco and extend this route to Manzanita Park-and-Ride Lot and Strawberry in Marin County. Create new Route 92 to provide weekday peak period service from Marin City and Sausalito to points along the Geary Blvd. corridor.

Although some of the proposed changes affect routing beyond the service area, they may make the routes more attractive to potential riders originating within or transferring from bus stops within the Central and Southern Marin study area. The changes were approved and implemented on March 8, 2009.

GGT Performance Standards

Key GGT service performance standards that could be affected by transit service enhancements in Central and Southern Marin include:

Passengers per Revenue Hour

- **Desired minimum productivity standard**: At least 20 passengers per revenue hour during peak periods and 15 during the off peak.
- Data provided in Table 2.9 in Appendix 1 reflects a blended average productivity and does not distinguish between peak and off peak productivity. Five of the 20 routes included in Table 2.9 in Appendix 1 exceed the desired 20 passengers carried per revenue benchmark.

Bus On-time Performance

- **Desired on-time performance standard**: Operate on-schedule 90% of the time.
- Bus on-time performance has improved from 81.1% in FY 2005 to 90.8% in FY 2007.

Marin Transit Revenue Hours and Ridership by Route

Table 2.4 provides a summary of FY 2007/08 annual revenue hours and ridership for Marin Transit Routes 17, 19, 22, 23, 29 and 36, serving Central and Southern Marin. Although five year revenue hour and ridership data are not available for individual Marin Transit routes serving Central and Southern Marin, Marin Transit fixed routes have experienced a 53% increase in annual revenue hours operated (from 54,033 to 82,803) and a 31% increase in annual ridership (from 1,711,798 to 2,248,744) between FYs 2000/01 and 2004/05[3].

Table 2.4 Annual Revenue Hours and Ridership for Marin Transit Local Routes Serving Central and Southern Marin (FY 2007/08)

FY 2007/08	Marin Transit Route							TOTAL
	17	19	22	23	29	36	71	
Annual Ridership	225,957	71,245	334,800	223,562	185,578	161,584	226,351	1,429,077
Annual Revenue Hours	9,271	6,407	18,377	11,206	8,204	4,805	7,200	65,470
Route totals based on 11 months actuals and annualized for full year.								

Marin Transit Bus Productivity and Farebox Recovery

Productivity and farebox recovery data, depicted below, show Marin Transit local routes serving Central and Southern Marin for FYs 2006/07 and 2007/08[4] (Table 2.5).

Table 2.5 Productivity and Farebox Recovery for Marin Transit Local Routes Serving Central and Southern Marin (FYs 2006/07 and 2007/08)

	Productivity			Farebox Recovery		
	FY 2006/07	FY 2007/08	% Change	FY 2006/07	FY 2007/08	% Change
Route 17	24.1	27.0	12.0%	20.1%	22.3%	10.9%
Route 19	11.0	12.0	9.1%	9.7%	12.0%	23.7%
Route 22	20.1	21.0	4.5%	16.9%	17.9%	5.9%
Route 23	22.9	20.5	-10.5%	17.7%	17.7%	0.0%
Route 29	23.7	24.0	1.3%	23.6%	24.2%	2.5%
Route 36	41.4	33.9	-18.1%	39.6%	33.9%	-14.4%
Route 71	33.0	27.8	-15.8%	29.7%	25.1%	-15.5%

[3] 2006 Marin Transit Short Range Transit Plan.
[4] FY 2006/07 data is based on YTD September 2006 to June 2007. FY 2007/08 data is based on YTD July 2007 to June 2008.

Proposed Near Term Marin Transit Service Changes

Marin Transit has continued to implement service recommendations developed through its Short Range Transit Plan process. As well, Marin Transit's future service improvement plans are guided by Measure A transit priorities. Measure A transit priorities are intended to improve the attractiveness of transit service to "choice" transit markets within Marin County and include:

- **Provide transit service every 15 minutes in the following corridors:**
  - Highway 101 corridor connecting all communities in the corridor and San Francisco
  - San Rafael to College of Marin via Andersen Drive/Sir Francis Drake
  - San Rafael to San Anselmo via Red Hill/4th Street
  - San Rafael Transit Center to Civic Center and Northgate Mall

- **Provide transit service at least every 30 minutes in the following corridors:**
  - Sausalito to Marin City and the Toll Plaza via Bridgeway
  - Mill Valley on Miller Avenue and East Blithedale
  - Corte Madera and Larkspur via Tamalpais/Magnolia and Sir Francis Drake
  - San Anselmo to Fairfax via Sir Francis Drake and Red Hill Road
  - San Rafael via Lincoln to Civic Center, Merrydale and on to Kaiser Hospital
  - Novato service in the Hamilton area, in the Ignacio area east of Palmer and South Novato Boulevard.
  - Novato service from neighborhoods to Vintage Oaks Shopping Center
  - Corridor service from Novato to San Rafael transit center with connections to College of Marin.

Marin Transit implemented a number of service enhancements on December 3, 2008. Changes affecting routes serving the Central and Southern Marin study area included:

- *Routes 17 and 29*: Peak hour frequency was increased from 60 to 30 minutes.
- *Route 36*: Saturday service discontinued.
- *Route 71:* Additional trips added on weekends to increase service between San Rafael and Marin City.

Marin Transit Performance Standards

Key Marin transit service performance standards[5] that could be affected by transit service enhancements in Central and Southern Marin include:

Passengers per Revenue Hour

- **Desired minimum productivity standard**: At least 20 passengers carried per revenue hour for all fixed routes after one year of operation.

[5] Performance standards documented in 2006 Marin Transit Short Range Transit Plan

- In FY 2007/08 Local Routes 17, 22, 23, 29, 36, and 71 exceeded the minimum productivity standard. Route 19 performance fell below the minimum of 20 passengers carried per revenue hour (refer to Table 2.11 in Appendix 1).

Connectivity

- **Desired standard**: Complete 95% of all local and regional service connections as scheduled.

- Data necessary to evaluate connectivity is not available.

On Time Performance

- **Desired standard**: Operate on-schedule at time points 85% of the time.

- Marin Transit local bus service exceeds the desired on time performance standard. Average on time performance for Marin Transit local service is 95.3%, ranging from 92.7% on weekends to 96.2% during midday weekday service hours. Peak hour on time performance is 95.5%.

2.1.2 Transit Hub and Corridor Facilities

There are several existing transit "hubs" in Central and Southern Marin County. These can be generally categorized as transfer facilities and other key facilities.

San Rafael Transit Center
The San Rafael Transit Center (also known as the C. Paul Bettini Transit Center) is located at the eastern edge of downtown adjacent to Hwy 101. The Transit Center is a bus-only facility providing bus and shuttle service at four passenger platforms (platforms A-D) with 18 bus bays. Golden Gate Transit (GGT), the primary operator at the Transit Center, provides local service within Marin County under contract to Marin County Transit District (MCTD), and regional service to Sonoma, Contra Costa and San Francisco Counties.

The facility has a security booth staffed by a security guard (located on Platform B), public restrooms, dry cleaner and coffee shop. GGT ticket books can be purchased at the ticket booth and tickets for the Oakland Airport shuttle are available at the dry cleaner shop. The Sonoma Marin Area Rapid Transit service (SMART) between Cloverdale and Larkspur includes a station adjacent to the San Rafael Transit Center in the future, which could cause changes to the facility.

Larkspur Ferry Terminal
Ferry customers can park their cars for free in the Larkspur lot for the first 24 hours. Vehicles will be ticketed on a daily basis until seventh day after the first 24 hours, when they are towed. Ticket amount is $12 per day after the first 24 hours for ferry riders. For long term parking, customers can use the Marin Airporter Lot across the street and pay $4 a day. An overflow lot west of the Marin Airporter site is also available.

The Larkspur Ferry Terminal also has a loading area for buses to meet ferries. In addition, there are three bus bays designated outside of the terminal area.

Tiburon Ferry Terminal
The ferry terminal in Tiburon is operated by the Blue and Gold ferry. Two off-site paid parking lots serve ferry patrons. The lots combined appear to offer parking for about 400 vehicles, but this parking is shared with other activities in Tiburon. Golden Gate Transit operates routes to the terminal area.

Marin City Transit Center
This is a curbside transit hub located on Donahue. The stops in this area appear to hold up to five buses. Many Golden Gate Transit Routes pass by this location, with Basic routes, a Commuter route, and Marin Transit Local routes stopping there.

Sausalito Ferry Terminal
The Sausalito Ferry Terminal, located in Downtown Sausalito, has Golden Gate Ferry and Blue and Gold ferries which travel to San Francisco. Ferry patrons use one of the approximately 200 long-term paid parking spaces maintained by the City of Sausalito. Golden Gate Transit routes serve ferry passengers.

Strawberry Village
There is a small transfer point at Reed and Belvedere behind the Strawberry Village shopping center. Golden Gate Transit routes stop at this location. There is curb space for up to three buses to load/unload at the same time. The location is about three blocks from the US Highway 101 bus pads at East Blithedale Avenue (Tiburon Wye). There is no designated park and ride lot associated with this facility.

San Anselmo Hub
The San Anselmo Hub, located just west of Sir Francis Drake Boulevard and Center Street, contains bus parking for up to four buses. There are no park and ride lots adjacent to this location. Marin Transit Local routes and GGT Commute routes stop at the hub.

Bus Pad Transit Capacity
Five bus pads are located adjacent to the Highway 101 corridor in the Study area. Each bus pad has room to load/unload one Golden Gate Transit bus in each direction, although more than one 40-ft coach has been observed loading at the following sites:

- Lucky Drive
- Paradise Drive
- East Blithedale Avenue
- Seminary Drive (surface bus stop also available)
- Spencer Avenue

Parking Capacity at Bus Pad and Park and Ride Lots
Parking lot capacity for each bus pad and park and ride facility is depicted in Appendix 1, based on data collected by the Study team in November 2008 and on published lot capacities.

The most utilized park and ride lot is the Manzanita Park and Ride/Tamalpais Junction, which contains parking for Golden Gate Transit and Marin Airporter riders. There are four Golden Gate Transit Routes which stop at the location. There are an estimated 378 spaces at this location, with another 50 on-street spaces often taken as the lot becomes fully occupied.

Key Arterial Roadway Bus Stops
In addition to the Highway 101 bus pads and transit centers discussed above, there are additional key bus stops on several of the local arterial roadways. These stops are recognized as places where transfers occur, or places with a significant amount of activity. Key bus stops on the east west arterial street corridors can be found in Appendix 1.

2.1.3 Corridor Travel Conditions

To provide a backdrop to travel conditions and demand, the Study team undertook a local breakdown of the current (ABAG/MTC 2007) regional forecasts of population and employment growth. These are detailed in Appendix 1 (Figures 4.1 and 4.2). They show modest growth on both indicators for the Study area. Demographically, and in terms of the transit market, Central and Southern Marin is one of the most stable (i.e. slowest growing) parts of the nine-county Bay Area.

Current Operating Environment on the Highway 101 Corridor
The major north-south roadway is US Highway 101. This is a freeway facility (although many portions are designed with exceptions to current freeway standards, such as lane and shoulder widths) with four lanes in each direction. Traffic congestion and slower speeds have been frequently observed, it has been mostly noted in the southbound direction in the AM peak period, and the northbound direction in the PM peak period.

In 2009, significant improvements in travel time are anticipated as a result of the completion of the gap closure project. The travel speeds should improve significantly, although queuing from the weaving bottleneck is still expected to occur. Studies have suggested that the northbound queue should improve at first, but gradually deteriorate to begin at a point about a half of a mile north of the East Blithedale/Tiburon Boulevard interchange. Additional information on the congestion of the Highway 101 interchanges can be found in Appendix 1.

Hwy 101 Corridor Bus Pad Capacity and Utilization
Park and ride lots and the unique bus pad facilities are a crucial part of Marin's transit infrastructure on the Hwy 101 corridor. The overflow counts[6] reveal a consistent excess demand at several locations on the Hwy 101 corridor, in the order of 30% or approximately 400 spaces daily. Significantly, several bus pad locations with no formal parking provision, and poor auto

[6] Counts are based on an inventory undertook by the Study team of bus pad/park and ride lot utilization in the morning peak and midday, on several weekdays in November 2008. More information can be found in Appendix 1.

access, show 30-60 regular "overflow" demand spaces on adjacent surface streets daily. These are especially apparent in the Lucky Drive/Paradise area, where future plans for bus pads in the Greenbrae/Twin Cities Hwy 101 improvements may reconfigure adjacent frontage roads and the pad locations themselves.

Profiles of Current Operating Environment on Arterial Transit Corridors

Each of the five study corridors (Corte Madera-San Anselmo/Fairfax, San Rafael-San Anselmo/Fairfax, Mill Valley-Sausalito, Larkspur-San Anselmo/Fairfax, Tiburon-E. Blithedale-Mill Valley) were analyzed for current and future population, employment, general traffic congestion and activity center growth between 2008 and 2018, the horizon year. The purpose of this analysis was threefold:

- First, to understand how well current transit service provision matches typical densities, current and future, since density is the primary (but not sole) factor in determining transit level of service.
- Second, to complement the Travel Forecasts and Transit Demand Projections in The *Existing Conditions Analysis Report*, Chapter 5 of Appendix 1 by providing localized analysis within each corridor.
- Third, to establish the underlying demand foundation for future investment in transit services and facilities.

Table 2.6 illustrates corridor population densities that correspond to typical types of transit.

Table 2.6 Typical Corridor Densities Supporting Fixed Route Transit Services[7]

Population Density/acre in corridor analysis	Dwelling units/acre equivalent	Typical dwelling type	Typically supports fixed route transit service frequency peak/off peak of:
0 - 8	0 - 4	Single family	Limited stop/none
8 -15	4 -7	Single family/Duplex	60 min
15 -30	7 -14	Quad/Townhouses	15-30min/60 min
30 -50	14 -24	Low rise (2- story) apartments	15 min/30 min
50 - 100	24 - 48	Medium rise (3-4 story) apartments	10 min/15-30 min (Rapid Bus)
100 - 360	48 - 170	Medium-High rise apartments (5 story+)	6-8 min/15 min (BRT)

[7] Based on review of transit industry practices used for both near term service planning and longer range strategic planning.

Corridor Conclusions

Figures 2.2-2.6 depict the current and future population with in a ¼ and ½ mile buffer around each of the five corridors.

Corte Madera-San Anselmo / Fairfax Transit Corridor:

1. This long, relatively low density corridor will remain largely stable in land use and population growth, and as such, will generate little change in originating transit trip demand.
2. The corridor's stability suggests that current and proposed near term service enhancements are sufficient to improve service attractiveness to "choice" transit markets.
3. Any changes in transit provision are likely to be driven by Measure A priorities, local commute needs, and connections to Hwy 101 regional express service.
4. The reconfiguration of Hwy 101 direct transit access and relocation of current bus pad facilities and related parking will require further consideration to achieve effective transit access and utility in the future on this segment of the freeway.
5. This corridor experiences significant traffic congestion, so that any actions to relieve this congestion will benefit bus travel times. This corridor is a candidate corridor for some transit signal priority, as well as, strategies to encourage residents to use transit rather than contribute to area wide congestion problems.

San Rafael-San Anselmo / Fairfax Transit Corridor:

1. This short corridor has the highest density of all of the corridors but is likely to have stable land use and low population growth, and as such will generate little change in originating transit trip demand.
2. The corridor has demand characteristics (length, density, activity center distribution) to support relatively frequent local service.
3. The corridor could potentially support frequent (15 minute peak/30 min off-peak), higher capacity dedicated short corridor service as an alternative to the current multiple overlapping services.
4. Regional commute connections to northbound SMART rail service and southbound Hwy 101 express bus service are corridor needs which may need to be considered in the future. This corridor experiences significant traffic congestion, so that any actions to relieve this congestion will benefit bus travel times. This corridor is a candidate corridor for some transit signal priority, as well as, strategies to encourage residents to use transit rather than contribute to area wide congestion problems.

Mill Valley-Sausalito Transit Corridor:

1. This corridor is the most stable in land use and population growth of those in the Study area, and likely to generate little change in originating transit trip demand.
2. The current local transit service, at 30 minute headways, matches or is slightly greater than the corridor would typically support.
3. Little change in the activity centers generating transit trips is expected, unless discussions regarding the possible redevelopment of the area in the former shipyard in Sausalito or along Miller Avenue are taken further.
4. Traffic congestion levels are not severe here. Although transit signal priority could be helpful in saving travel times at specific intersections, the need for a coordinate transit signal priority system does not exist.

Larkspur-San Anselmo / Fairfax Transit Corridor:

1. Local service levels are broadly in line, or slightly better than, the corridor density and activity centers demand would typically generate.
2. The future regional transit connection at Larkspur SMART station merits further consideration, especially its role serving northbound trips originating in southern Marin, since:
    a. The northbound AM commute to Novato and other Sonoma Co. destinations on the SMART corridor is one which shows appreciable growth in the Study area (as described in *Chapter 5: Travel Forecasts and Transit Demand Projections* in Appendix 1**).**
    b. SMART service is currently envisaged (and future Larkspur facilities configured) for a primarily southbound AM commute.
    c. No parking is currently planned for the Larkspur SMART station, yet a northbound Larkspur-originating demand is being identified, not all of which will be satisfied by transit.
3. The need for park and ride facilities to serve the northbound Larkspur-originating commute suggests that a location which can meet this need should be considered: this need could be met by:
    a. Providing parking at the currently proposed Larkspur station (if even feasible – the issue has been considered extensively already by SMART and the City of Larkspur).
    b. Providing an additional park and ride facility at an additional SMART station (most likely on an extension south of Sir Francis Drake Blvd, on the SMART right of way, where more generous station capacity may be available in the Lucky Drive/Paradise area; this area has the added advantage of a future enhanced regional bike/pedestrian routes and Hwy 101 access as part of the Greenbrae/Twin cities realignment project.

4. The Larkspur ferry terminal facility reconfiguration merits further study for regional transit connections: as part of a future parking garage, enhanced transit transfer facilities should be explored.
5. This corridor experiences significant traffic congestion, so that any actions to relieve this congestion will benefit bus travel times. This corridor is a candidate corridor for some transit signal priority, as well as strategies to encourage residents to use transit rather than contribute to area wide congestion problems.

Tiburon—E. Blithedale—Mill Valley Transit Corridor Conclusions:

1. The corridor is narrow and relatively short, east of Hwy 101.
2. Local transit level of service is somewhat higher than the typical level of a corridor of this character.
3. Growth is limited, but current transit usage may also be a reflection of transit delays on the congested signalized sections of E. Blithedale.
4. The focus of future transit development on this corridor is likely to be on:
    a. Improved regional connections at Hwy 101
    b. Enhanced transit speeds in the peak period on E. Blithedale
5. The travel speeds in this corridor are generally satisfactory for transit operations, although some localized congestion has been reported on East Blithedale Avenue between Camino Alto and Highway 101. The need for a system-wide transit signal priority system is not great here, although some treatments at or near the Highway 101 interchange may be appropriate.

Figure 2.2 Corte Madera-San Anselmo/Fairfax Transit Corridor: 2018 Population

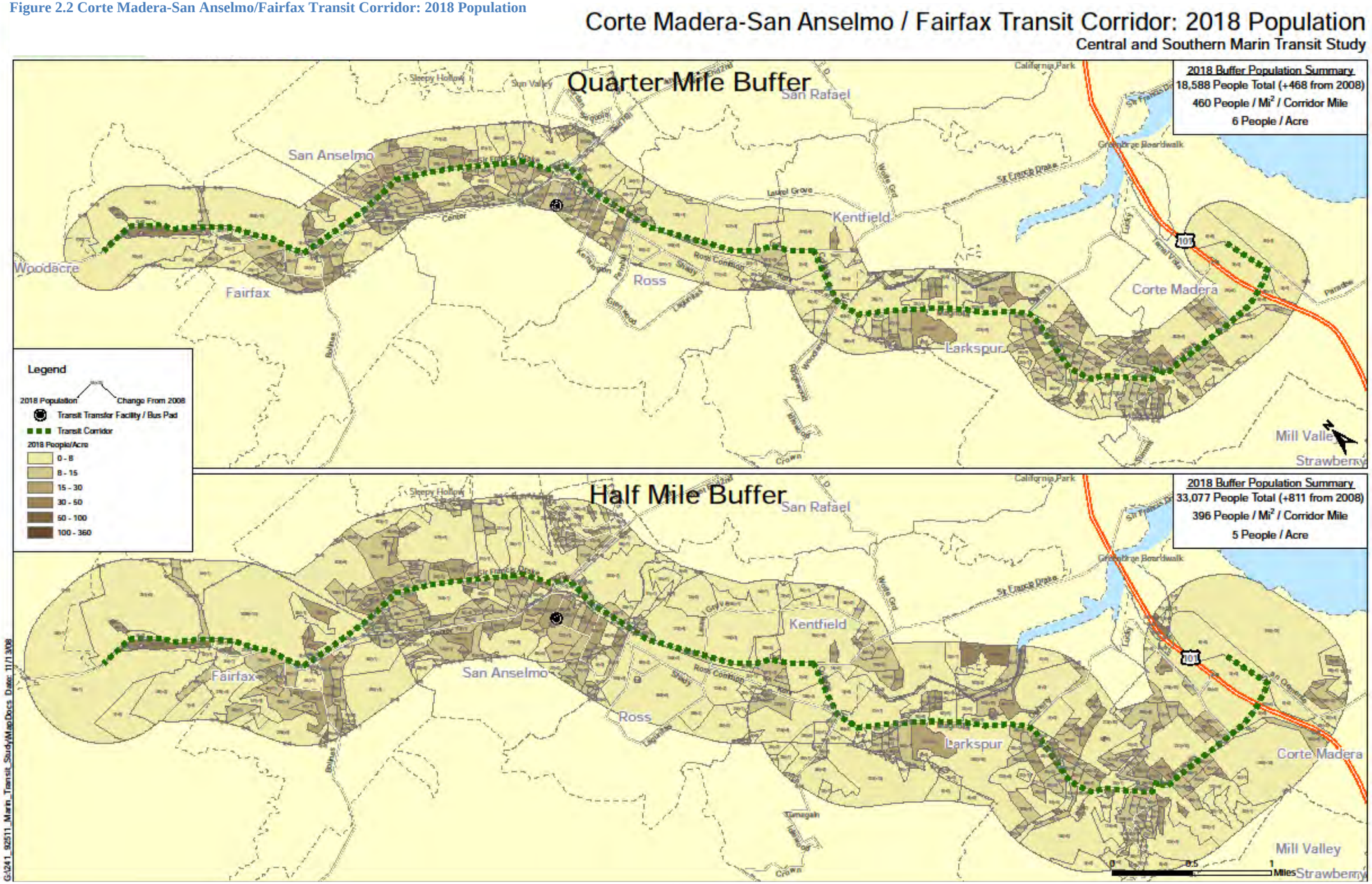


Figure 2.3 San Rafael-San Anselmo/Fairfax Transit Corridor: 2018 Population

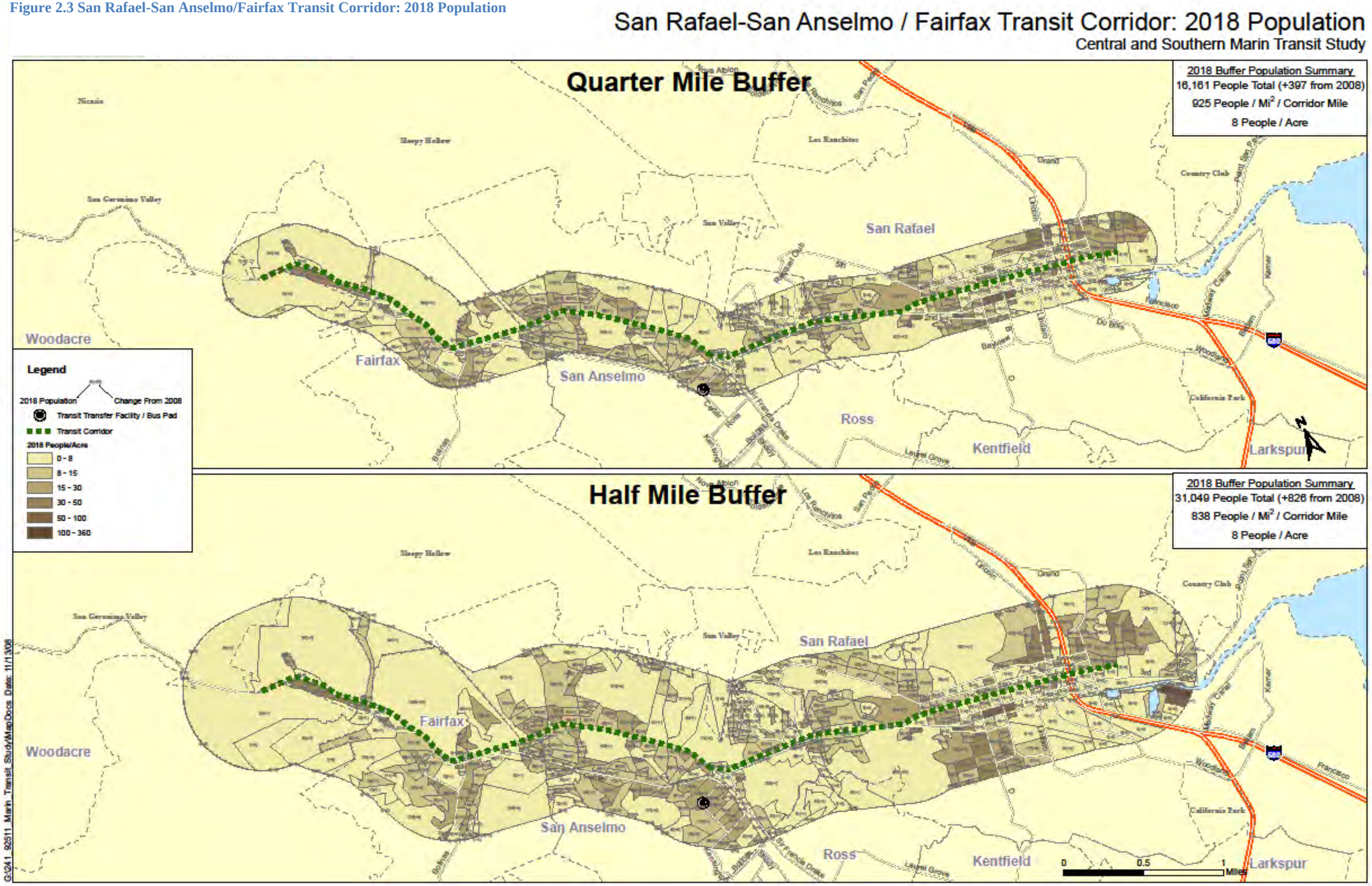


Figure 2.4 Mill Valley-Sausalito Transit Corridor: 2018 Population

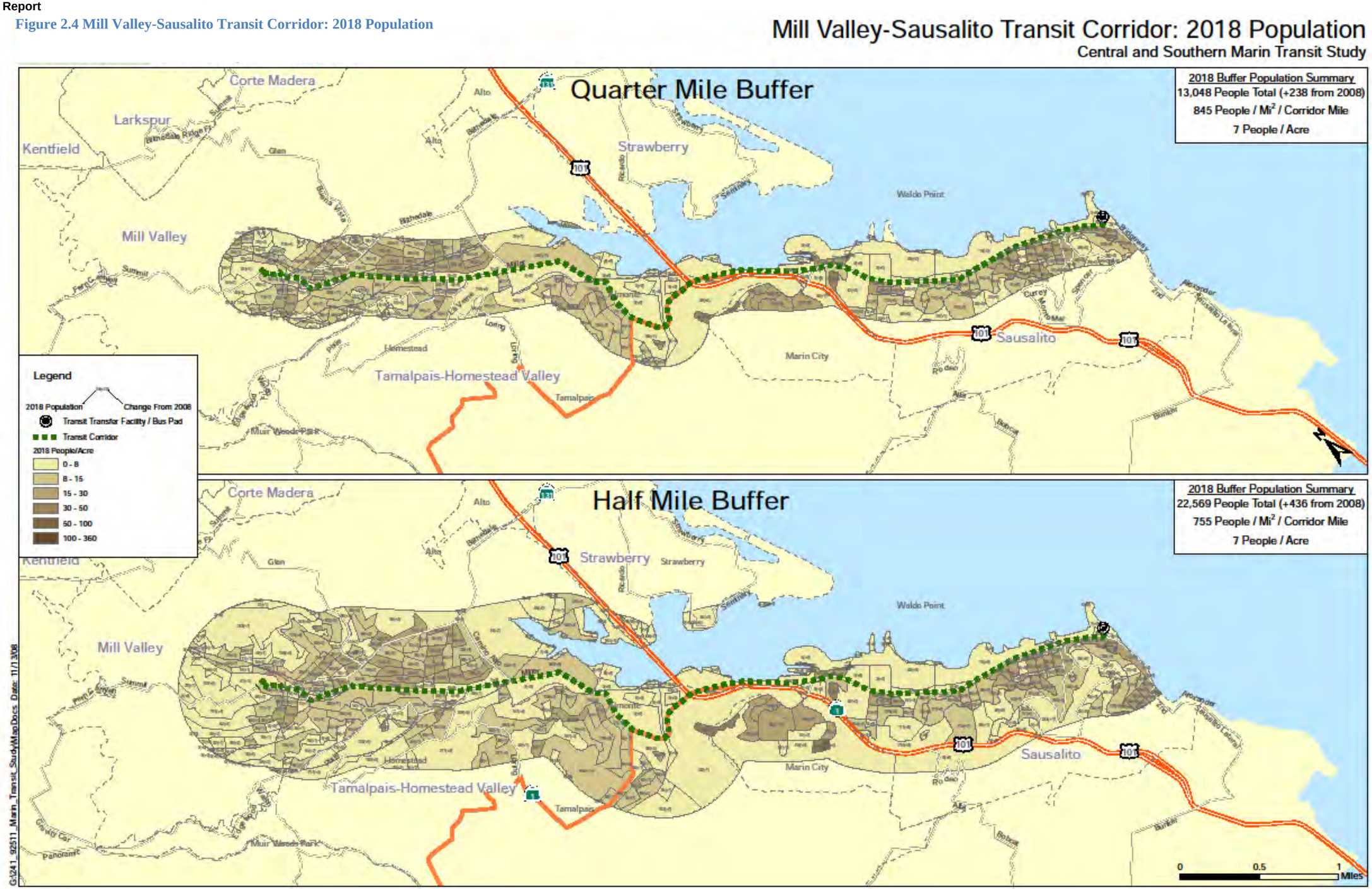


Figure 2.5 Larkspur-San Anselmo/Fairfax Transit Corridor: 2018 Population

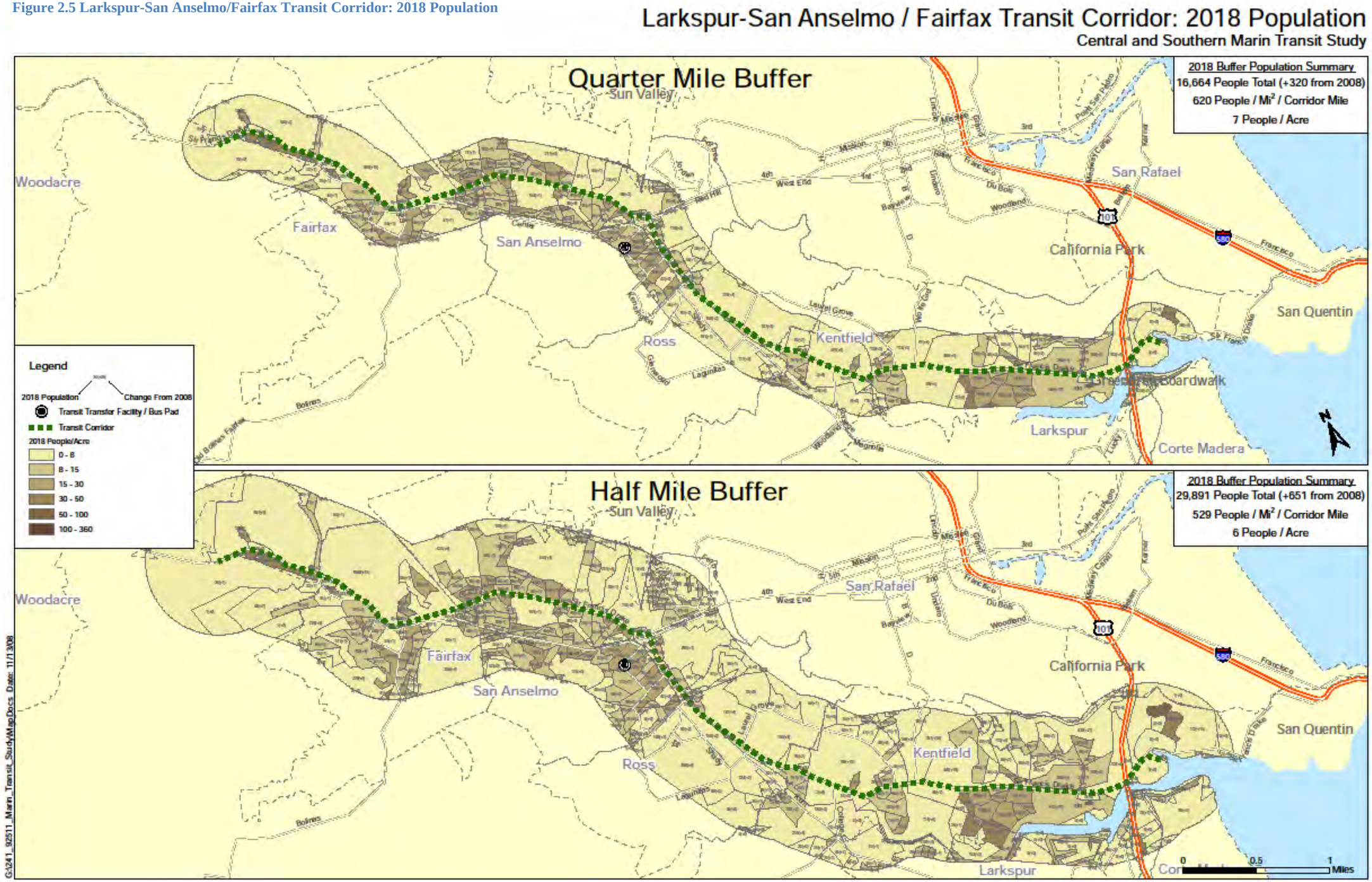
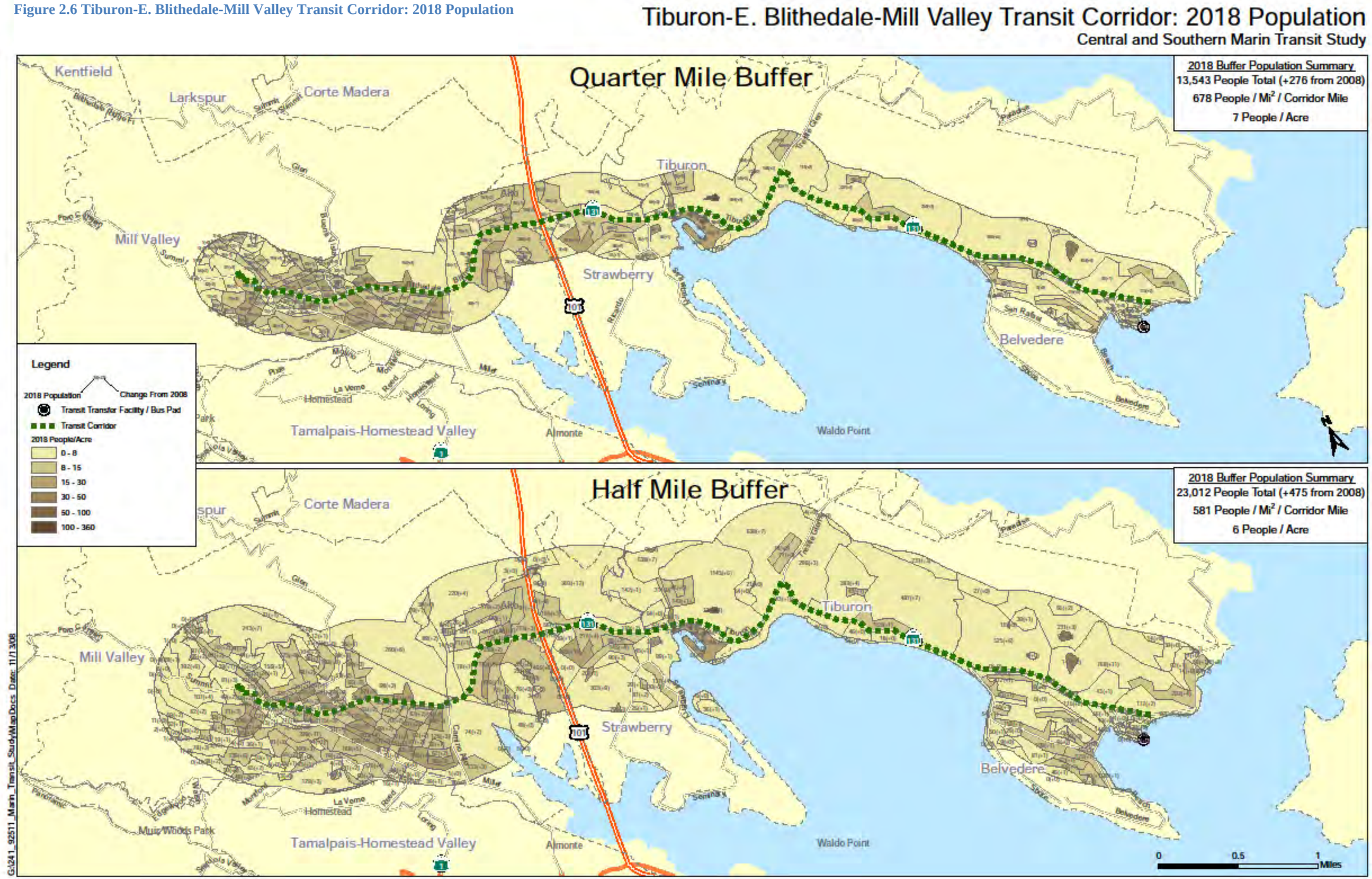


Figure 2.6 Tiburon-E. Blithedale-Mill Valley Transit Corridor: 2018 Population



2.1.4 Travel Forecasts & Transit Demand Projections

This section describes estimated trip patterns and ridership forecasts for the Study area. The methodology is based upon the Marin County Travel Model, data on transit ridership provided by Golden Gate Bridge, Highway and Transit District, and analyses from it. The tables and graphics that describe the findings can be found in Chapter 5: Travel Forecasts and Transit Demand Projections in Appendix 1.

The majority of the development of this model has focused on peak hour travel behavior and home-based work trips. For local transit service in Marin County, work trips are a major component of ridership, but they do not represent the only reason that local transit service is taken in Marin County. Using these travel model results directly poses a problem in determining non-peak hour trip probabilities, and does not provide for non-congestion-related sensitivity in ridership forecasts during these time periods.

The first portion of this study examines overall travel demands between four key areas within Central and Southern Marin. These are:

- Richardson Bay Communities – Sausalito, Tiburon, Mill Valley, Belvedere and surrounding areas such as Marin City
- Lower Ross Valley – Corte Madera, Larkspur and adjacent unincorporated areas
- Upper Ross Valley – San Anselmo, Woodside, and adjacent unincorporated areas such as Kentfield
- San Rafael Basin – the Central San Rafael general area, as well as the Canal District and related areas within the City such as Anderson Drive

In order to fully describe travel patterns, locations beyond these four areas were also examined, which includes three additional areas in Marin County – Las Gallinas Valley (Terra Linda and Lucas Valley areas), Novato, and West Marin. Three areas were identified in Sonoma County – Petaluma, the Sonoma Highway 101 Corridor north of Petaluma (Santa Rosa, Cotati and Rohnert Park) and the remainder of Sonoma County. In San Francisco, the city was divided up into four areas -- the Financial District, the Marina District and Van Ness Corridor, the Richmond and Sunset Districts, and the Excelsior/Mission/Bayview Districts. All other counties are presented as countywide areas.

Richardson Bay Communities
The communities of Sausalito, Marin City, Mill Valley, Tiburon, and Belvedere (and surrounding areas) are generally oriented to San Francisco for work trips, as shown in Table 5.1 and Figure 5.1 (in Appendix 1). Around 37% of the residents are estimated to work in San Francisco or further south. This is quite significant, in that home-based work trips incorporate all trip patterns rather than the primary wage earner; secondary wage earner trips (such as student part-time workers at nearby grocery stores or restaurants) are counted equivalently to the primary wage earner. Another 23% are projected to work in northern Marin County (Las Gallinas Valley or Novato), with other many workers remaining local in Central and Southern Marin (38%).

These patterns are generally constant between 2000 and 2018, and only 8% more work trips are projected in the 10-year planning period.

There are slightly less than two jobs for every worker in this area. For those people working in these communities, most come locally. An estimated 17% are from this immediate area, with another 27% from other parts of Central and Southern Marin and approximately 21% come from northern Marin Communities. As with the residents, the travel patterns in this area are expected to remain stable by 2018, with about a 10% growth in jobs projected. Almost half of the resident trips remain in the immediate area, and over 62% of the trips to the non-residential destinations are made by local residents.

Lower Ross Valley

The communities of Larkspur, Corte Madera and surrounding areas also show a strong trend towards San Francisco, as shown in Table 5.3 and Figure 5.5 (in Appendix 1). Around 36% of the residents are estimated to work in San Francisco or further south. This is quite significant, in that home-based work trips incorporate all trip patterns rather than the primary wage earner; secondary wage earner trips (such as student part-time workers at nearby grocery stores or restaurants) are counted equivalently to the primary wage earner. Another 26% are projected to work in northern Marin County (Las Gallinas Valley or Novato), with many other workers remaining local in Central and Southern Marin (39%). These patterns are generally constant between 2000 and 2018, and only 8% more work trips are projected in the 10-year planning period.

There are about 30% more jobs than workers. Much of this results from the high volume of retail activity. For those people working in these communities, most come locally. An estimated 9% are from this immediate area, with another 33% from other parts of Central and Southern Marin and approximately 20% come from northern Marin Communities. As with the residents, the travel patterns in this area are expected to remain stable by 2018, with only about a 1% growth in jobs projected.

The prominence of local retail activity tends to result in a high proportion of trips remaining in the immediate Lower Ross area, about 40 percent of the resident trips today. Of the remaining trips, the Central San Rafael basin accounts for an estimate 20% more of these trips. The proportion of non-resident trip ends in this area are slightly lower (33% for 2008) because of the strong regional shopping centers in the area.

Upper Ross Valley

The communities of San Anselmo, Fairfax, Woodside and surrounding areas also show a strong trend towards San Francisco, but slightly less than the communities in more southerly parts of Marin County. As shown in Table 5.5 and Figure 5.9 (in Appendix 1), around 34% of the residents are estimated to work in San Francisco or further south. This is quite significant, in that home-based work trips incorporate all trip patterns rather than the primary wage earner; secondary wage earner trips (such as student part-time workers at nearby grocery stores or restaurants) are counted equivalently to the primary wage earner. Another 23% are projected to work in northern Marin County (Las Gallinas Valley or Novato), with many other workers remaining local in Central and Southern Marin (37%). These patterns are generally constant

between 2000 and 2018, and only 16% more work trips are projected in the 10-year planning period.

There are about five workers to every job in this area. Most employment is associated with local-serving businesses. For those people working in these communities, most come locally. An estimated 7% are from this immediate area, with another 35% from other parts of Central and Southern Marin and approximately 26% come from northern Marin Communities. As with the residents, the travel patterns in this area are expected to remain stable by 2018, with only about a 7% growth in jobs projected.

The local focus of retail activity tends to result in a high proportion of trips remaining in the immediate Upper Ross area, about 40% of the resident trips, as shown in Table 5.6 (in Appendix 1). Of the remaining trips, the Central San Rafael basin accounts for an estimated 18% more of these trips. The proportion of non-resident trip ends in this area is much higher (56% for 2008) because of the strong orientation of local-serving businesses.

San Rafael Basin

Central San Rafael and the surrounding neighborhoods of the San Rafael Basin show a strong trend to San Francisco, but slightly less than the communities in more southerly parts of Marin County. As shown in Table 5.7 and Figure 5.11(in Appendix 1), around 36% of the residents are estimated to work in San Francisco or further south. This is quite significant, in that home-based work trips incorporate all trip patterns rather than the primary wage earner; secondary wage earner trips (such as student part-time workers at nearby grocery stores or restaurants) are counted equivalently to the primary wage earner. Another 23% are projected to work in northern Marin County (Las Gallinas Valley or Novato), with many other workers remaining local in Central and Southern Marin (38%). These patterns are generally constant between 2000 and 2018, and only 6% more work trips are projected in the 10-year planning period.

There are slightly over two jobs to every worker in this area. An estimated 16% are from this immediate area, with another 30% from other parts of Central and Southern Marin and approximately 19% come from more northerly Marin areas. As with the residents, the travel patterns in this area are expected to remain stable by 2018, with only about a 13% growth in jobs projected.

The role of the Central San Rafael basin as the County's hub tends to result in a high proportion of trips remaining in the immediate area, as shown in Table 5.8 (in Appendix 1). About 50% of the resident trips today are estimated to be doing this. The proportion of non-resident trip ends in this area is somewhat lower (38% for 2008) because of the role that this area plays as a major activity hub within Marin County.

2.1.5 Summary of Key Existing Conditions Analysis Findings

The following is an initial summary of the key findings from the *Existing Conditions Analysis Report*.

EXISTING TRANSIT SERVICES:

Golden Gate Transit (GGT)

1. Majority of GGT bus routes serving Central and Southern Marin have experienced a decrease in annual ridership between 2004 and 2008.

2. This trend may be explained by a ridership switch to ferry service, (ridership in AM peak has increased by 12 % between 2005 and 2007 and in the pm peak by 15% for the same period), by a general reduction in commute travel between Marin County and San Francisco, and a possible mode shift back to auto usage.

3. Recent ridership data collected in the last nine months suggests that ridership on GGT Basic and Commute Routes is beginning to increase.

4. GGT bus on-time performance has improved in recent years, achieving the desired performance standard of 90% of all trips running on-time as scheduled. Schedules were adjusted with additional running time.

Marin Transit

1. Only one Marin Transit route serving Central and Southern Marin is not achieving a desired productivity goal of 20 passengers per revenue hour. Route 19 carried 12 passengers per revenue hour in FY 2007/08.

2. Marin Transit local service on time performance has improved significantly in recent years. On time performance has increased from a 56% on time performance level reported in the 2006 Marin Transit Short Range Transit Plan to 95.3% reported in July and August 2008.

Planning Implications for Study

The significance of transit in the service area became more apparent when mode share data and transfer data was available. The latter will be available in the recent onboard passenger survey findings. From the initial findings of the existing conditions transit service overview:

1. Congestion along the Highway 101 Trunk and east/west corridors will continue to create on time performance challenges for both GGT and Marin Transit. Enhancements along the Highway 101 Trunk and east/west corridors should focus on improving bus running times to increase the attractiveness and travel time advantage of GGT Basic and

Commute Routes. Running time enhancements will facilitate good on time performance without investing additional revenue hours.

2. Improved on time performance along the east/west corridors will become increasingly important to ensure good connectivity between local and commute services if BRT-type service is introduced along selected east/west corridors.

TRANSIT HUB AND CORRIDOR FACILITIES:

Hwy 101 facilities:

1. Current park and ride capacity, with the exception of Smith Ranch north of the Study Area, shows significant excess demand.

2. Locations with no formal parking – especially bus pads in the Lucky Drive/Paradise and also at Shoreline/Manzanita – generate significant overflow demand on adjacent surface streets.

3. Park and ride facilities are currently configured for the southbound commute, but in the future, demand forecasts suggest some provision for the northbound commute should be considered (applicable both to Golden Gate Transit and SMART)

TRAVEL FORECASTS AND TRANSIT DEMAND PROJECTIONS:

1. There is no significant slow-down in freeway travel time in the southbound AM peak period direction. This is partly the result of the traffic being restricted upstream in Central San Rafael.

2. There is an anticipated benefit on transit travel time in the northbound PM peak period with the completion of the gap closure project in January 2009. Today, there is at least a 7-minute delay for all northbound buses that cannot use the HOV lane.

3. The aggregate demand for travel is forecast as "slower growth" in the next decade. The total number of trip ends increases by less than 15 percent for both residents and for non-resident trip attractions in all cases. The reason is that much of the area has been "built out," with only small sites available for redevelopment.

4. The increases in demand tend to be to the north. While some growth is forecast to occur to/from San Francisco, the overall trend is to have more trips traveling northward in the future. Even with this shift, the overall demand of travel is not going to shift significantly.

CORRIDOR PROFILES:

1. The five East-West Study Corridors all show constant population and employment levels over the next ten years, with growth of less than 3% over the entire decade.

2. Corridor population densities are broadly in line with, or somewhat below, the current level of local service provision (30 minute peak/60 minute off-peak fixed route service).

3. Regional and local mobility needs exist to destinations beyond each corridor, and beyond the County, on all travel corridors: these may require transit service in future, irrespective of low residential or employment densities and land uses which support local transit services.

4. Opportunities for significant land use change towards densities, which might support higher capacity transit (such as streetcar), appear limited in the next ten years; this is especially apparent in the Mill Valley-Sausalito corridor.

5. The regional commute demand in the non-traditional direction (northbound, Sonoma employment destinations) suggested a need to better define in the subsequent tasks of the Study, the optimal transit connections between the East West corridors and the 101 trunk line/SMART services northwards, in addition to the primary southbound/San Francisco direction.

CHAPTER 3: DEVELOPMENT OF PROGRAM OF IMPROVEMENTS

Chapter 3 provides an overview of the development process of the program of improvements for the Central and Southern Marin Transit Study. This chapter is summarized through a series of tables, which follow each step of the development process. Figure 3.1 outlines the process used for the development of potential improvement concepts for consideration in the Study. An initial list of potential improvements was developed in the early stages of the study. An analysis of these improvement concepts was conducted using a set of evaluation criteria to determine their application in the study area. From this analysis, the list of improvement concepts was refined for further definition (Chapter 4) and evaluation (Chapter 5).

3.1 Initial Improvement Concepts

An initial list of improvement concepts was developed from the findings of the Existing Conditions Analysis (Chapter 2) and from feedback obtained from the Technical Advisory Committee (TAC). The initial list of improvement concepts directed the development of the analysis to determine the draft list of improvements and is summarized in Table 3.1 along with the anticipated benefit.

Figure 3.1 Process for Developing List of Potential Improvements

Improvement Concepts Reviewed with TAC 1/21/09	Analysis Conclusions
Expanded Park and Ride capacity	Shortfall of 300 spaces min. identified + 200 Kiss & Ride; no clear desire to expand capacity simply to satisfy current overflow; managed solution needed based on non-auto modes; park & ride opportunities on arterials within cities very limited
Bus Pad Access Improvements on Hwy 101	Access improvements essential to improving attractiveness / effectiveness. Limited $ means grade improvements preferred over ped grade seps and provide more effective spread of investment in Cen/So. Marin
Arterial Corridor Transit Signal Priority (TSP)/Capacity Improvements	Desirable to pursue at key locations identified by transit operator as generating delay and On Time Performance (OTP) reliability
Local Stop Established Minimum Facilities Improvements	Establish a hierarchy of local bus stops along key east/west corridors: 1. Limited stop express bus stops - minimum 2 mile spacing 2. Local bus stops - approximately 1/2 mile spacing Transfers between local and limited stop express occur along corridor at limited stop express bus stops
Out of Direction Travel Needs	Reverse Travel Corridor Enhancements needed in Sausalito-Mill Valley (although streetcar not likely to provide effective solution); E/Dtn San Rafael-San Anselmo corridor; connections to SMART NB
Major Transit Transfer Hub (new/expanded)	Service levels and transfers likely to be broadly at current levels in 5-10 years. No new "Super-hub" required; (the Ferry Terminals + SRTC are the major regional hubs)

Draft List of Improvements

- **Multi-Modal Green Hubs**
- **Hwy 101 Key Pads & Ramps Transit Program**
- **Arterial Speed and Reliability Program**
- **Local Stop Enhancement Program**
- **Key bidirectional Corridor Enhancements**
- (Captured in Multi-Modal Green Hubs and Key Pads & Ramps Transit Program)

Table 3.1 Initial Central and Southern Marin Transit Study Improvement Concepts

Initial Central and Southern Marin Transit Study Improvement Concepts	
Expanded Park and Ride Capacity	To encourage transit use by choice regional commute market.
Bus Pad Access Improvements on HWY 101	Improve pedestrian access and operating efficiency.
Arterial Corridor Transit Signal Priority (TSP) and Capacity Improvements	Decrease onboard transit travel times. Make regional and local transit mode more attractive.
Local Stop Established Minimum Facilities Improvements	Improve pedestrian/ADA access to local bus stops. Enhance bus stop amenities.
Out of Direction Travel Needs	Improve reverse commute transit service.
Major Transit Transfer Hub (new or expansion of existing)	Improve route connectivity.

3.2 Evaluation of Initial Improvement Concepts

The key findings of the Existing Conditions Analysis (Chapter 2) were used to conduct the first stage analysis of the initial improvement strategies. Evaluation criteria were also developed by the consulting team in consultation with TAC members and TAM staff representatives. The initial evaluation criteria are defined and summarized in Table 3.2.

Table 3.2 Initial Improvement Concept Evaluation Criteria

Initial Evaluation Criteria	Comment
Meeting Transit Efficiency and Effectiveness Goals	**Enhance operating cost efficiencies and service reliability (on-time performance).**
Facilitate Transfers	**Improve connectivity between local routes, regional routes and between local and regional routes. Improve bus stop/transfer site comfort and safety amenities.**
Improve Travel Times: Intra-County and Regional	**Decrease bus running times and onboard passenger travel times. Make regional and local transit mode more attractive.**
Increase Transit Usage (transit dependent and choice riders)	**Affect increased transit usage by car drivers, pedestrians and bicyclists. Recapture lost transit ridership and attract new ridership.**
Cost Effective for Transit Operators	**Maintain or reduce current bus operating hours.**
Meet Environmental Goals	**Enhance air quality and congestion mitigation goals.**
Achievable within TAM & Agency Resources	**Eligibility of enhancements within existing TAM, transit agency, and jurisdictional funding sources and feasible within capital priority programs.**

3.3 Finalized List of Improvement Concepts

Table 3.3 summarizes the result of the evaluation analysis of the initial improvement concepts. From this evaluation the list of improvement concepts brought forward for further definition (Chapter 4) and evaluation (Chapter 5) was reduced from six to five. The Major Transit Transfer Concept for Central and Southern Marin County was eliminated because anticipated service levels within the next five to ten years would remain at current levels and be insufficient to justify the develop of a new centralized transit hub or to significantly expand an existing hub. After reviewing the final improvement concepts with the TAC, a draft list of improvements was developed. The finalized list of Central and Southern Marin Transit Study enhancement concepts is summarized in Table 3.4 and defined in Chapter 4.

Table 3.3 Summary of Initial Improvement Concepts Analysis

Improvement Concepts Reviewed with TAC Members 1/21/09	Analysis Conclusions
Expanded Park and Ride Capacity	Shortfall of 300 spaces min. identified + 200 Kiss & Ride; no clear desire to expand capacity simply to satisfy current overflow; managed solution needed based on non-auto modes; park & ride opportunities on arterials within cities very limited
Bus Pad Access Improvements on HWY 101	Access improvements essential to improving attractiveness / effectiveness. Limited $ means grade improvements preferred over ped grade seps and provide more effective spread of investment in Cen/So. Marin
Arterial Corridor Transit Signal Priority (TSP) and Capacity Improvements	Desirable to pursue at key locations identified by transit operators as generating delay and On Time Performance (OTP) reliability.
Local Stop Established Minimum Facilities Improvements	Establish a hierarchy of local bus stops along key east/west corridors: 1. Limited stop express bus stops - minimum 2 mile spacing 2. Local bus stops - approximately 1/2 mile spacing Transfers between local and limited stop express occur along corridor at limited stop express bus stops
Out of Direction Travel Needs	Reverse Travel Corridor Enhancements needed in Sausalito-Mill Valley (although streetcar not likely to provide effective solution); E/Dtn San Rafael-San Anselmo corridor; connections to SMART NB.
Major Transit Transfer Hub (new or expansion of existing)	Service levels and transfers likely to be broadly at current levels in 5-10 years. No new "Super-hub" required; (the Ferry Terminals + SRTC are the major regional hubs).

Table 3.4 Finalized List of Central and Southern Marin Transit Study Enhancement Concepts

Proposed Improvement Concepts
Multi-Modal Green Hubs
Hwy 101 Key Pads & Ramps Transit Program
Arterial Speed and Reliability Program
Local Stop Enhancement Program
Key Bidirectional Corridor Enhancements

3.4 Stakeholder Input

Stakeholder input was critical to the development, refinement, and evaluation of the five Central and Southern Marin Transit Study improvements concepts. Stakeholder input was obtained through:

- A series of TAC meetings at critical steps in the study—meetings were held 10/30/08, 01/08/09, 01/29/09, 03/05/09, 04/09/09, 04/17/09, 05/12/09 and 05/27/09.
- A series of informal meetings with GGT and Marin Transit staff, as well as, County and city staff members and elected representatives.
- A Public Workshop held at the Marin Center 03/26/09 (summary of input provided in Appendix 3).
- A series of Executive Committee and Board Meetings at critical steps in the study—meetings were held 11/10/08, 01/12/09, 3/16/09, 3/26/09, 4/13/09, and 5/11/09 (summary of input provided in Appendix 3).
- A meeting with Caltrans District 4 staff on 04/14/09 to specifically review alternatives for the Hwy 101 Key Pad & Ramps Transit Programs enhancements.
- A presentation to Tamalpais Valley City Council Meeting on 04/20/09 and Mill Valley City Council on 06/01/09.

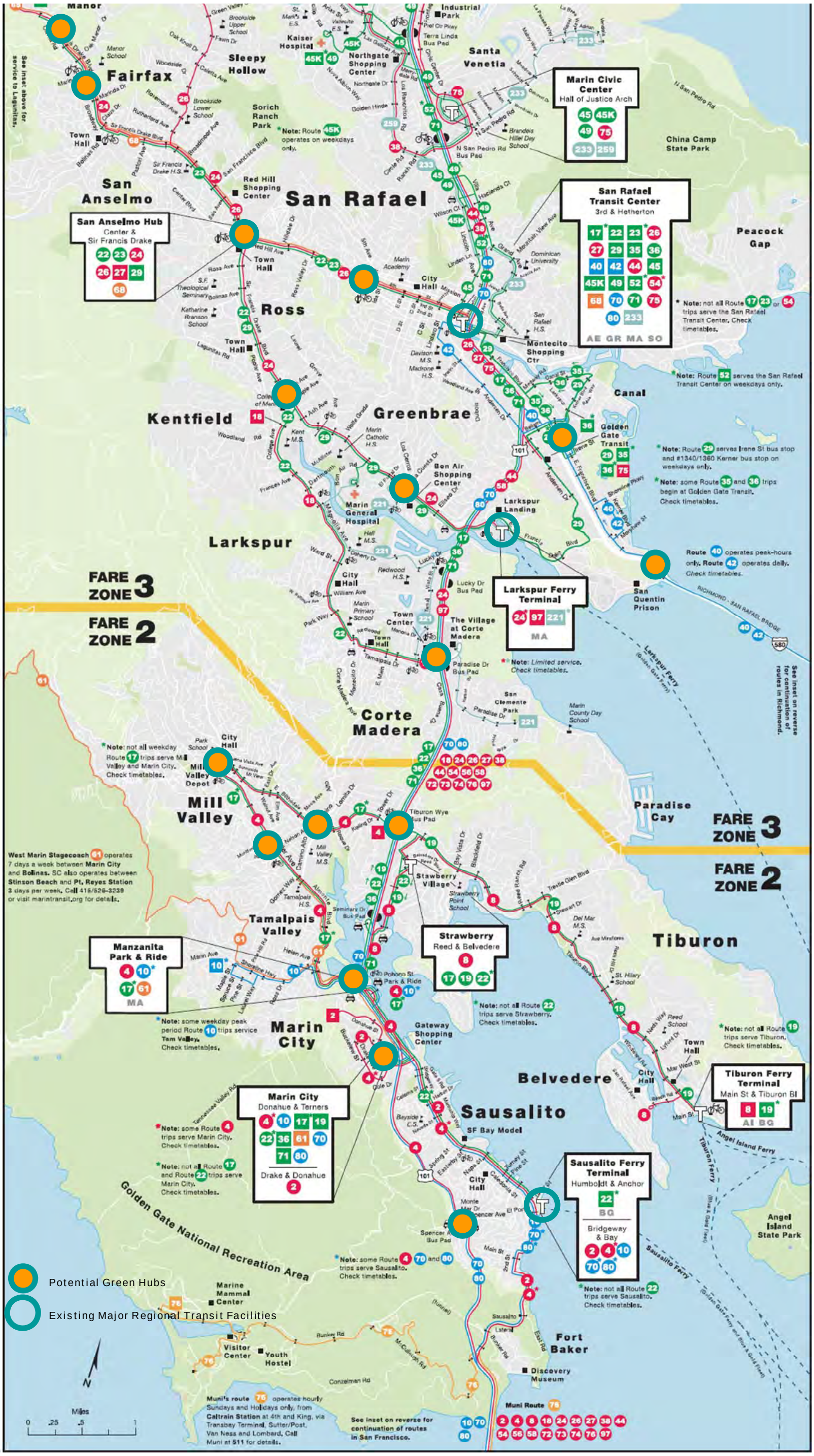
CHAPTER 4: DESCRIPTION OF APPLICABLE IMPROVEMENTS

Chapter 4 describes the program of improvements for the Central and Southern Marin Transit Study. From the existing conditions (Chapter 2) and development analysis (Chapter 3), the list of improvement concepts was refined for further definition and evaluation (Chapter 5). The program of improvements consists of the following: Multi-Modal Green Hubs, Hwy 101 Key Pads & Ramp Transit Program, Arterial Speed and Reliability Program, Local Stop Quality Enhancement Program, Key Bidirectional Corridor Enhancements.

4.1 Multi-Modal Green Hubs

Multi-Modal Green Hubs are intended as strategic transit hubs to collect and distribute passengers. Multi-Modal Green Hubs will be designed to improve transit operating efficiency and service quality, while being scaled to, and compatible with, the surrounding land uses and host communities. Seventeen potential Multi-Modal Green Hub locations have been identified in the Central and Southern Marin Transit Study area. These range from established hubs and/or park-and-ride sites like San Rafael Transit Center, San Anselmo Hub, Marin City Transit Center, the Larkspur, Tiburon, and Sausalito Ferry Terminals, Bon Air Shopping Center, Manzanita Park-and-Ride, and the Spencer Avenue Bus Pad, to a number of potential new sites including GGT's Sir Francis Drake/Olema Road bus turnaround, Fairfax (between Sir Francis Drake and Center west of Pastori), San Rafael (4th at Ida), College of Marin, Mill Valley Depot, Mill Valley Municipal Parking Lot (Miller at Evergreen), Alto Shopping Center (E. Blithedale), and the San Quentin area (Francisco at Main). Figure 4.1 provides a map of potential Green Hub locations.

Figure 4.1 Potential Green Hub Locations



All developed Green Hubs will function as formal transfer hubs, served by limited stop express regional services and local feeder services. All sites will be designed to facilitate efficient, direct bus access.

Depending on location, some outlying or HWY 101 sites will serve as intercept facilities attracting park-and-ride transit commuters and reducing single occupant vehicle traffic on the HWY 101 trunk and east/west corridors. There will be an emphasis on increased transit commuter parking and kiss-and-ride capacity at these sites. Other sites with parking capacity constraints can serve as "community" collectors serving the surrounding neighborhoods with the design emphasis on good pedestrian access, bicycle storage, as well as kiss-and-ride and taxi service capacity.

The Multi-Modal Green Hub concept provides Marin County communities with a flexible transit-oriented feature. Given the diversity of the study area, there is no single standard Green Hub design. One size certainly does not fit all situations and opportunities. Although individual facility design will depend on local site capacity and surrounding conditions, tempered by local jurisdictional preferences, each facility will be designed to maximize transit efficiency, effectiveness and attractiveness with the facility scale and range of amenities that are feasible. Key Green Hub design elements are summarized in Table 4.1.

Table 4.1 Green Hub Design Elements

Green Hub Element	Notes
Enhanced Pedestrian Access	Including safe sidewalk access, controlled pedestrian street crossing, and ADA accessibility features including strategically located wheelchair ramps, curb cuts, paved walkways, and texture treatment for the visually impaired.
Improved Passenger Comfort, Security and Transit Information Amenities	Including benches and shelters (ADA accessible) scaled to planned passenger volumes, security lighting for improved safety at and around the facility, clear bus bay assignment signage, fare medium vending machines, real time bus arrival information, posted system maps and schedules, direct access transit information phones and where appropriate direct line taxi phones. This suite of amenities will enhance the transfer and bus departure wait.
Amenities to Attract Bicyclists	Including secure bicycle parking in lockers that can be reserved and are easily accessible by bicycle commuters.
Passenger Drop Off and Pick Up Staging Capacity	Inclusion of curb space or parking lot space close to the bus bays for passenger drop off and pick up is critical to the attraction of choice riders. Where feasible, pick up staging space should be provided to allow drivers to dwell for 5 to 20 minutes while waiting for return trip bus arrivals.
Taxi and Shuttle Bus Capacity	Each Green Hub should have taxi stand capacity for both private for-hire taxi service and contracted taxi jitney services. The latter could be provided on a contract basis for formal, subscription feeder services from residential neighborhoods that cannot be served by regular transit coaches or smaller min-buses.
Increased Park-and-Ride Capacity	Where feasible increase off-street or on-street parking capacity dedicated to transit park-and-ride passengers. Some sites have off-street capacity in public or commercial/retail lots. A certain percentage of parking stalls could be dedicated and signed for transit park-and-ride use through negotiation with property management companies, similar to the arrangement at Bon Air Shopping Center. Other sites have on-street capacity that could be designated as transit park-and-ride spaces. All dedicated spaces (off-street or on-street) have to be properly signed and policed. A guaranteed or reserved parking program is required to secure consistent parking capacity for regular transit commuters. A reservation fee could be charged to ensure guaranteed parking. The guaranteed parking program could be administered and delivered on-line. Parking fees could be a revenue source for the agency or jurisdiction responsible for the affected Green Hub.
Environmentally Sustainable Amenities	The amenities that are proposed for the hubs are intended to be done in an environmentally responsible way. The power needed to provide some new amenities would be offset by solar panels. The hub construction would be targeted to use non-toxic materials where possible, and preferably with locally-recycled materials. The overall design of the facilities would be enhanced with careful design to promote as much water retention as possible.

4.2 Hwy 101 Key Pads & Ramps Transit Program

The current bus pad concept along the Highway 101 corridor in the study area is an effective way to provide accessibility for routes heading to and from San Francisco as they travel along the freeway. The design of the bus pads acts much like a rail station; buses can pull out of the right lane and onto the exit ramp, then pull into the pad, board and unload passengers, then resume traveling on the freeway in the rightmost lane.

The current bus pads have been in operation for several decades. Most recently many of the pads have had some improvements such as new shelters and sidewalks. Most are situated very close to pedestrian ramps and bridges that connect both sides of the roadway, so that a person boarding the bus in one direction is able to return in the other direction.

The functionality of these bus pads has raised some concerns. The pads are located in between ramps where persons are driving vehicles at high speeds. There are awkward crosswalks and steep paths that sometimes must be negotiated by riders to reach the pads. Some of the pedestrian ramps and bridges, built before the ADA standards were established, are not able to meet the design requirements of ADA and create a challenging way of travel for persons in wheelchairs to negotiate. The stops are also located in an area where noise levels from nearby traffic are quite high, and carbon monoxide and particulate exhaust from large volumes of vehicles is present.

Assessment of Improvements in Central and Southern Marin County

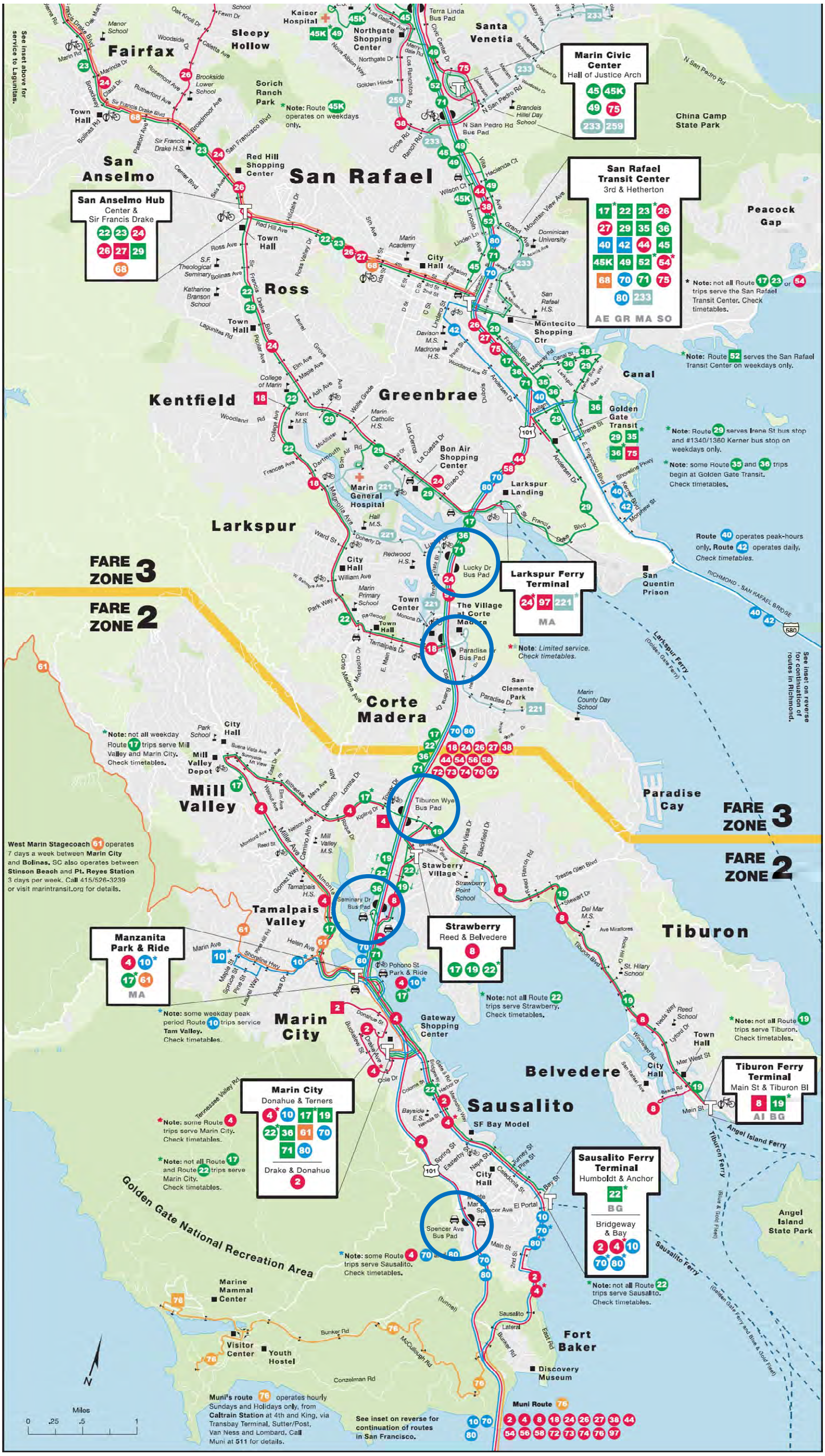
There are five bus pads in each direction–at Lucky Drive, Paradise Drive, East Blithedale Avenue, Seminary Drive and Spencer Avenue (Figure 4.2).

The pads at Spencer Avenue and Seminary Drive are tightly constrained. There is limited available land to expand parking capacity, and the bus pad stops are limited in length. The parking layouts are small and can be difficult to negotiate. Improvements at these locations would need to be carefully made given the significant limitations of the site.

The Lucky Drive bus pad experiences lighter traffic. This location is to be redesigned as part of the Greenbrae interchange improvements project—there is a separate, active design process occurring that is examining bus stop relocation issues with this stop. The design team should be attentive to the park-and-ride demand, as well as cross-highway access for stops located on either side.

The remaining bus pads at Paradise and East Blithedale are most suitable as the preferred location for implementing improvements. There is available land within the current right-of-way to make modifications. The ramp volumes are significant enough to create some delays with buses reentering traffic today, so that a redesign could potentially save travel time for not only the persons walking to and from the stop, but also to the through passengers on buses.

Figure 4.2 Locations of HWY 101 Transit Pads in Central and Southern Marin



Concept Elements

The concept is to provide a set of operations improvements intended on improving the overall flow and accessibility of these pads. The improved concepts are also to improve transit efficiency and effectiveness through better flow in the stop areas, to facilitate transfers between bus routes and other models, which would then increase transit usage and improve the overall environment.

Concepts have been developed and are currently being reviewed and revised based upon comments from Caltrans and other staff. The concepts generally focus on three possible options. A diagram of each option is also attached.

- **Option 1:** Pause on-ramp traffic to allow for buses to re-enter traffic from the current pads. In this concept, a signal is installed to temporarily pause on-ramp traffic, much like a ramp meter. This is diagrammed in Figure 4.3.
- **Option 2:** Relocate the bus pads to the far side of the interchanges, facilitating safer and closer access to the arterials. In this option, a new bus pad location would be created using the portion of the interchanges that currently have been vacated as a result of eliminating the full cloverleaf interchange design a few decades ago. This is diagrammed in Figure 4.4.
- **Option 3:** Route all bus pad buses to the off-ramp, providing a special bus-only lane with transit signal priority to a related stop at the far side of the off-ramp/arterial intersection. Once leaving this stop, the buses can re-enter traffic using the direct on-ramp. This is diagrammed in Figure 4.5.

The pads would particularly place the bus stops closer to potential drop-off, pick-up and bus transfer stops on adjacent arterials streets.

Figure 4.3 Option 1 Diagram

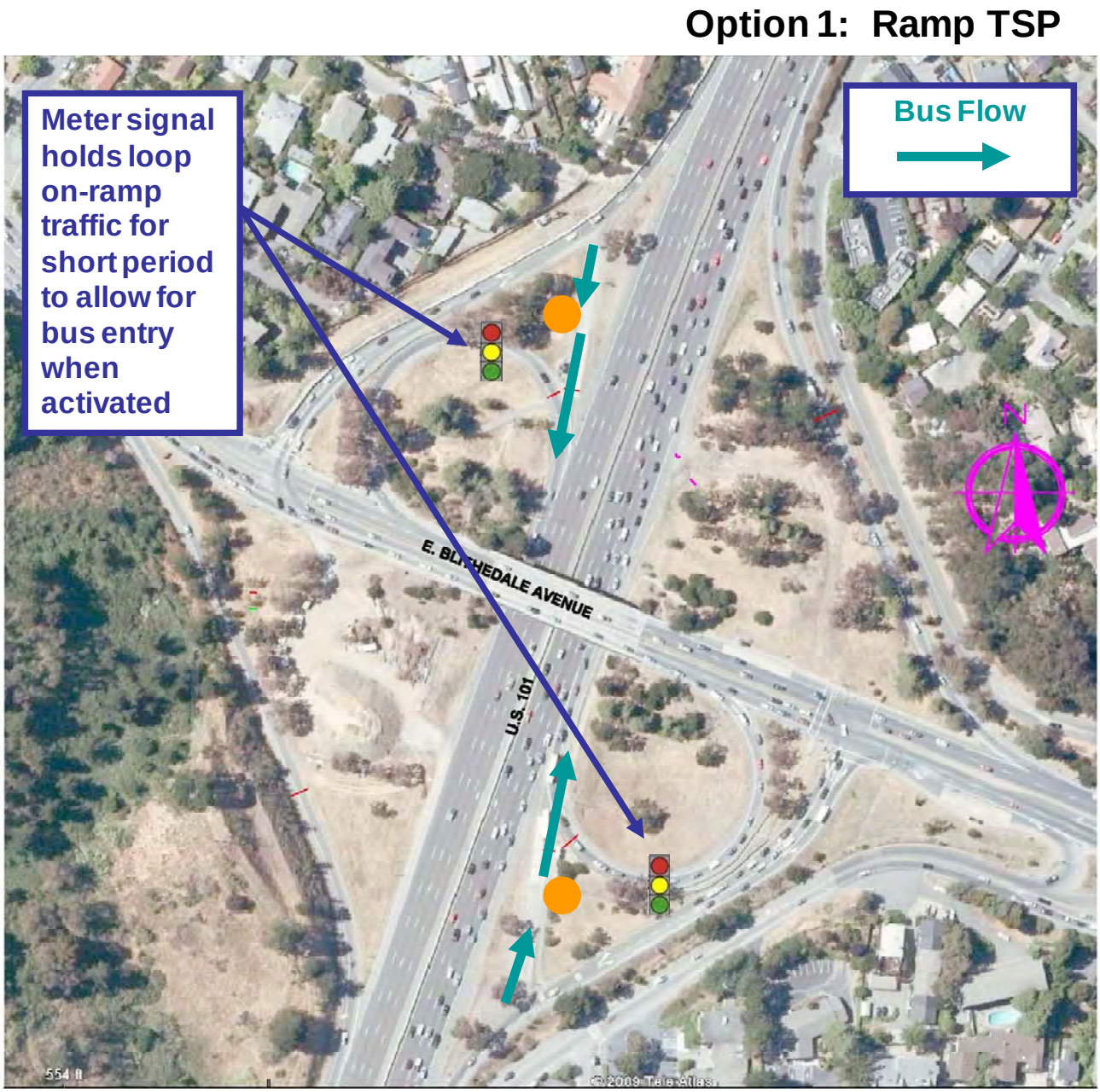


Figure 4.4 Option 2 Diagram

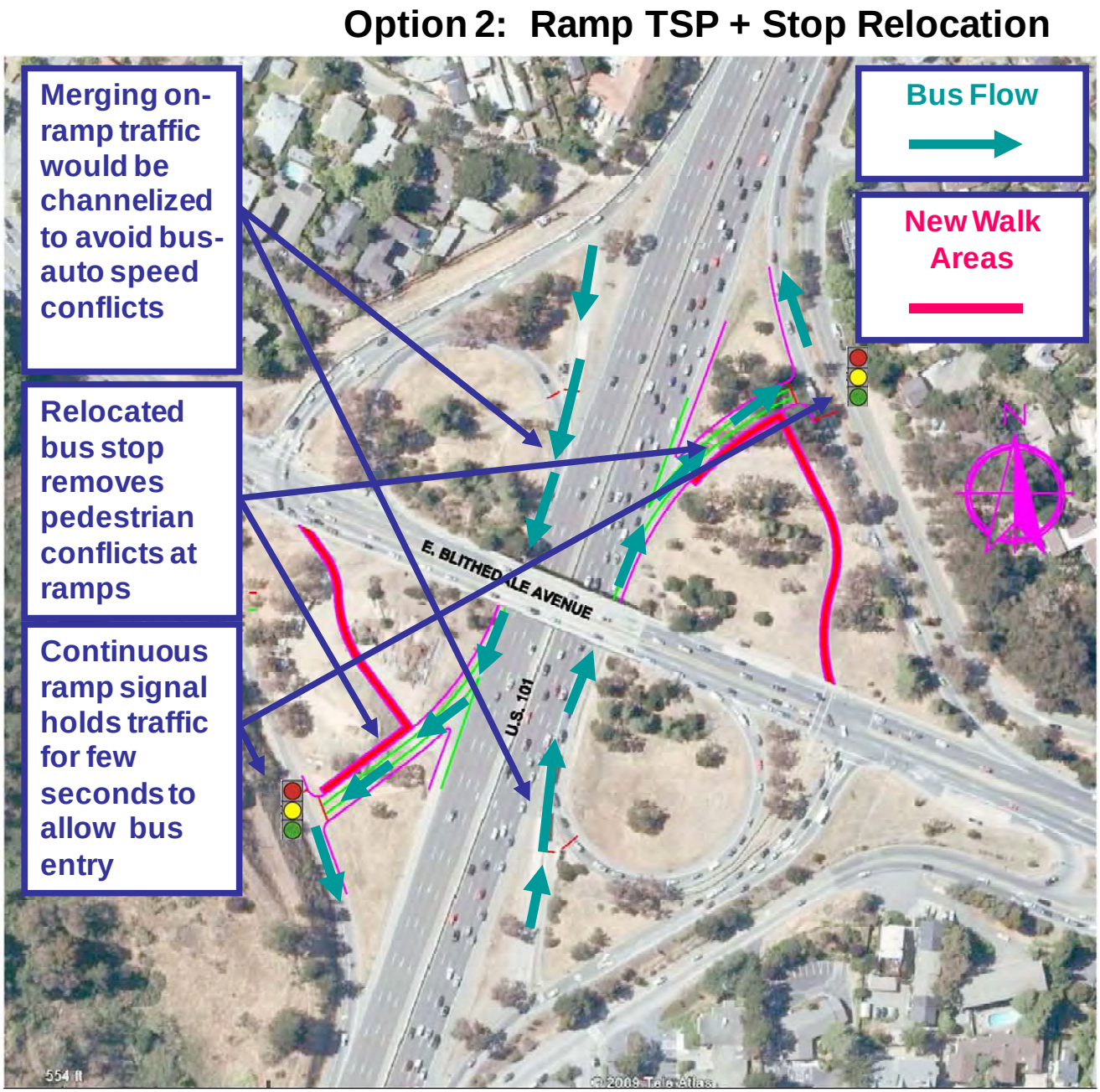
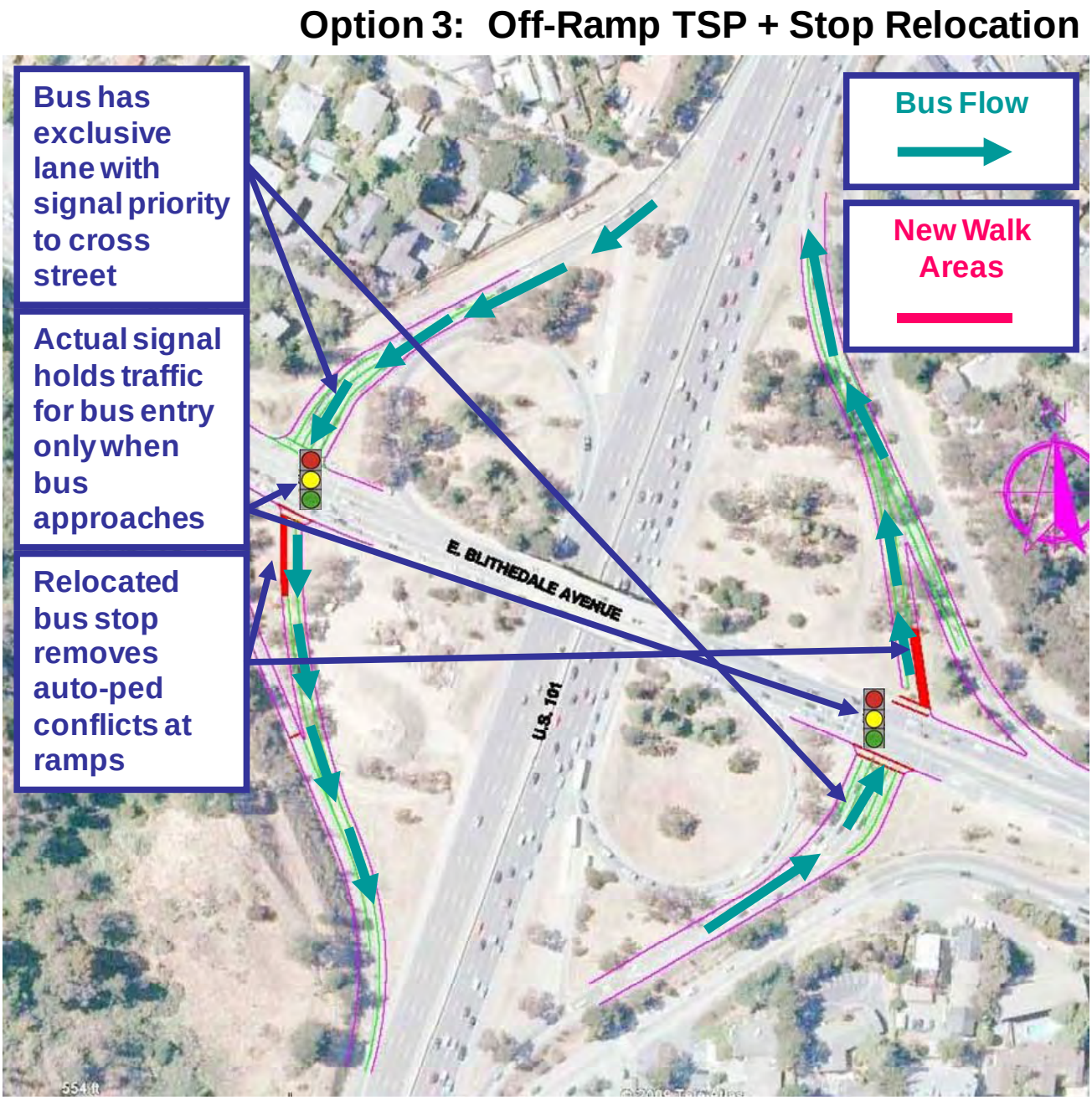


Figure 4.5 Option 3 Diagram



4.3 Arterial Speed and Reliability Program

Setting

Bus travel speeds on arterial roadways are often much slower than auto driving speeds. This occurs because the bus must stop for a variety of reasons such as:

- **Stopping to load/unload passengers.** Buses obviously must stop to load and unload their passengers. The time it takes to load passengers often includes the time it takes to pay the fare. While there may be a short time per passenger, the delay associated with loading and unloading all of the passengers in aggregate can be quite significant. For example, if it takes 20 seconds to load a passenger and there are 30 passengers in the route, that adds 600 seconds, or 10 minutes of travel time. Special loading and unloading can be further slowed if passengers are in wheelchairs or have bicycles or strollers.
- **Delays getting back into traffic.** Many times, buses pull off to the curb to load and unload passengers. Then, the driver must wait until there is a gap to reenter the stream of traffic. This can further slow the overall bus route speed.
- **Delays at intersections.** Both buses and private vehicles often encounter delays at intersections. Not only is this a typical delay for autos, but there is a special added problem for buses: Many signal systems are designed to move groups of cars through a series of intersections; when a bus stops, they fall behind that group and then must wait through another signal cycle to clear an intersection. In a worst case setting, the bus driver stops frequently, and – with each stop – finds that the next signal has already changed.

If buses stop frequently enough, the problem of "bus bunching" occurs. This phenomenon occurs when a bus has to stop so frequently that the overall travel speed gets slower and slower – as more passengers gather downstream (because the time gap grows between that bus and the bus that was in front of it). The following bus may not be delayed by lots of boarding riders, so it ends up making the trip faster. In a worst case setting, the faster, later bus will actually be right behind or even pass the slower, earlier bus.

Techniques to Improve Speed and Reliability

The concept is to provide a set of operation improvements intended on improving the overall flow of buses in this corridor. This includes improving travel speeds, as well as, improving the reliability (or the on-time performances) of the buses. This results in improvements to transit attractiveness and efficiency.

Complementary techniques include bus stop spacing and positioning, strategic geometric changes, and transit signal priority where useful. These techniques are both complementary with each other as well as with other programs.

The development *of* ***limited-stop routes*** for long corridors that have frequent buses is the most typical way to achieve speed improvements. If buses can stop few times, the amount of delay on the roadway is reduced and the buses can operate much faster. (The development of the green

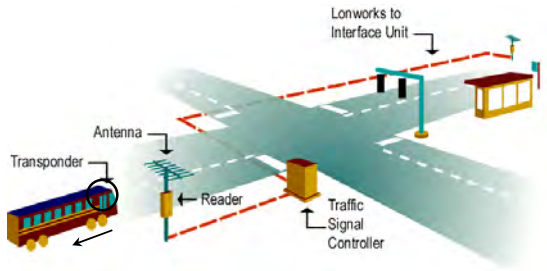
hubs program will encourage more users to use the hubs, further reducing the demand at intermediate bus stops.)

Strategic geometric changes provide opportunities to better interface the bus system with local signal system (as they no longer would have to "get stuck" at a red traffic signal because they had to stop). The positioning of buses to ensure that they can travel through multiple signals without being stopped provides major travel time advantages.

Transit signal priority is another concept that has evolved in the last several years as systems can be more sophisticated and adaptive to real-time traffic conditions. The principal behind transit signal priority is not pre-emption (which some signals have for emergency vehicles) but is instead designed to incorporate minor shifts in phasing to allow for buses to move through a corridor more quickly. The most common techniques are to extend the green phase long enough to allow buses to clear (and reducing the next cycle green phase to balance the interruption); or to have a signal phase turn red before a bus gets to the intersection so that the side street green phase will not as significantly delay the buses. A related technique is phase-switching (permitting left turns after a through movement rather than before as an example) when buses are waiting at an intersection approach.

There has been several successful arterial speed and reliability strategies implemented ranging from downtown areas to lower-density suburbs. Through this process, specific ways to incorporate transit signal priority have been implemented and shown to produce better transit speeds and reliability. The most common methods include:

- **Green extension**. This transit signal priority technique is one where – through early detection – the bus is able to have an upstream signal held to a longer green time, enabling the bus to make the signal. In this instance, the side street (one without bus signal priority) signal change is delayed, but the side street would still have a comparable time to the signal timing plans so that drivers and pedestrians to clear the intersection. For example, a side street phase may be delayed by 8 seconds to allow a bus to clear the intersection – but the side street would still have the same total amount of green time and the major arterial roadway and its turning phases would also still have the same total amount of green time (including left-turn phases) through a window of two or three complete cycles. Thus, there is no aggregate decrease in traffic green time – and thus no impact to overall traffic congestion.



- **Early green/red truncation**. This transit signal priority technique is one where – through early detection – the bus is able to have a signal turn green earlier so that the bus can gain travel time. In this instance, a significant upstream detection is required so that any pedestrians that may be in the intersection are able to clear the intersection before the signal changes. Again, the recovery signal design for a red truncation can be achieved by shifting the side street travel time that is cut short to the next cycle.

- **Phase swapping.** Intersections with several phases to allow left-turns are often good candidates for transit signal priority because the sequence of the phases can be slightly changed to improve bus speeds. For example, a protected left-turn phase – often set to occur before the phase for through movements – can be temporarily swapped with that through movement if a bus is traveling through the intersection. This can save 10 to 20 seconds of the time the bus must wait at an intersection. The left-turn phase would simply occur after the through movement phase, rather than before.
- **Queue jumping and exclusive transit signals**. In cases where buses have significant delays in pulling out into traffic after stopping, exclusive priority for buses can be very advantageous. One common technique is to allow for buses to "jump" a green light and reenter mixed-flow traffic when leaving a stop – in front of other vehicles traveling through a signal. It is particularly useful in cases where buses would re-enter a mixed-flow traffic lane after being at a stop or in an exclusive lane.

Assessment of the Concepts for Marin County

Generally speaking, bus operations in Marin County occur on roadways which are narrow and have short cycle times. The need to provide long cross-street green times is somewhat diminished and thus there are not many locations where significant intersection signal delay occurs.

One corridor where delays have been reported by bus drivers and identified by the consultant team as most suitable is Sir Francis Drake Boulevard between Red Hill Avenue and US Highway 101. This corridor contains approximately 14 signals maintained by the City of San Anselmo and Marin County. The signals on this corridor also have multiple phases (especially for exclusive left-turns) which can lengthen the time it takes for a bus to get past the intersection once stopped. The result is that Golden Gate Transit estimates that it takes up to 19 minutes to travel between the San Anselmo Hub and Eliseo Drive during the morning commute. This distance is approximately 3.4 miles, so that the average bus speed is 10.7 miles per hour; this speed is lower than a more standard transit operating speed of 13 to 14 miles per hour.

The corridor has already had some improvements made to bus stop locations so that the buses can move easier through the corridor. Generally, good transit service design suggests that bus stop placement be reviewed periodically – and that systems that can allow for transit signal priority be considered where delays are significant.

Improved transit speeds are best recommended with detailed operations studies that should be performed with the participation of both the transit operators (Golden Gate Transit and Marin transit) as well as the jurisdictions in the corridor. The overall service plan would be identified in coordination with other speed improvements; with transit signal priority being considered once the overall service plan is proposed and accepted by the participants.

4.4 Local Stop Quality Enhancement Program

Setting

The key element of the Local Stop Quality Enhancement Program is to improve the attractiveness of transit to choice riders and improve overall service quality to transit dependent riders. The program can help to guide the assignment of capital funds earmarked for bus stop improvements. The Program is intended to establish a set of priority bus stops targeted for bus stop enhancements identified in local capital improvement programs. These essentially would be local bus stops located between proposed Multi Modal Green Hubs along the key east/west transit corridors in Central and Southern Marin (Fairfax/San Rafael along Sir Francis Drake, Red Hill & 4th; San Anselmo/Larkspur along Sir Francis Drake; San Anselmo/Corte Madera along Sir Francis Drake, Magnolia & Tamalpais; Mill Valley to HWY 101 along Blithedale; and Mill Valley/Marin City along Miller & Shoreline). A preliminary list of Potential Local Bus Stop Enhancement locations are depicted in Figure 4.6.

Although bus stops are used by GGT and Marin Transit, placement and development falls under local jurisdictions. A prioritized list of "enhanced" bus stops should be developed for each jurisdiction jointly by GGT, Marin Transit and the responsible jurisdiction. Selection criteria should include bus stop spacing standards, bus stop guidelines established in Memoranda of Understanding between Marin Transit and the various jurisdictions, passenger boarding volumes, and strategic location (major transit trip attractors and attractors, senior apartments and facilities, as well as group homes and programs for persons with disabilities).

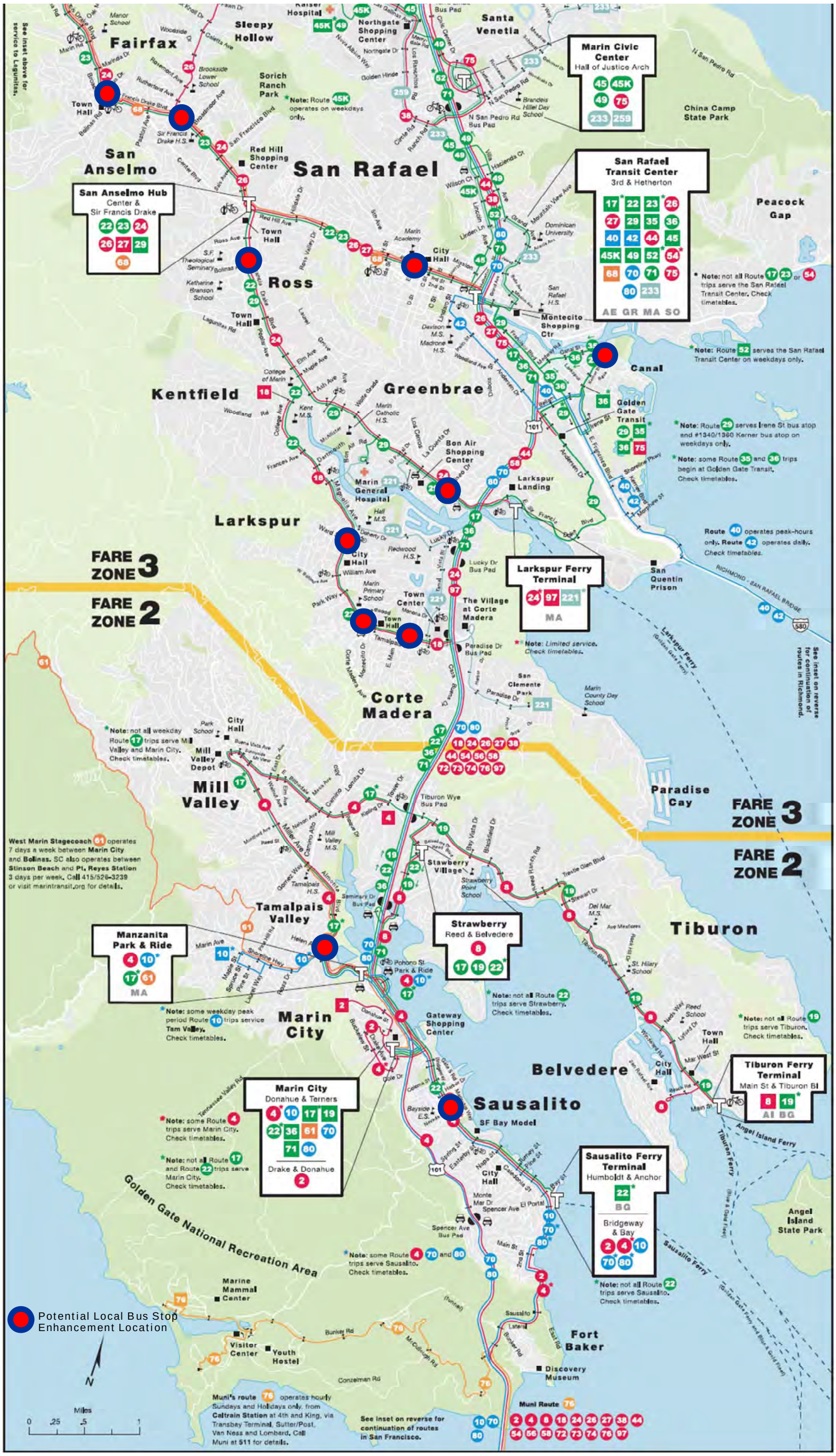
Based on a preliminary assessment of boardings by bus stop and bus stop spacing done in conjunction in this Study, 22 potential Local Bus Stop Enhancement locations were identified. The 22 stops are comprised of 11 bus stop pairs (inbound and outbound stops). A one mile minimum spacing was used for this analysis.

Range of Enhancements

The range of enhancements could include but not be limited to:

- Improved pedestrian access.
- ADA accessibility.
- Shelters and benches.
- Routing and schedule information.
- Enhanced lighting.
- Guaranteed secure bicycle parking.
- Kiss and ride drop off and pick up capacity.

Figure 4.6 Potential Local Bus Stop Enhancement Locations



Prioritization of Local Bus Stop Enhancements

Once a list of candidate bus stop sites have been identified, a Local Bus Stop Enhancement Prioritization Program is critical to the establishment of a five to ten year capital budget. Prioritization criteria can include:

- **Enhancements tied with a particular corridor improvement program** – integrating stop enhancements into a more comprehensive improvement project.

- **Planned roadway and sidewalk improvements** – taking advantage of site-specific rehabilitation and improvement initiatives.

- **Passenger volumes** – assigning a higher phasing priority to stops with high volumes of passenger boardings and alightings.

- **Facility development or redevelopment** – assigning a higher phasing priority to new or redeveloped transit destinations such as senior apartments and activity centers, schools, recreational facilities and public offices. With forward planning, bus stop improvements can be integrated into and funded through the site plan and development agreement.

- **AM peak direction bus stops** – generally, morning peak stops are characterized by groups of passengers congregating prior to scheduled depart times, whereas PM peak direction bus stops do not generally have passengers congregating. Passengers disperse relatively quickly upon alighting. The exceptions may be stops with passenger pick up spaces or PM direction transfer sites. Also PM peak stops should mirror any ADA accessibility features associated with the corresponding AM stop.

Renderings of the typical Multi-Modal Green Hub, Hwy 101 Bus Pad/Ramp Improvement, and Local Stop Enhancements are provided at the end of this chapter.

4.5 Key Bidirectional Corridor Enhancements

Three Bidirectional Corridor Enhancement initiatives were identified during the Central and Southern Marin Transit Study. These included the following:

- Muir-Sausalito-Mill Valley Welcome Service
- Canal-Downtown San Rafael-San Anselmo Rapid Service
- Larkspur Area Hub Connections

These three Bidirectional Corridor Enhancements were selected because of their combined work and non-work distinct travel demand characteristics, resulting in an all day potential market for transit provision beyond the non-commute hours. (Corridors with commute only or very low level non-work demand characteristics, such as Tiburon Blvd., Belvedere, and Corte Madera/Tamalpais Dr. were excluded from this category of all day bidirectional corridor potential service.) All three are subject to further demand analysis and service planning efforts.

In the case of the Larkspur Area Hub Connections initiative, further assessment will be conducted in conjunction with SMART station area planning and assessment of shuttle bus requirements.

Muir-Sausalito-Mill Valley Welcome Service

The service is primarily intended as a tourist or visitor-oriented shuttle connecting the Sausalito Ferry Terminal with visitor attractions along the Bridgeway Corridor in Sausalito, the Muir Woods Shuttle, and Downtown Mill Valley. The service is anticipated to operate on a Friday through Sunday basis during the high tourist season between Memorial Day weekend and Columbus Day weekend.

A separate demand study has been approved to assess need and potential demand for the Muir-Sausalito-Mill Valley Welcome Service. Assuming sufficient potential demand and funding availability, Marin Transit will prepare a service plan and operate the service.

Canal-Downtown San Rafael-San Anselmo Rapid Service

This initiative was suggested as a service enhancement to improve service quality and increase potential ridership for the largely transit depend market in the Canal District. The service would operate as a limited stop weekday peak and off-peak express and a:

- Local loop in the Canal District.
- Limited stop express along East Francisco Boulevard to the proposed San Quentin Multi-Modal Green Hub (connections to the East Bay).
- Limited stop express between the Canal District and the San Rafael Transit Hub.
- Limited stop express along 4th serving the proposed 4th and Ida, San Anselmo Multi Modal Green Hubs. The service could be possibly expanded further west along Sir Francis Drake to serve the proposed Fairfax and Sir Francis Drake/Olema Road Multi Modal Green Hubs.

A further San Rafael Transit Hub transfer analysis is required to determine the volume of transfers between Route 29 and Routes 22 and 23. Implementation would depend on potential demand, funding capacity, and the availability of buses to meet the required peak bus pull-out requirements.

Larkspur Area Hub Connections

When opened, the Larkspur SMART Station could emerge as a significant multi modal transfer site between SMART, GGT bus and ferry service, and Marin Transit. In addition, a north bound travel demand was identified in the Central and Southern Marin Transit Study that could potentially be served, in part by SMART. Enhanced multi modal transfer capabilities at this site could encourage a transit mode shift for some of the north bound commute. Further demand

analysis in conjunction with SMART planning is required. Consideration of enhanced multi-modal transfers should be incorporated into the Larkspur Station Area planning initiative.

4.6 Capital and Operating Costs of Improvements

The capital costs of the Key Transit Improvements are broken-down by key transit investment components, jurisdiction, number of locations, average cost per location, capital cost per improvement, and the subtotaled cost of each key improvement. The cost estimate summary is depicted below in Table 4.2. The combined total capital cost for the key transit improvements was estimated within a range, of which the mid-point would be approximately $35 million.

The subtotaled Key Improvement Costs are presented as the Cost of Benefits in Table 4.3, which is the capital cost per annual transit passenger benefited. When the Cost of Benefit is spread-out over a 25 year horizon, the cost per annual transit passenger benefited ranges between $0.20 and $4.00.

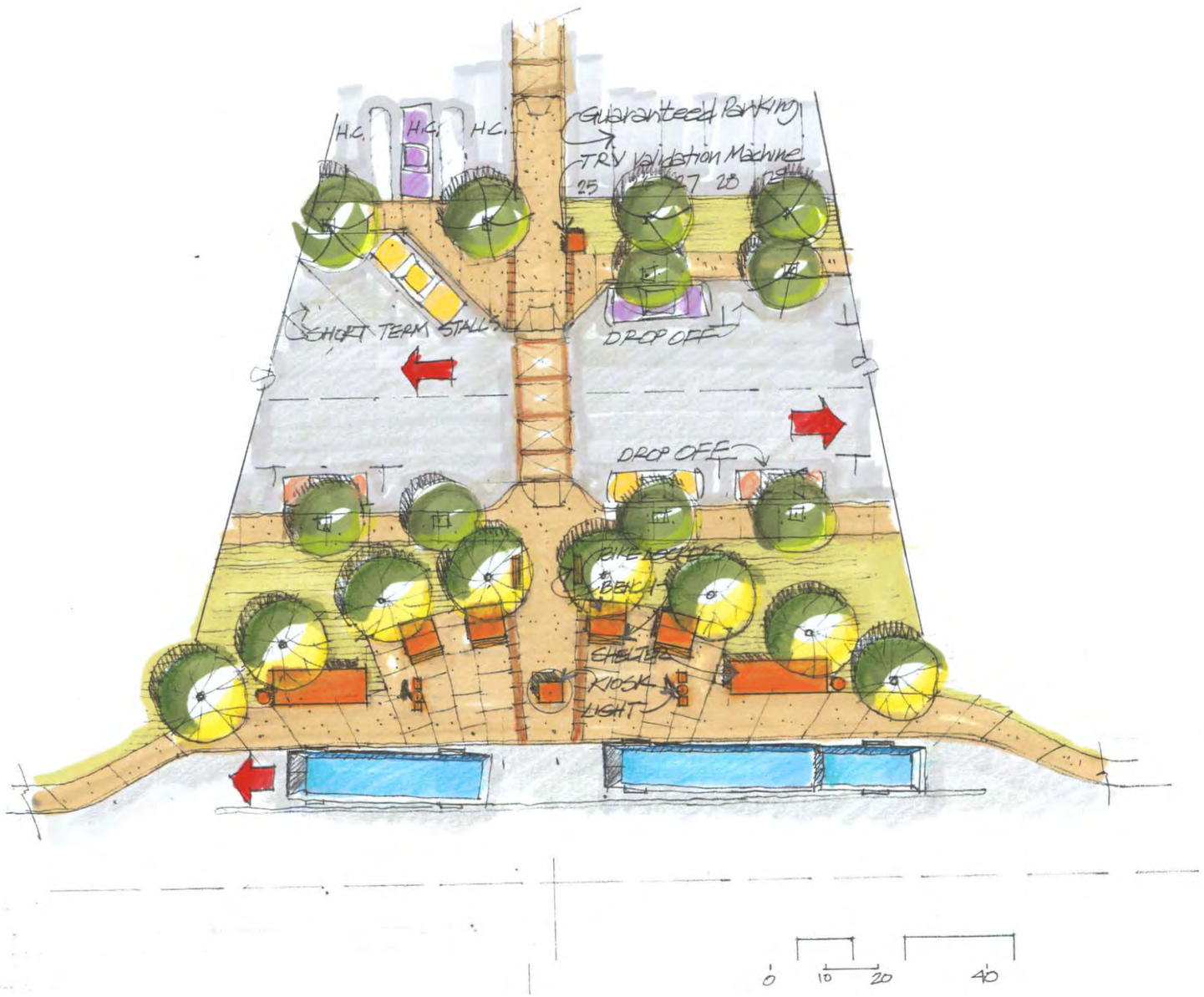
Table 4.2 Cost Estimate Summary of Transit Improvements

Improvement Category	Key Transit Investment Components	Jurisdiction	No. of Locations	Ave. Capital Cost per location ($000s)	Capital Cost of Improvement ($000s)	Subtotaled Key Improvements ($000s)
Multi-Modal Green Hubs	Guaranteed Secure Bike Parking	Cities/TAM	17	$20	$476	$5,964
	Additional Short Stay Pickup Capacity	Cities	17	$25	$595	
	Added Drop-off Capacity	Cities	17	$20	$476	
	Expanded Bus-Bus Transfer Capacity	Cities	8	$150	$1,680	
	Neighborhood Shuttle/shared ride service transfer capacity	Cities/MCTD/GGT	17	$25	$595	
	Guaranteed Transit Parking Management Program	Cities/TAM	8	$85	$952	
	Security, Lighting, Shelter, Facilities Package	Cities/MCTD/GGT	17	$50	$1,190	
Hwy 101 Key Pads & Ramps Transit Program	At Grade signal controlled pedestrian activated ramp crossings	Caltrans/Cities/Co.	10	$75	$1,050	$8,610
	Ramp Transit Signal Priority (TSP)	Caltrans/Cities/Co.	6	$100	$840	
	Bus Pad Access Reconfiguration	Caltrans/Cities/Co.	4	$1,200	$6,720	
Arterial Speed and Reliability Program	Transit Signal Priority (TSP)	Cities/MCTD/GGT	13	$300	$5,460	$13,860
	Roadway/Intersection Reconfiguration	Cities/Co.	12	$500	$8,400	
Local Stop Enhancement Program	Investment in Facilities for Priority Limited Stop Express Bus Stops	MCTD/GGT/Cities	16	$45	$1,008	$1,008
	Bus stop prioritization investment program			TBD	TBD	
Key Bidirectional Corridor Enhancements	Muir-Sausalito-Mill Valley Welcome Service	Cities/Co.	1	$1,400	$1,960	$5,880
	Canal-Downtown San Rafael-San Anselmo Rapid Service	Cities/MCTD	1	$2,800	$3,920	
	Larkspur-area Hub Connections	City/GGF/SMART/ Caltrans	1	TBD	TBD	
				TOTAL	$35,322	

Table 4.3 Benefit-Cost per Transit Passenger of Improvements

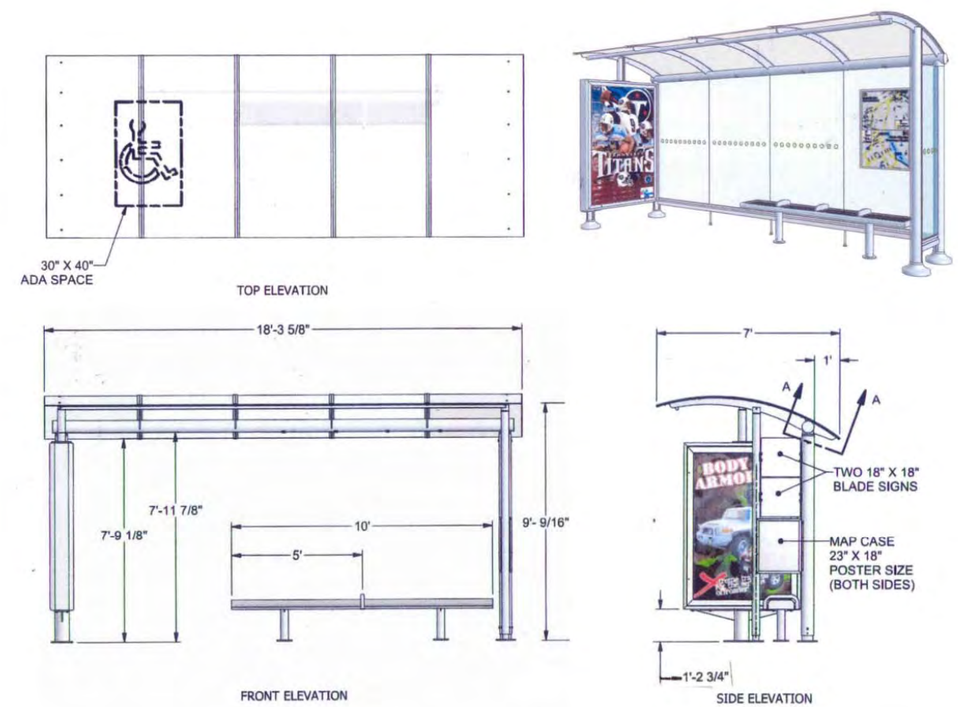
List of Improvements	Subtotaled Key Improvements Costs ($000s)	Cost of Benefits (Capital Cost/Annual Transit Passengers Benefited)	Cost of Benefits (Cost/ 25 yr Annual Transit Passengers Benefited)
Multi-Modal Green Hubs	$5,964	$4.54	$0.18
Hwy 101 Key Pads & Ramps Transit Program	$8,610	$100.82	$4.03
Arterial Speed and Reliability Program	$13,860	$58.46	$2.34
Local Stop Enhancement Program	$1,008	$10.66	$0.43
Key Bidirectional Corridor Enhancements	$5,880	TBD	TBD

Figure 4.7 Typical Multi-Modal Green Hub



LITTER-RECYCLING STATION

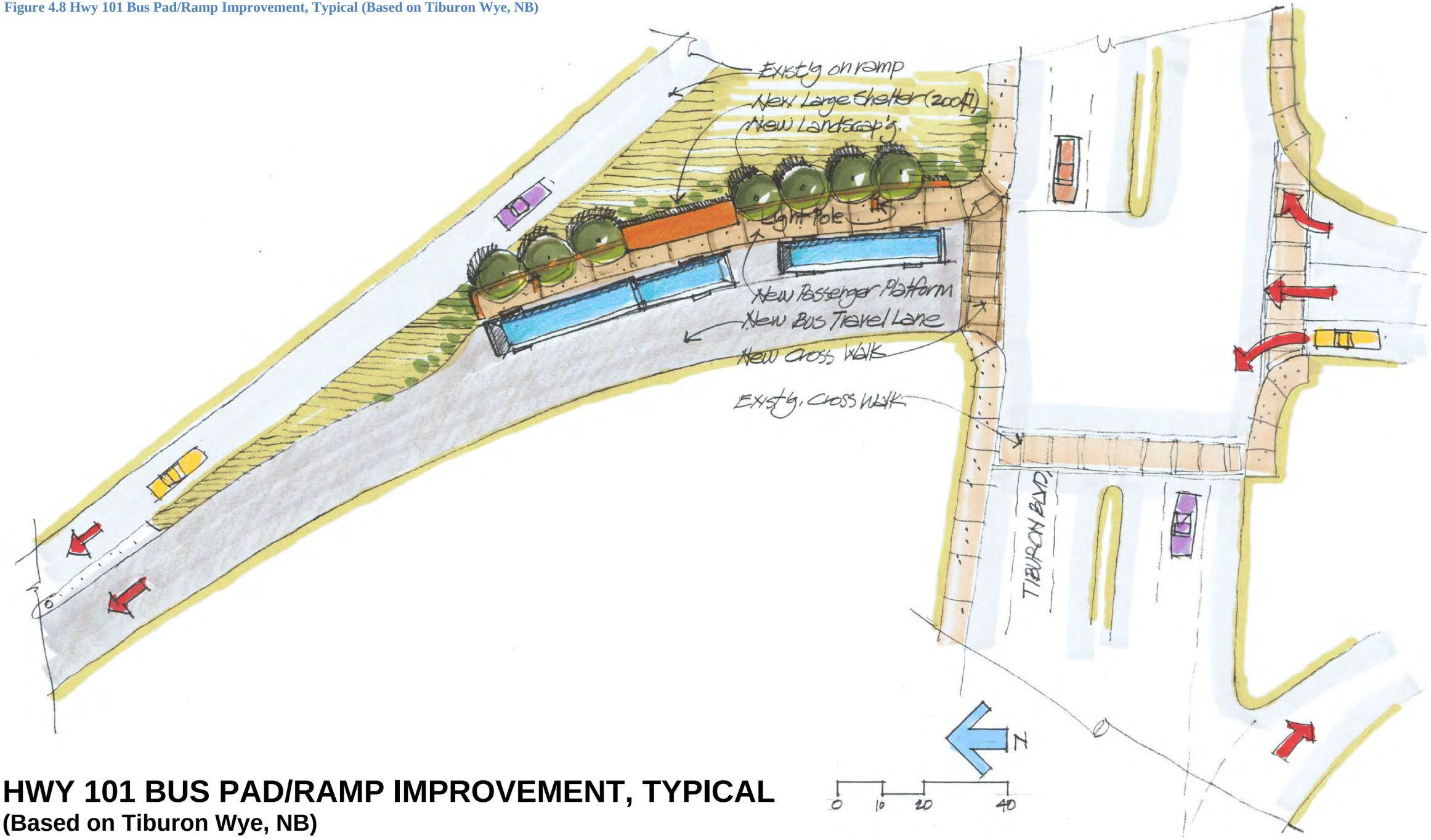
BIKE LOCKER



PEDESTRIAN SHELTER

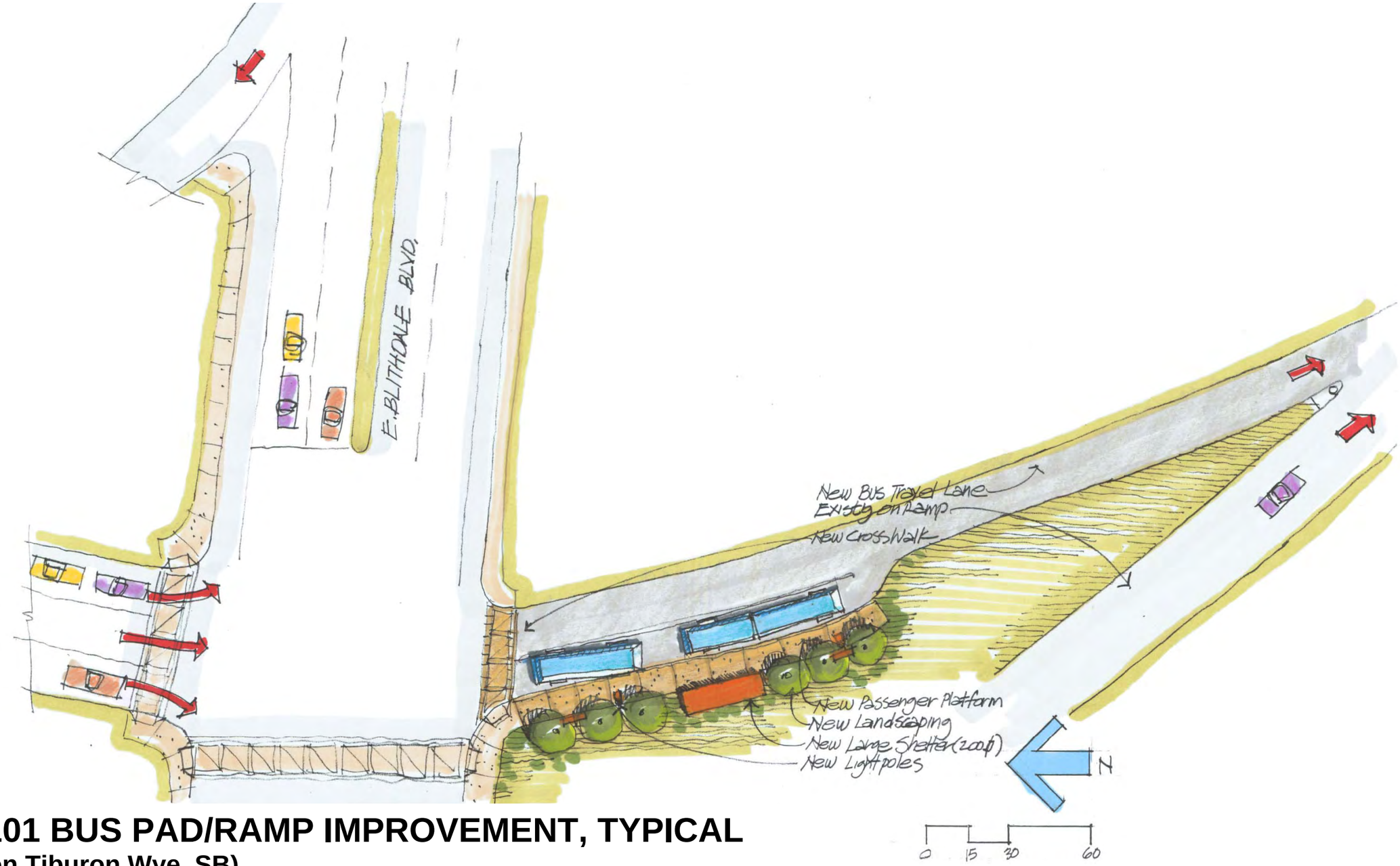
TYPICAL MULTI-MODAL GREEN HUB

Figure 4.8 Hwy 101 Bus Pad/Ramp Improvement, Typical (Based on Tiburon Wye, NB)



HWY 101 BUS PAD/RAMP IMPROVEMENT, TYPICAL
(Based on Tiburon Wye, NB)

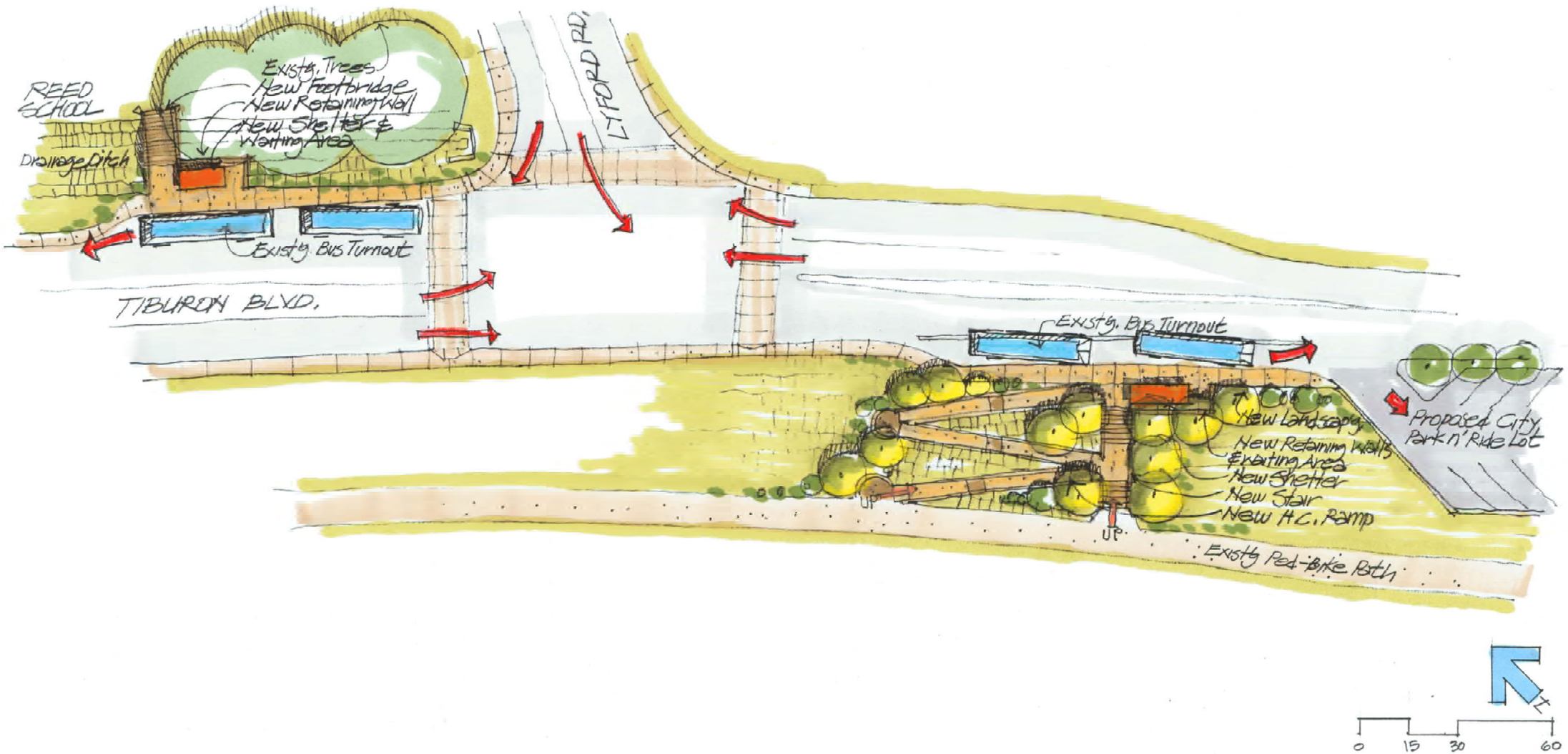
Figure 4.9 Hwy 101 Bus Pad/Ramp Improvement, Typical (Based on Tiburon Wye, SB)



HWY 101 BUS PAD/RAMP IMPROVEMENT, TYPICAL

(Based on Tiburon Wye, SB)

Figure 4.10 Local Stop Enhancement, Typical (Based on Tiburon Blvd./Lyford Rd. Location)



LOCAL STOP ENHANCEMENT, TYPICAL

(Based on Tiburon Blvd./Lyford Rd. Location)

CHAPTER 5: BENEFIT ASSESSMENT OF IMPROVEMENTS

Overview of Benefit Assessment Measures

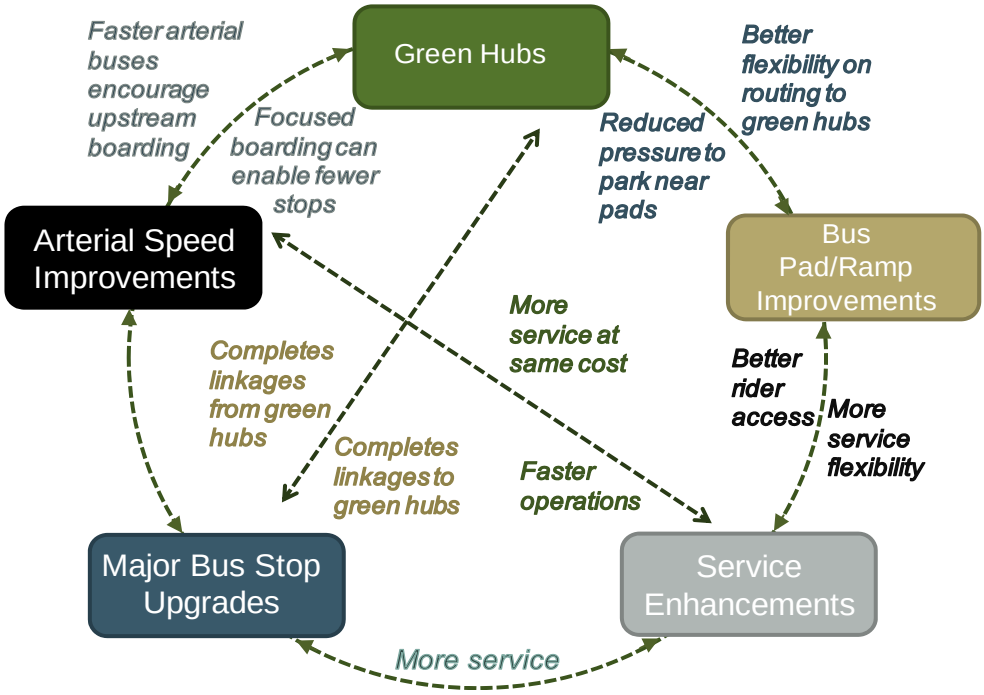
The overall proposed program of improvements significantly improves the environment which bus transit riders can experience in Marin County. The benefits occur for all types of ways that people access the Golden Gate Transit and Marin Transit buses. The intent of the program is to provide choices of ways to reach the transit system, addresses concerns of overflow demand for some access modes, and provides amenities that make transit riding more comfortable.

Some strategies also have the added benefit of faster travel times for transit operations. The faster travel times benefit the users by making trips using transit faster. The benefits also occur to the operators, as they are able to travel faster – covering more distance in the same amount of time. .

The program elements are designed to complement one another, as described in Figure 5.1. For example, the green hubs program provides upstream parking opportunities for residents, while the arterial speed and reliability program would mean that persons who park at the upstream green hubs can make their trip faster.

The benefit analysis presented in this chapter is performed by looking at each program as a separate component of an overall strategy. Because there is an added benefit if the programs are implemented in concert with each other, some of the analysis begins with the assumptions that the other study programs will also be implemented. To determine the net benefit, the analysis focused on what the improvements would gain by that particular program, in order to prevent a double-counting of the benefits.

Figure 5.1 Programs Provide Interrelated Benefits to Each Other



With these overall comments in mind, the study has assessed the potential benefits of the improvements from implementing the various elements of the program. The key measures described include:

Annual Walk to Transit Trips Benefitted. Several elements of the program are intended to make it more attractive and comfortable for those persons who walk to the bus stop, hub or transit center. Based on existing ridership data by route and stop, the measure assesses how many of these trips will be benefited by improved walking conditions.

There are several sources available to provide the appropriate data. Data provided by the transit operators on the number of boardings of routes in the study area forms the basis of the analysis. The number of annual passengers who walk to transit can be estimated from mode-of-access responses from on-board surveys conducted for Marin Transit and Golden Gate Transit in 2008 to determine the proportion of persons who walk.

Annual Bicycle to Transit Trips Benefitted. A number of programs improve conditions for persons who bicycle to transit stops, hubs and transit centers. Today, secure bicycle parking is not generally available so that bicyclists more often take their bicycles on buses; there is reported inability to board bicycles on various bus routes because all of the racks are taken. The choices available to bicyclists are constrained for this reason. The proposed programs seek to improve bicycle access as well as increase bicycle parking capacity through the study area. There is benefit that occurs to persons who bicycle to transit. There is also the expectation that the additional bicycle parking capacity and enhanced environment will allow some persons to shift from driving cars to using bicycles to reach the buses.

The number of annual bicycle to transit trips benefited is estimated according to the annual ridership by line, the proportion of bicyclists that ride to a transit route, and the proportion of overall transit boardings that occur at the proposed hub locations. Data on the number of boardings of routes in the study area forms the basis of the analysis, as provided by the transit operators.

The number of annual passengers who bicycle to transit includes the existing, reported bicycle users, determined from recent mode-of-access responses to surveys conducted in 2008 for Marin Transit and Golden Gate Transit. In addition to the existing users, new bicycle users are estimated to be also able to use transit as a result of the improved parking capabilities and overall improvements to access. The benefits from new bicycle trips are assumed to be directly related to the number of increased secure bicycle parking facilities provided. The benefits assessment presented here assume 85 new secure bicycle parking lockers to be distributed in the green hubs program.

Annual Transit and Auto Trips that Park-and-Ride Benefitted. A major benefit is expected to occur for persons who drive to a bus stop. The existing park-and-ride users will benefit from both an increase in guaranteed transit parking supply (distributed in the transit parking component of the green hubs program), with new park-and-ride users benefitting from additional system parking capacity and faster bus travel speeds making the option of parking and riding transit more attractive.

To assess the benefits, separate calculations are made for those who will relocate their park-and-ride location closer to their homes, and new riders who will be attracted to the bus system. For example, there is an estimated 850 parking spaces that would be created in the aggregate for the

Multi Modal Green Hubs program. Of these, an estimated 500 of these spaces are intended to accommodate overflow parking that occurs on neighborhood streets and in other areas. These spaces are assumed to be used once a day, and each space is assumed to replace two auto trips. The remaining 350 parking spaces made available to new riders that are estimated to instead drive today (because they cannot find parking and because the bus speeds are less desirable); each space is assumed to replace two daily auto trips. All of the trips are adjusted to an annual condition.

Annual Drop-Off, Pick-up and Transferring Passengers Benefitted. The benefit of the programs to drop-off, pick-up and transferring passengers is also significant. In particular, the Multi Modal Green Hubs program specifically calls out the need to have zones for dropping off and picking up bus riders. In addition, the new green hubs and the freeway bus pad improvements can significantly improve the ability for persons to transfer at these locations, and allows the operators to implement services to facilitate these transfers. The programs finally improve the ability for local shuttles and other services to link within the overall program

The estimate of benefitting passengers can be assessed by applying the current proportion of people who use these modes of access to reach the transit system (as determined by mode of access responses to on-board surveys conducted for Marin Transit and Golden Gate Transit in 2008) to the overall ridership by line and stop in the study area.

Annual Boardings Benefitted. The benefit of the program is examined in aggregate by adding all of the modes of access together. In this way, the overall impact of the improvement to riders is recognized.

The number of annual boardings is estimated according to the annual ridership by line, and the proportion of transit boardings that occur at the proposed hub locations. In addition, new riders anticipated from shifting bicyclists, shifting pedestrians, shifting park-and-ride users and shifting drop-off/pick-up users are also added.

There are several sources available to provide the appropriate data. Data on the number of boardings of routes in the study area forms the basis of the analysis. The numbers of persons who board at these locations today are anticipated to benefit. In addition, the number of shifting passengers determined from other modes is added.

Annual Pedestrian Trips Benefiting by Safer At-Grade Crossings. The program includes a number of safety improvements. Safety improvements can take many forms and some are more expensive than others, but generally they involve improved visibility and recognition that bus passengers are often required to cross streets to reach a stop. For this assessment, it is anticipated that every rider must cross the street either when boarding or leaving a bus. Thus, half-of the overall walk-to-transit stop trip activity (discussed above) are anticipated to benefit from safer crossings.

Annual Auto Driver/Passenger Minutes Saved. As noted in the above improvements to modes of access, the programs are anticipated to reduce the amount of time that drivers are spending in their vehicles. The reduction is assumed to be gained from ways in which the various programs attract people to either not drive at all, or drive shorter distances. The industry standard service elasticity of 0.3 (a one percent change in travel speed results in a 0.3 increase in mode share) is applied to develop the general statistics. This is based upon international research

reported in the TCRP (Transit Cooperative Research Program) 95 Report: *Traveler Response to Transportation System Changes*, Chapter 9, entitled "Transit Scheduling and Frequency".

Annual Greenhouse Gas emissions reduced (tons). There is a considerable amount of data about the relationship between greenhouse gas emissions and vehicle miles of travel, with the speed profiles and vehicle mix having a variable affect on each new trip that is no longer made by driving the full distance. The amount of reduction is ultimately related to the type of driving, the type of fuel, the gasoline efficiency of the vehicles, and other technological assumptions. For this assessment, an average benefit has been applied. This benefit relationship (determined by the Regional Planning Partnership examined this relationship for Mercer County, New Jersey in April 2006), showed a reduction of 1.413 pounds of CO_2 for each daily vehicle mile. With 2000 pounds in a ton, it is estimated that each weekday trip mile reduced will yield 0.18 of annual tons reduced. An inverse of that is that an annual ton of CO_2 is reduced for every 5.5 weekday vehicle miles of travel if the ratio is annualized.

The calculation of reduced vehicle miles of travel are related to the minutes saved as calculated in the auto driver minutes saved. It is assumed that each trip has an average speed of 30 miles an hour, so that it assumed to take two minutes to travel one mile.

5.1 Multi-Modal Green Hubs

The Central and Southern Marin Transit Study has a set of proposed recommendations for strategic capital improvements designed to benefit transit users in particular, as well as provide a general benefit to Marin County in the form of fewer vehicle miles of travel and greenhouse gas emissions. The recommended program includes a set of distributed improvements through the study area. Key recommendations include multi-modal green hubs, freeway bus pad and associated ramp improvements, arterial improvements to enhance speed and reliability, enhancements of other key local bus stops, and enhanced specific corridor improvements.

The following details include the assumptions, methodology and sources, and outcomes of potential benefits from implementing the multi-model green hubs.

5.1.1 Anticipated Green Hub Benefits

The multi-modal green hubs are assumed to be distributed throughout Central and Southern Marin to improve transit efficiency and effectiveness, to facilitate transfers between bus routes and other models, to improve travel time, to increase transit usage, and to improve the overall environment. The key components of a typical green hub are assumed to be:

More attractive to transit riders who are pedestrians. The green hubs are assumed to be ADA-compliant, and to contain necessary security, lighting and shelter for persons waiting for the bus or walking to or from the bus in the immediate area.

More attractive to transit riders who are bicyclists. The green hubs are assumed to offer secure bicycle parking in lockers that can be reserved, and the lockers would be placed in a location easily accessible to bicyclists.

More attractive to transit riders that are dropped off or picked up. Each green hub is proposed to have an area where drop-off capacity is available, as well as new pick-up zones to facilitate passenger pick-up This proposal also assumes that taxis can potentially use these areas.

More attractive to transferring passengers. Each hub is assumed to have adequate room to allow for at least two or three buses from Golden Gate Transit, Marin Transit, and/or neighborhood shuttles to provide coordinated transfer points when they occur.

More attractive to transit riders who are also park-and-ride users. The park and ride inventory from Fall 2008, described in Chapter 2, showed a significant latent park-and-ride demand around existing lots. The proposal is to provide guaranteed parking for transit riders as part of a unique hub design requirement for each community; the actual number of park-and-ride spaces would be determined as part of a partnered design and implementation process. Potential parking management techniques would require implementation of a parking permit program by transit users. Each hub is assumed to offer 50 new spaces (this is an average number for the purposes of the benefits analysis – actual numbers would be determined on a site-by-site basis, as described in Chapter 4), and these spaces can be supplied by providing a new park-and-ride area, signing existing on-street or off-street parking for transit users, working with nearby property owners to lease or to allocated parking in nearby privately-owned locations, or transferring the supply to a nearby transit hub where no additional parking capacity is available.

Environmentally sustainable amenities. The amenities that are proposed for the hubs are intended to be done in an environmentally responsible way. The power needed to provide some new amenities would be offset by solar panels. The hub construction would be targeted to use non-toxic materials where possible, and preferably with locally-recycled materials. The overall design of the facilities would be enhanced with careful design to promote as much water retention as possible.

There are an estimated 17 that would be constructed in this program. Of these, some are transit "hubs" today – even the current hubs would be examined to make sure that all of the various connectivity improvements are provided.

5.1.2 Assessment of Benefits of the Green Hubs Program

The annual benefits that are estimated using these methods are shown in Table 5.1. This table summarizes the benefits for both a typical weekday as well as anticipated annual conditions.

As Table 5.1 shows, the overall benefit of the Multi Modal Green Hubs program is estimated to be over 2.6 million transit trips per year. This benefit is great because most transit riders will be using a green hub at some point in their trip.

This is expected to be an improvement in bicycle to transit usage. An estimate 211,000 existing and new bicycle trips are expected to benefit from safer stops as well as secure bicycle parking.

The program will reduce auto driving in two ways. Some people that currently drive to transit will be able to park closer to their homes or use new secured bicycle parking. This results in 870 new weekday transit riders if the additional access capacity is made available for bicyclists and park-and ride users.

Other people that today who do not ride because they cannot find parking will now be able to board the bus sooner, rather than drive the entire distance of their trip. Finally, the program

should result in a shift the modes of access to encourage people to use choose ones that are more environmentally friendly (by shortening some auto trips and eliminating others, as well as facilitating bicycle and pedestrian bus access). The result is an estimated savings of auto passenger minutes of over 3 million during a year.

There is a significant reduction in greenhouse gas emissions. The benefit is estimated at 1,100 tons per year removed by implementing the Multi Modal Green Hubs program.

Table 5.1 Estimated Annual Benefits of Green Hubs

Estimated Annual Benefits of Green Hubs

Category of Benefit	Typical Weekday	Annual
Overall Program (17 Green Hubs Example):		
Bicycle to Transit Trips	830	211,600
Walk to Transit Trips	5,770	1,471,300
Park-and-Ride Transit Trips Shifted to Hubs (Overflow parking from neighborhoods)	500	127,500
Previous Auto Trips Shifted to Park-and-Ride at Hubs (Parking made available)	350	89,300
Other Types of Transit Trips (Drop-off/pick-up/transfer from other buses and shuttles)	2,938	749,200
Trips Benefited at Green Hubs	10,388	2,648,900
Pedestrian Trips Benefiting by Safer At-Grade Crossings	4,779	1,218,700
Auto Driver/Passenger Minutes Saved	12,500	3,187,500
Greenhouse Gas emissions reduced (tons).	4.42	1,100
Single Typical Hub:		
Bicycle to Transit Trips	49	12,447
Walk to Transit Trips	339	86,547
Park-and-Ride Transit Trips Shifted to Hubs (Overflow parking from neighborhoods)	29	7,500
Previous Auto Trips Shifted to Park-and-Ride at Hubs (Parking made available)	21	5,253
Other Types of Transit Trips (Drop-off/pick-up/transfer from other buses and shuttles)	173	44,071
Trips Benefited at a Green Hub	611	155,818
Pedestrian Trips Benefiting by Safer At-Grade Crossings	281	71,688
Auto Driver/Passenger Minutes Saved	735	187,500
Greenhouse Gas emissions reduced (tons).	0.26	64.71

Other qualitative benefits are also likely. These are qualitative because they generally represent opportunities to make new choices, and be more flexible in the services and facilities provided at the Green Hubs. Specifically, these benefits are anticipated:

Improvements to Access Choices for Riders. While the benefit is estimated for each mode, it is noted that there will be improved choices for local residents to get to transit. The benefits are described by mode and these reflect a typical choice access mode, but the programs provide more flexibility so that an individual has a variety of options from one day to the next.

Improved Flexibility for Transit, Shuttle and Taxi Operators. The new connectivity capabilities of the green hubs program can improve the overall environment for transit, shuttle and taxi operations. The operations have more flexibility to implement or target their operations at hubs, allowing for more focused strategies on this interface with their riders.

Potential Benefit of Shared Parking Arrangements. As the parking program is implemented, some communities may find that there is an opportunity to have shared parking arrangements for transit riders and local businesses. In particular, some parking spaces used by transit riders on weekdays can be used for local needs or activities during evenings or weekends.

5.2 Hwy 101 Key Pads and Ramp Transit Program

The current bus pad concept along the Highway 101 corridor in the study area is an effective way to provide accessibility for bus routes heading to and from San Francisco as they travel along the freeway. However, the functionality of these bus pads can be improved. The pads are located in between ramps where persons are driving vehicles at high speeds. There are awkward crosswalks and paths to reach the pads.

The concept is to provide a set of operations improvements to facilitate the overall flow and accessibility of these pads. The improvements will improve transit efficiency and effectiveness through better flow in the stop areas, to facilitate transfers between bus routes and other models, which would then increase transit usage and improve the overall environment.

5.2.1 Anticipated Bus Pad/Ramp Transit Priority Improvement Program Benefits

The key benefits to a typical bus pad are assumed to be:

More attractive to transit riders who are pedestrians. The bus pads are assumed to be ADA-compliant, and to be upgraded and possibly relocated to reduce the walk time required by bus riders to reach the pads.

More attractive to transit riders who are bicyclists. The bus pads will be better designed to have bicycle access to and from the pads. The paths will be better lit and wider.

More attractive to transferring passengers. Each bus pad loading area is assumed to have adequate room to allow for at least two or three buses from Golden Gate Transit, Marin Transit, and/or neighborhood shuttles to prevent traffic from queuing into interchange traffic, as sometimes occurs today.

There are five bus pads in each direction – at Lucky Drive, Paradise Drive, East Blithedale Avenue, Seminary Drive and Spencer Avenue. Of these, the benefits assessment is based on improvements to the two most suitable bus pads where improvements can be made -- at Paradise Drive and East Blithedale Avenue (Tiburon Wye).

Concepts have been developed and are currently being reviewed and revised based upon comments from Caltrans and other staff. The concepts generally focus on three possible options:

- **Option 1:** Pause on-ramp traffic to allow for buses to re-enter traffic from the current pads. In this concept, a signal is installed to temporarily pause on-ramp traffic, much like a ramp meter.

- **Option 2:** Relocate the bus pads to the far side of the interchanges, facilitating safer and closer access to the arterials. In this option, a new bus pad location would be created using the portion of the interchanges that currently have been vacated as a result of eliminating the full cloverleaf interchange design a few decades ago.
- **Option 3:** Route all bus pad buses to the off-ramp, providing a special bus-only lane with transit signal priority to a related stop at the far side of the off-ramp/arterial intersection. Once leaving this stop, the buses can re-enter traffic using the direct on-ramp.

5.2.2 Assessment of Benefits of the Bus Pad/Ramp Transit Priority Program

The annual benefits that are estimated using these methods are shown in Table 5.2. This table summarizes the benefits for both a typical weekday as well as anticipated annual conditions. The annualized numbers provide an explanation of the various benefits shown in each of the identified reporting categories.

This table shows that the program is expected to provide travel time benefits. The pedestrians accessing the bus pads will benefit from shorter distances, safer paths and better connectivity. Those persons riding in buses that stop at the pads will find that the improvements are designed to minimize the potential delay associated with reentering traffic, so that savings of up to a minute for each passenger can be gained. If each user benefits by one minute, almost 700,000 passenger minutes will be saved through this program.

The slightly faster buses will also induce additional demand. 5,100 more riders a year is estimated to be attracted to the improved pads as a result of travel time benefits, with many of those driving longer distances into San Francisco. The result is estimated to save over 200,000 minutes of auto driver time, and thus promoting a savings of 73 tons a year in greenhouse gas emissions, based on the rates that describe the relationship between VMT reduction and emissions as presented in the methodology.

Other qualitative benefits are also likely. These are qualitative because they generally represent opportunities to make the pads safer and more accessible for transit use. Specifically, these benefits are anticipated:

Improved Safety for Riders. The performance measures do not clearly identify the greatest benefit of the program, which is to provide a safer environment for people using the bus pads. The intent is to upgrade the pads where possible to improve the overall access environment, discouraging pedestrians crossing in front of high speed vehicles or walking in areas that are dimly lit.

Improved Flexibility for Transit, Shuttle and Taxi Operators. The new connectivity capabilities of some of the bus pad options can improve the overall environment for transit, shuttle and taxi operations. The operations have more flexibility to implement or target their operations at hubs, allowing for more focused strategies on this interface with their riders.

Table 5.2 Estimated Annual Benefits of Bus Pad Improvements

Estimated Annual Benefits of Bus Pad Improvements

Category of Benefit	Typical Weekday	Annual
Overall Program (4 Bus Pad Improvements Example):		
Annual One-way Transit Trips Benefited (including through trips)	2,687	685,200
Annual Bike to Transit Trips Benefited (only stop activity)	33	8,500
Annual Walk to Transit Trips Benefited (only stop activity)	418	106,600
Annual Auto Trips Captured by Transit	20	5,100
Annual One-way Transit Transfers Benefited (only stop activity)	132	33,600
Annual Pedestrian Trips Benefited by Safer At-Grade Crossing	670	170,800
Annual Transit Passenger Minutes Saved	2,687	685,200
Annual Auto Driver/Passenger Minutes Saved	806	205,600
Annual Greenhouse Gas emissions reduced (tons)	0.28	73
Single Bus Pad:		
Annual One-way Transit Trips Benefited (including through trips)	672	171,300
Annual Bike to Transit Trips Benefited (only stop activity)	8	2,125
Annual Walk to Transit Trips Benefited (only stop activity)	105	26,650
Annual Auto Trips Captured by Transit	5	1,275
Annual One-way Transit Transfers Benefited (only stop activity)	33	8,400
Annual Pedestrian Trips Benefited by Safer At-Grade Crossing	167	42,700
Annual Transit Passenger Minutes Saved	672	171,300
Annual Auto Driver/Passenger Minutes Saved	202	51,400
Annual Greenhouse Gas emissions reduced (tons)	0.07	18

5.3 Arterial Speed and Reliability Program

In general, bus operations in Marin County occur on roadways which are narrow and have short traffic signal cycle times. The need to provide long cross-street green times is somewhat diminished and thus there are not many locations where significant intersection signal delay occurs.

One corridor where delays have been reported by bus drivers and identified by the consultant team is Sir Francis Drake Boulevard between Red Hill Avenue and US Highway 101. The benefits estimated here are based on this corridor to provide an illustrative example of how arterial speed improvements provide benefit.

The example corridor contains approximately 14 signals maintained by the City of San Anselmo and Marin County. The signals on this corridor also have multiple phases (especially for exclusive left-turns) which can lengthen the time it takes for a bus to get past the intersection once stopped. The result is that Golden Gate Transit estimates that it takes up to 19 minutes to travel between the San Anselmo Hub and Eliseo Drive during the morning commute. This distance is approximately 3.4 miles; therefore, the average bus speed is 10.7 miles per hour. This speed is lower than a more standard transit operating speed of 13 to 15 miles per hour.

In general, good transit service design suggests that bus stop placement be reviewed periodically – and that consideration be given to transit signal priority where delays are significant.

The improvements are two-fold: operate more limited stop bus service in the corridor and deploy transit signal priority to reduce travel time to improve transit efficiency and improving the quality of the bus ride for passengers.

Limited-stop buses in the corridor will focus on the Multi-modal Green Hubs program to encourage more users to use these stops, reducing the need to stop at intermediate points. Transit signal priority can be sophisticated and adapt to real-time traffic conditions. The principal behind transit signal priority is not pre-emption (which some signals have for emergency vehicles) but is instead designed to incorporate minor shifts in phasing to allow for buses to move through a corridor more quickly. For example, a side street phase may be delayed by 8 seconds to allow a bus to clear the intersection – but the side street would still have the same total amount of green time and Sir Francis Drake Boulevard would still have the same total amount of green time (including left-turn phases) through a window of two or three complete cycles. Thus, there is no anticipated aggregate decrease in traffic green time – and thus no impact to overall traffic congestion. The most common techniques are to extend the green phase long enough to allow buses to clear (and reducing the next cycle green phase to balance the interruption); or to have a signal phase turn red before a bus gets to the intersection so that the side street green phase will not as significantly delay the buses.

5.3.1 Anticipated Arterial Speed and Reliability Improvement Program Benefits

The key benefits to arterial speed and reliability improvements are assumed to be:

More attractive to all transit riders who travel through the corridor. The ability to speed buses faster through the corridor will reduce the in-vehicle time of all riders, regardless of their mode of access.

More attractive to persons who may be using downstream park-and-ride facilities. Today, the speeds are slow enough that some riders are likely driving downstream to get parking ahead of the bus. If the bus speeds can be improved for the entire trip, there will be a tendency of some people to not seek downstream parking (near the congested parking areas in close proximity to Highway 101) and instead park, bicycle or walk to a closer destination.

Better ability to provide on-time bus service. As traffic flows vary through a congested time period, a delay of just two or three minutes at the beginning of the segment can be compounded by additional stopping to a point where the buses may not operate at posted times. Stopping multiple times – at local bus stops as well as signalized intersections – often results in schedule adherence problems. The result is that there may be a long wait for a bus, and when the bus arrives, it may then be overcrowded. A well-implemented speed and reliability program can reduce the amount of stopping that a bus has to make.

5.3.2 Assessment of Benefits of the Arterial Speed and Reliability Improvements

The annual benefits that are estimated using these methods are shown in Table 5.3. This table summarizes the benefits for both a typical weekday as well as anticipated annual conditions. The annualized numbers provide an explanation of the various benefits shown in each of the categories.

The benefits are estimated from an expectation that the average bus speed will increase from 10.7 miles an hour to 14.6 miles an hour.

The benefits are shown by current riders and their modes of access. Overall, there could be over 474,000 one-way transit trips benefiting from this program – merely from travel time. An additional 11,600 auto trips will shift to transit if the green hubs program were implemented

There is and estimated savings of over 2 million transit passenger minutes through the year. The persons who shift from driving to using transit will reduce the overall minutes saved to about 465,000 as a result of shifting the drivers – many of whom drive to San Francisco. The result is a greenhouse gas emission reduction of 164 tons per year.

Table 5.3 Estimated Annual Benefits of Arterial Speed and Reliability Improvements

Estimated Annual Benefits of Arterial Speed and Reliability Improvements

Category of Benefit	Weekday	Annual
Overall Program (2 Segments of Approx. 1.7 Miles Example):		
Annual Bike to Transit Trips Benefited	93	23,600
Annual Walk to Transit Trips Benefited	1,161	296,000
Annual One-way Transit Trips Benefited	1,860	474,300
Annual Auto Trips Captured by Transit	46	11,600
Annual Transit Passenger Minutes Saved	7,879	2,009,100
Annual Auto Driver/Passenger Minutes Saved	1,825	465,400
Annual Greenhouse Gas emissions reduced (tons)	0.64	164
Typical Improved Segment:		
Annual One-way Transit Trips Benefited	930	237,150
Annual Bike to Transit Trips Benefited	46	11,800
Annual Walk to Transit Trips Benefited	580	148,000
Annual Auto Trips Captured by Transit	23	5,800
Annual Transit Passenger Minutes Saved	3,939	1,004,550
Annual Auto Driver/Passenger Minutes Saved	913	232,700
Annual Greenhouse Gas emissions reduced (tons)	0.32	82

In addition to these quantitative benefits, the program will also provide an important cost savings to the transit operators. The operators will be able to make trips faster, providing an opportunity to extend the number of route miles of a particular route, reduce the number of hours that a driver has to be working, have more ability to guarantee timed-transfers, or allow for fewer buses to be assigned to a route while keeping the same headway. These benefits will depend on service refinements made by operators once the faster service is possible.

5.4 Local Stop Quality Enhancement Program

There are bus stops located throughout the study area where the conditions at the stop are not desirable. Passengers may have no paved space to wait for a bus, no shelter or no sidewalk to reach the bus. Even though the green hubs program is designed to provide an alternative for bus riders, some riders will still need to use bus stops located in other places. The program assumes that highly-used bus stops would also be enhanced.

The consultant team canvassed the study area and identified 22 locations other than green hubs where major bus stops would be designated. These stops may be use if limited-stop bus services are established in a corridor.

The typical components of an enhanced bus stop include paved waiting areas, appropriate crosswalks that are compatible with Americans with Disability Act (ADA) Guidelines, other low-scale design improvements to make them attractive and a bus shelter.

5.4.1 Anticipated Local Stop Quality Enhancement Program Benefits

The major benefit to this program is expected to be those users of the system today. The enhancement program will make local bus stop more accessible (with the design upgrades) and be more visible to transit users. The enhancements may also involve providing better sidewalks and waiting areas, keeping waiting passengers out of the dirt and mud. The enhancement may also provide better lighting to the bus stop so that waiting passengers can be seen.

5.4.2 Assessment of Benefits of the Local Stop Quality Enhancement Program

The annual benefits that are anticipated are shown in Table 5.4. This table summarizes the benefits for both a typical weekday as well as anticipated annual conditions. The annualized numbers provide an explanation of the various benefits shown in each of the categories identified in April 2009. As this table shows, over 1,000 trips a day will benefit from the enhanced bus stops, or over 300,000 passengers a year. About one-third of these will benefit from safer crossings.

In addition to these quantitative benefits, a qualitative benefit is expected in generally more public awareness to the transit stop location so that they will be more likely to consider trying transit in the future.

Table 5.4 Estimated Annual Benefits of Local Stop Quality Enhancement Program

Estimated Annual Benefits of Local Stop Quality Enhancement Program

Category of Benefit	Weekday	Annual
Annual One-way Transit Trips Benefiting (all modes) from Safer Stop Environment	1,189	303,100
Annual Walk-to-Transit Trips Benefiting from Safer Crossings	371	94,600

5.5 Key Bidirectional Corridor Enhancements

The Key Bidirectional Corridor Enhancements require further analysis, planning and refinement to determine the scale and location of future investments, and were excluded from the benefits assessment in this Chapter of the report and from the prioritized recommendations evaluation in Chapter 6.

5.6 Summary of Benefits

The benefits listed here provide an illustrative picture of the various components of the program. Table 5.5 compiles these findings into a summary table. As this table shows, the annual benefit will accrue to almost 3.6 million passengers a year. About 1.5 million passengers a year will benefit from safer crossings.

There will be a significant savings in auto driver minutes resulting from shifts to transit use. The estimated benefit is almost 4 million minutes a year, resulting in an estimated savings of 1,337 tons of greenhouse gas emission reduction.

Table 5.5 Aggregated Benefits

Aggregated Benefits

Category of Benefit	Green Hubs Program	Ramp TSP/ Bus Pads Improvement Program	Arterial Speed and Reliability Program	Enhanced Local Stops Program	Total Benefit
Bicycle to Transit Trips	211,600	8,500	23,600	NA	243,700
Walk to Transit Trips	1,471,300	106,600	296,000	189,200	2,063,100
Drop-Off/Pick-Up/Transfer Transit Trips	749,200	22,200	61,700	0	833,100
Total Transit Trips	2,648,900	170,800	474,300	303,100	3,597,100
Pedestrian Trips Benefiting by Safer At-Grade Crossings	1,218,700	170,800	NA	94,600	1,484,100
Auto Driver/Passenger Minutes Saved	3,187,500	205,600	465,400	NA	3,858,500
Greenhouse Gas emissions reduced (tons).	1,100	73	164	NA	1,337

The same data can be examined on a typical improvement basis. This summary information is shown in Table 5.6. This shows that each improvement individually yields benefit in a number of areas, and that the reduction in auto driver trips and greenhouse gas emission reduction are more comparable on a unit basis. The lowest cost benefits – the local stop enhancements – benefit the least people on a per installation basis, while the green hubs and the arterial speed and reliability improvements programs tend to benefit the most. While the bus pad improvements do not show as much of a benefit on a unit basis, it is noted that they do provide a significant benefit to safety and security – key issues which both policymakers and the public alike have identified during the Study as important non quantifiable benefits resulting from the improvements program.

Table 5.6 Summary of Benefits by Typical Individual Site

Summary of Benefits by Typical Individual Site

Category of Benefit	Typical Green Hub	Typical Ramps/ Bus Pads	Typical Arterial Speed Improvement	Typical Enhanced Local Stop
Number of Sites in Program	17	4	2	22
Bicycle to Transit Trips	12,447	2,125	11,800	NA
Walk to Transit Trips	86,547	26,650	148,000	8,600
Drop-Off/Pick-Up/Transfer Transit Trips	44,071	5,550	NA	0
Total Transit Trips	155,818	42,700	237,150	13,777
Pedestrian Users benefitted by Safer At-Grade Crossings	71,688	42,700	NA	4,300
Auto Driver/Passenger Minutes Saved	187,500	51,400	232,700	NA
Greenhouse Gas emissions reduced (tons).	65	18	82	NA

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a set of conclusions and final recommendations, building on the findings of the Benefits Assessment described in Chapter 5.

6.1 Conclusions

Central and Southern Marin has a highly developed local and regional transit system that currently provides level of service which broadly match the characteristics and travel markets of the current arterial and Hwy 101 corridors. The five-ten year future is likely to see slow growth in the Study area and a flat demand for the traditional San Francisco-bound commute.

The focus of the improvements therefore is on improving the attractiveness of transit to choice and transit-dependent riders by providing the infrastructure to reduce intra-Marin transit travel times, facilitate local and regional transfers, and focusing these investments directly at the users in each community across Southern Marin.

Five transit improvement programs were developed in the Central and Southern Marin Transit Study including:

- Multi-Modal Green Hub Program
- HWY 101 Key Pads and Ramp Transit Program
- Arterial Speed and Reliability Program
- Local Stop Enhancement Program
- Key Bidirectional Corridor Enhancements

The first four programs are highly interrelated, reinforcing overall transit efficiency, effectiveness, and marketability benefits, as well as supporting congestion management, air quality and community livability ideals. In an ideal world a comprehensive, phased corridor by corridor improvement plan would be developed and implemented that integrated elements of the Multi-Modal Green Hub, HWY 101 Key Pads and Ramp, Arterial Speed and Reliability, and Local Stop Enhancement Programs. However, the current funding realities and multi-jurisdiction responsibilities necessitate a more modest approach to the implementation of these strategies. A realistic implementation strategy is reflected in the Study recommendations.

Three Bidirectional Corridor Enhancement initiatives were identified during the Central and Southern Marin Transit Study. These included the following:

- Muir-Sausalito-Mill Valley Welcome Service
- Canal-Downtown San Rafael-San Anselmo Rapid Service
- Larkspur Area Hub Connections

All three are subject to further demand analysis and service planning efforts. In the case of the Larkspur Area Hub Connections initiative, further assessment will be conducted in conjunction with SMART station area planning and assessment of shuttle bus requirements.

With the exception of the Key Bidirectional Corridor Enhancement initiatives, the four interrelated enhancement programs were evaluated using the following benefit measures:

- Annual bicycle to transit trips served.
- Annual walk to transit trips served.
- Annual auto trips to existing park-and-ride captured by transit at hubs.
- Annual bus boardings served.
- Annual pedestrian users benefited by safer at-grade crossings.
- Annual auto driver/passenger minutes saved.
- Annual greenhouse gas emissions reduced (tons)
- Annual one-way transit transfers served.

The benefit analysis methodology and findings are detailed in Chapter 5 of this report. Table 6.1 provides a summary of benefits by measure by program. Table 6.2 provides a summary of benefits by measure for individual improvement site for each program category.

Table 6.1 Aggregated Benefits by Enhancement program

Aggregated Benefits by Enhancement program

Category of Benefit	Green Hubs Program	Ramp TSP/ Bus Pads Improvement Program	Arterial Speed and Reliability Program	Enhanced Local Stops Program	Total Benefit
Bicycle to Transit Trips	211,600	8,500	23,600	NA	243,700
Walk to Transit Trips	1,471,300	106,600	296,000	189,200	2,063,100
Drop-Off/Pick-Up/Transfer Transit Trips	749,200	22,200	61,700	0	833,100
Total Transit Trips	2,648,900	170,800	474,300	303,100	3,597,100
Pedestrian Trips Benefiting by Safer At-Grade Crossings	1,218,700	170,800	NA	94,600	1,484,100
Auto Driver/Passenger Minutes Saved	3,187,500	205,600	465,400	NA	3,858,500
Greenhouse Gas Emissions Reduced (tons).	1,100	73	164	NA	1,337

Table 6.2 Summary of Program Benefits by Typical Individual Site

Summary of Program Benefits by Typical Individual Site

Category of Benefit	Typical Green Hub	Typical Ramps/ Bus Pads	Typical Arterial Speed Improvement	Typical Enhanced Local Stop
Number of Sites in Program	17	4	2	22
Bicycle to Transit Trips	12,447	2,125	11,800	NA
Walk to Transit Trips	86,547	26,650	148,000	8,600
Drop-Off/Pick-Up/Transfer Transit Trips	44,071	5,550	NA	0
Total Transit Trips	155,818	42,700	237,150	13,777
Pedestrian Users benefitted by Safer At-Grade Crossings	71,688	42,700	NA	4,300
Auto Driver/Passenger Minutes Saved	187,500	51,400	232,700	NA
Greenhouse Gas emissions reduced (tons).	65	18	82	NA

As Table 6.1 shows, the annual benefit will accrue to almost 3.6 million passengers a year. About 1.5 million passengers a year will benefit from safer crossings. There will be a significant savings in auto driver minutes resulting from shifts to transit use. The estimated benefit is almost 4 million minutes a year, resulting in an estimated savings of 1,337 tons of greenhouse gas emission reduction.

Table 6.2 shows that each improvement individually yields benefit in a number of areas, and that the reduction in auto driver trips and greenhouse gas emission reduction are more comparable on a unit basis. The lowest cost benefits – the local stop enhancements – benefit the least people on a per installation basis, while the green hubs and the arterial speed and reliability improvements programs tend to benefit the most. While the bus pad improvements do not show as much of a benefit on a unit basis, it is noted that they do provide a significant benefit to safety and security – key issues which both policymakers and the public alike have identified during the Study as important non quantifiable benefits resulting from the improvements program.

6.1.1 Implementation and Jurisdiction

Implementation of the five programs will involve a number of jurisdictions responsible for supporting follow-up activities, operations and maintenance, and development. Table 6.3 provides a summary of the jurisdictions that will be involved in the implementation of the various programs. Jurisdictional involvement will vary from candidate site to candidate site depending on location and the nature of the site improvement.

Table 6.3 Summary of Agencies and Jurisdictions Potentially Involved in Planning and Implementation of Central and Southern Marin County Transit Enhancements

Enhancement Program	Jurisdictions Involved in Implementation*
Multi-Modal Green Hubs	TAM, GGT, Marin Transit, Caltrans, County of Marin, Marin College, the Cities of San Rafael, Mill Valley, Larkspur and Sausalito, the Towns of Fairfax, San Anselmo, Tiburon, as well as private property owners.
Hwy 101 Key Pads & Ramps Transit Program	TAM, GGT, Marin Transit, Caltrans, County of Marin, Town of Corte Madera.
Arterial Speed and Reliability Program	TAM, GGT, Marin Transit, Caltrans, County of Marin, the Cities of San Rafael, Larkspur and Mill Valley, and the Towns of Fairfax, San Anselmo, and Ross.
Local Stop Enhancement Program	TAM, GGT, Marin Transit, County of Marin, the Cities of San Rafael, Larkspur, Sausalito and Mill Valley, and the Towns of Fairfax, San Anselmo, Tiburon, and Ross. In some cases private developers may be involved.
Key Bidirectional Corridor Enhancements	SMART, TAM, GGT, Marin Transit, County of Marin, the Cities of San Rafael, Larkspur, Sausalito and Mill Valley, the Towns of Fairfax and San Anselmo, as well as the National Parks Service.

* Local jurisdictional involvement will be dependent on specific improvement site location.

6.2 Study Recommendations

The Study Benefits Assessment identified the quantifiable (hard) benefits from the development of the full five-category program of transit improvements. In addition to the quantified benefits, non-quantified factors will also influence the priority and sequence of project delivery. These factors include the following, as described in the previous chapter:

- Funding Availability
- Project Eligibility for available funding
- Fit with existing TAM and local and regional program priorities

The recommendations within the five program categories reflect the hard and soft factors and are described in Table 6.4. For each program category, the recommendations are structured to reflect the key steps in the chronology of taking the projects forward. Each begins with a recommendation supporting follow-up activity: this establishes the principle of policymaker support for each program element which has a need for the agreement or support of TAM, and where appropriate, the other relevant partners.

Table 6.4 Central and Southern Marin Transit Study RECOMMENDATIONS

Program Element	*TAM Board Recommended Action*	**Recommendations** (all Responsible Agencies)	Participating Agency
Multi Modal Green Hubs	*Approve recommendation to support two Pilot Programs with the participating jurisdictions and Transit Operators .(e.g. City of Mill Valley identifying preferred locations for Pilot Program of initial two Multi Modal Green Hubs .)*	MMGH1 Support a Multi Modal Green Hubs program as a key component of future transit infrastructure in Central & Southern Marin	TAM
		MMGH2 Prioritize the development of the Multi Modal Green Hubs in accordance with local jurisdictions' priorities and readiness	TAM/Local/GGT/MCTD
		MMGH3 Support a Multi Modal Green Hubs Pilot Program at a minimum of two sites (e.g. in Mill Valley, in collaboration with the Miller Ave. Design Study)	TAM/City of Mill Valley/GGT/MCTD
		MMGH4 Identify the Multi Modal Green Hub Pilot Program's property, access, construction and ongoing maintenance requirements	TAM/City of Mill Valley/GGT/MCTD
		MMGH5 Establish a Guaranteed Transit Parking Program as a supporting element of the Multi Modal Green Hubs program	TAM/City of Mill Valley
		MMGH6 Deliver a Multi Modal Green Hub Pilot Program of early starts at a minimum of two sites	
Arterial Speed and Reliability Program	*Approve recommendation to support Marin County and Local Jurisdictions to undertake necessary technical analysis to establish transit priority measures on relevant segments of Sir Francis Drake Blvd.*	ASR1 Support a multi-corridor Arterial Speed and Reliability Program as a key component of future transit development in Central & Southern Marin	TAM/Local/GGT/MCTD
		ASR2 Establish a working group comprising TAM, Marin Co. and local jurisdictions to develop a memorandum of understanding (MOU) governing development and implementation of the Arterial Speed and Reliability Program	TAM/Marin Co./Local
		ASR3 Agree lead agency to undertake necessary additional operational analysis to develop a first phase of a corridor system management plan	TAM/Marin Co./Local
Hwy 101 Key Pads and Ramps Program	*Approve recommendation to support Caltrans and Transit Operators to undertake necessary operational and technical analysis to establish Tiburon Wye as a Pilot Program site.*	KPR1 Support a Key Bus Pads Development Program as a key component of future transit infrastructure in Central & Southern Marin	TAM/GGT/MCTD/Caltrans
		KPR2 Establish a working group comprising TAM, Caltrans and local jurisdictions to refine the operational concept for enhanced bus pads and ramps	TAM/GGT/MCTD/Caltrans
		KPR3 Establish Key Bus Pads Pilot Program at a minimum of one site (e.g. Tiburon Wye or Paradise)	TAM/GGT/MCTD/Caltrans
		KPR4 Undertake the necessary Caltrans processes (PSR, PA/ED) to deliver first Key Bus Pads Development Program site	TAM/GGT/MCTD/Caltrans
		KPR5 Deliver the first Key Bus Pads Pilot Program site project (e.g. Tiburon Wye or Paradise)	TAM/GGT/MCTD/Caltrans
Local Stop Enhancement Program	*Approve recommendation to participate as a member of Technical Advisory Committee (TAC) member in Local Stop Enhancement Program and assist in development of funding program.*	LSE1 Support a Local Stop Enhancement Program as a key component of future transit infrastructure in Central & Southern Marin	TAM/GGT/Local
		LSE2 Develop a priority list of local stops for enhancement in accordance with local jurisdictions' priorities, in coordination with Golden Gate Transit and Marin Transit	TAM/Local/GGT/MCTD
		LSE3 Adopt an Enhanced Local Stops amenities policy, accordance with Golden Gate Transit and Marin Transit local stop policies	TAM/GGT/MCTD
		LSE4 Deliver Local Stop Enhancement Program, accordance with Golden Gate Transit and Marin Transit bus stop policies	TAM/GGT/MCTD
Key (Bidirectional) Corridor Enhancements	*Approve recommendation to support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor*	KCE1 Support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor	TAM/Local
		KCE2 Undertake a Market Demand Analysis for additional transit service on the Mill Valley-Sausalito Welcome Corridor	MCTD/Co.
		KCE3 Based on the results of demand analysis, develop 2-year pilot of an enhanced transit service (potentially seasonal) on the Mill Valley-Sausalito Welcome Corridor, connecting local service with Muir Woods and Fort Baker services	MCTD/Local
		KCE4 Prepare a Canal-San Anselmo Corridor transit development plan for increased service on the corridor	TAM/MCTD/Local
		KCE5 Prepare a Station Transit Facilities and Service Plan in conjunction with SMART for future service linking the Larkspur SMART station, the Sir Francis Drake corridor and Larkspur Landing/Golden Gate Ferry Terminal	TAM/SMART/Local

6.2.1 Funding and Program Implementation

The Study Recommendations were subject to a review of potential existing revenue sources and project elements that might be eligible for those sources at Federal, State and Regional/Local levels, excluding the majority of TAM's existing Measure A expenditure program, which is nearly fully committed in the near term.

Funding the recommended transit improvements presents near term challenges, but opportunities from existing sources are available, particularly over the mid to longer-term. Clearly, the current economic climate impacts funding availability for the recommended transit improvements. Local and State revenues have slowed, and certain transit revenues have been re-allocated within the State budget for purposes not traditionally funded with transit dollars. Specifically, Transit Development Act (TDA) funds (sales tax based revenues) have declined and State Transit Assistance (STA) funds have been eliminated from the state budget for the next five years. To address these revenue shortfalls, Marin Transit and Golden Gate Transit implemented service reductions during the course of this study and these reductions were incorporated into the baseline assumptions in the study. Even with these reductions transit operators are likely to face potential service cuts and fare increases to balance budgets in the next few years.

Near-term funding uncertainty is compounded by the status of the federal transportation bill reauthorization. The current bill, SAFETEA-LU, will expire on September 30, 2010. A new five year reauthorization is in the planning stages; however, it is unlikely to be in place before SAFETEA-LU expires requiring an extension of the current bill. This uncertainty in federal transit funding sources burdens the regional allocation process and makes predicting funding availability for the Southern and Central Marin Transit Study improvements difficult.

As shown in Table 6.5, there are several sources that may provide funding opportunities. The table includes sources of funds that may be eligible for elements of the recommended program; however, funds may not necessarily be available. For example, FTA Section 5307 and Section 5309 funds are eligible for use on several project elements. These sources are subject to regional priorities established by MTC and by transit operators' priorities and may not be available for use on the recommended projects in the foreseeable future. Additionally, while certain sources may be eligible for the recommended projects, they may not be available due to state and federal budget constraints. As such, the table provides a starting point for further analysis and for building project funding plans.

Generally it is unlikely that a single source will fund projects within the recommended improvements; rather, a mix of funding targeted to capital project elements will be required. For example, several bicycle and pedestrian sources are available for those elements of the recommended projects. That funding, coupled with other transit funding could make the project financially feasible in the near-term or mid-term. Additionally, partnering with Marin Transit and Golden Gate Transit will be required to integrate project elements into existing funding plans and to assist in obtaining transit funding available in the region. To achieve maximum results, the Southern and Central Marin Transit Study recommendations will need to be considered in the capital priorities for the transit operators.

Table 6.5 summarizes the sources and potentially eligible program capital cost elements.

Table 6.5 Funding Sources and Potentially Eligible Program Capital Cost Elements

Name	Source	Administered by	Category	Supports	Who May Apply?	Potentially Eligible Central & Southern Marin Transit Study Capital Elements	Funding Availability	Funding Timeline
FEDERAL								
SAFETEA-LU -- Congestion Mitigation and Air Quality Improvement Program (CMAQ)	FHWA	MTC	TR/B/P	Improved air quality through support of transit capital, operating expenses for first three years of new transit services, and bicycle and pedestrian facilities.	State DOT's, MPOs, transit agencies.	**All MMGH: Bike Parking; add capacity for Short Stay Pickup, Drop-Off, Bus-Bus Transfer, Neighborhood Shuttle/Shared Ride Transfer; Transit Parking Management; Security, Lighting, Shelter, Facilities. All LSE: Priority ltd express bus stops; bus stop investments. All KCE: Welcome Service; Rapid Service, Hub Connections.**	Subject to Federal reauthorization; MTC is considering how program extension would be allocated.	Reauthorization or extension of program to be determined by September 2009.
SAFETEA-LU -- STP/CMAQ Program: Local Streets and Roads Rehabilitation Shortfall	FHWA	MTC/CMAs	A&T	Funds are distributed to the County Congestion Management Agencies (CMAs) for programming to local streets and roads rehabilitation projects.	Local Agencies.	**All ASR: Transit Signal Priority, Roadway/Intersection Reconfiguration.**	Subject to Federal reauthorization; MTC is considering how program extension would be allocated.	Reauthorization or extension of program to be determined by September 2009.
SAFETEA-LU -- STP/CMAQ Program: Transit Capital Rehabilitation Shortfall	FHWA	MTC/CMAs	TR	For transit capital projects.	Operators. MTC sets aside these funds to meet high-scoring transit capital shortfall needs.	**Only Transit capital projects that would be proposed by a transit operator within MMGH, KPR, LSE and KCE.**	Subject to Federal reauthorization; MTC is considering how program extension would be allocated.	Reauthorization or extension of program to be determined by September 2009.
SAFETEA-LU -- STP/CMAQ Program: Transportation for Livable Communities/Housing Incentive Program (TLC/HIP)	FHWA	MTC/CMAs	TR/B/P/A&T	The TLC/HIP is a grant program intended to help municipalities plan and construct community-oriented transportation projects.	Local Agencies.	**MMGH and Larkspur area Hub Connections if improvements are making communities more livable by improving access to transit from retail, residential and commercial areas.**	Subject to Federal reauthorization; MTC is considering how program extension would be allocated.	Reauthorization or extension of program to be determined by September 2009.
SAFETEA-LU -- STP/CMAQ Program: Regional Bicycle and Pedestrian Program	FHWA	MTC/CMAs	B/P	This program is designed to fund regionally significant bicycle and pedestrian projects.	Local Agencies.	**Bike Parking.**	Subject to Federal reauthorization; MTC is considering how program extension would be allocated.	Reauthorization or extension of program to be determined by September 2009.
SAFETEA-LU -- Safe Routes to School	FHWA	Caltrans	B/P	For infrastructure related projects: planning, design, and construction of projects that substantially improve the ability of students to walk and bicycle to school. Must be within approximately 2 miles of a school.	State, local, and regional entities; nonprofits; schools.	**MMGH projects to the extent that they serve schools and provide ped and bike improvements.**		
FTA Section 5307 Formula Grant Program	FTA	MTC	TR	In general, large urbanized area formula funds can be used for transit capital purposes only.	Formula distribution/transit operators.	**Only Transit capital projects that would be proposed by a transit operator within MMGH, LSE, KCE.**	*Available to the extent not fully programmed by GGT*	MTC is currently programming FY 12-14

Name	Source	Administered by	Category	Supports	Who May Apply?	Potentially Eligible Central & Southern Marin Transit Study Capital Elements	Funding Availability	Funding Timeline
FTA Section 5307 Transportation Enhancements	FTA	MTC	TR/B/P	In urbanized areas, with populations over 200,000, operators are required to set aside 1 percent of Section 5307 money for Transportation Enhancements, which can include bus stop improvements and improved bicycle and pedestrian access to transit.	Transit operators.	**Elements of MMGH and LSE projects that would be proposed by transit operators.**	*Available to the extent not fully programmed by GGT*	MTC is currently programming FY 12-14
FTA Section 5309 Capital Program	FTA	MTC	TR	In large urbanized areas only, used for capital purposes on fixed guideway transit services such as rail, ferry, cable cars, and buses operating in exclusive rights of way.	Distributed to regions on an urbanized area formula.	**Only Transit capital projects that would be proposed by a transit operator within MMGH, LSE, and KCE.**	*Available to the extent not fully programmed by GGT*	MTC is currently programming FY 12-14
FTA Section 5317 New Freedom Program	FHWA/FTA	MTC	TR	Transportation services directed to elderly and disabled that go beyond those required by the Americans with Disabilities Act (ADA).	Public agencies and nonprofits.			
Hazard Elimination Safety Program/HSIP	FHWA	Caltrans	TR/A&T	Safety improvements on roadways and highways.	Local agencies	**All KPR programs: pedestrian ramp crossings, ramp transit signal priority, bus pad access reconfiguration.**		
American Recovery and Reinvestment Act - Various Programs	USDOT	Various Agencies - FHWA, FTA, MTC	TR/B/P/A&T	Immediate implementation of highway, transit, streets and roads projects	Various agencies - Caltrans, MTC, cities and counties	**Potentially all capital elements recommended in the study.**	Formula funding already committed for most transit and streets and roads programs.	Most competitive program deadlines have passed or are within the next 4 months.
STATE								
Transportation Development Act/State Transit Assistance Funds (TDA/STA)	State Sales Tax/Gasoline Tax revenues	MTC	TR	Capital and operating expenses.	Transit operators.	**Only Transit capital projects that would be proposed by a transit operator within MMGH, LSE, KCE.**	TDA fully programmed by GGT and MT for the next several years; no STA funds available for the next 5 years.	Funding provided annually
TDA Article 3 Funds	State Sales Tax	MTC/CMAs	B/P	Transportation projects. 2% of County funds set aside for bicycle and pedestrian projects.	City and counties.	**Bike parking, pedestrian activated ramp crossings, bus pad access reconfiguration.**	Currently committed to Class 1 Bike Paths	No funding capacity expected for 2-3 years
Caltrans Community Based Transportation Program (CBTP)	State	Caltrans	TR/B/P/A&T	Integration of land use and transportation planning and alternatives to address growth.	Local agencies.	**To the extent the Canal CBTP identified improvements included in the Corridor Enhancements.**	Approx. $3 m statewide in FY10.	Annually.
Bicycle Transportation Account (BTA)	State	Caltrans	B	Improve safety and convenience for bicycle commuters.	City and County projects.	**Bike parking, pedestrian activated ramp crossings, bus pad access reconfiguration.**	Approx. $7.2 m statewide in FY 11	Annually; next Call for Projects scheduled for December 2009
Office of Traffic Safety	State	Caltrans OTS	B/P	Pedestrian/bicycle safety a priority.	Public agencies.	**Bike parking, pedestrian activated ramp crossings, bus pad access reconfiguration.**		Annually released every November. Apps due in January.

Name	Source	Administered by	Category	Supports	Who May Apply?	Potentially Eligible Central & Southern Marin Transit Study Capital Elements	Funding Availability	Funding Timeline
Safe Routes to School (SR2S)	State	Caltrans	B/P	Infrastructure projects that improve safety and efforts that promote walking and bicycling, within two miles of a school.	Cities and counties.	**MMGH projects to the extent that they serve schools and provide ped and bike improvements.**		
STIP - RTIP	State Highway Funds	CMAs/CTC	TR/A&T	Local transportation projects programmed at the county level.	Local agencies.	**All KPR.**	Committed to Marin Sonoma Narrows project	FY 2018 and beyond
STIP TE	State Highway Funds	CMAs/CTC	B/P	Enhancement activities include pedestrian and bicycle facility improvements, landscaping, scenic beautification.	Local agencies.	**Bike parking, pedestrian activated ramp crossings, bus pad access reconfiguration.**		FY 2018 and beyond
SHOPP – State Highway Operation and Protection Program	State Highway Funds	Caltrans/CTC	A&T	Collision reduction, bridge preservation, roadway preservation, roadside preservation, mobility enhancement and preservation of other transportation facilities related to the state highway system. Projects must have a Caltrans completed Project Initiation Document.	Caltrans.	**All KPR.**	Subject to the State budget and the STIP fund estimate released every 2 years.	The SHOPP is programmed as part of the STIP. 2010 STIP covers FY 2010-11 to FY 2013-14.
Proposition 1B/Traffic Light Synchronization Program	Bond proceeds.	Caltrans	TR/A&T	Traffic light synchronization projects or other technology based improvements to improve safety, operations, and the effective capacity of local streets and roads.	Cities, Counties and regional agencies	**Transit Signal Priority.**		
REGIONAL/LOCAL								
Lifeline Transportation Program	CMAQ, JARC, and STA	MTC and CMAs	TR	Community based transportation projects focused on low income communities.	Local agencies.			
Transportation Fund for Clean Air (TFCA)	Regional tax on motor vehicles	BAAQMD and CMAs	TR/B/P	Purchase or lease of clean fuel buses, clean air vehicles, ridesharing programs, bicycle facility improvements, dissemination of transit information.	Public agencies, nonprofits.	**Bike Parking.**	$350,000 per year in Marin County (Program Manager funds); $10 million per year regionally for competitive program	Next Call for Projects for Program Manager funds scheduled for January 2010
Transportation Fund for Clean Air (TFCA) - Marin County Bicycle Parking Program	Regional tax on motor vehicles	County of Marin	B	Bicycle racks and lockers provided at a discount	Public agencies, nonprofits, private agencies located in Marin County.	**Bike Parking.**	$225 per bike rack; $900-$1,800 per locker	Available year round
Safe Routes to Transit	RM2	TransForm (Formerly Transportation and Land Use Commission)	B/P	Enhance pedestrian and bicycle access to regional transit station in order to reduce congestion on one or more state toll bridges.	Public agencies in the nine Bay Area Counties.	**All MMGH bicycle elements that link to regional transit service.**	$4.1 m available in the Region for FY 09 Call for Projects	Call for Projects in June 2009, June 2011, June 2013.

Name	Source	Administered by	Category	Supports	Who May Apply?	Potentially Eligible Central & Southern Marin Transit Study Capital Elements	Funding Availability	Funding Timeline
San Francisco Bay Trails Project		ABAG	B/P	Regional hiking and biking trails around the San Francisco and San Pablo bays.	Cities, Counties, and districts with planned trails.			
TAM Measure A – Safe Routes to Schools	TAM Measure A	TAM	B/P	Technical assistance to identify and remove the barriers to walking, biking, carpooling, or taking transit to school as well as classroom education, special events, and incentives for choosing alternative modes to schools.	Local agencies, schools, non profits, community organizations.	**MMGH projects to the extent that they serve schools and provide ped and bike improvements.**	$44.0 m available for school related congestion and safer access to schools for FY05 to FY25.	Call for Projects occurs annually.

Categories:
TR -- Transit
B -- Bicycle
P -- Pedestrian
A&T -- Auto and Truck

Acronyms:
DOT -- Department of Transportation
MPO -- Metropolitan Planning Organization
STIP -- Statewide Transportation Improvement Program
MTC -- Metropolitan Transportation Commission

Program Elements:
MMGH – Multi Modal Green Hubs
ASR – Arterial Speed and Reliability Program
KPR – Hwy 101 Key Pads and Ramps Program
LSE – Local Stop Enhancement Program
KCE – Key (Bidirectional) Corridor Enhancements

6.2.2 Recommended Pilot Program

Two Pilot Programs are also contained within the overall recommendations, for the Multi Modal Green Hubs and the Key Pads and Ramps Program. These Pilot Programs have emerged during the latter part of the Study as potential early implementation opportunities with willing local partners. They also provide an opportunity to test the transit improvement concepts with current Golden Gate Transit and Marin Transit services at a limited number of local sites which can incorporate all elements of each facility (for example, for the Multi Modal Green Hubs Pilot, the guaranteed transit parking program, a new concept for Marin, would be part of a pilot, combined with local-regional timed transfers, enhanced secure bike parking, dedicated "park & call", all within an attractive secure new facility). The Pilot sites also enable the participating agencies to refine these working concepts before their wider rollout across Central and Southern Marin.

6.2.3 Prioritized Action Recommendations

The Study scope sought prioritized recommendations for both TAM and its participating partner agencies. The full list of recommendations was subject to an evaluation using the criteria of funding availability, expressions of agency and/or jurisdictional interest and the findings from the Study Benefits Assessment relating to ridership, travel time, greenhouse gas emissions cost per trip. Figure 6.1 provides the summary of the results of this evaluation as they relate to the five program categories and the specific TAM Board Action Recommendations.

The detailed recommendations were also evaluated and prioritized within the individual Transit Improvement Programs. Figure 6.2 provides the full table detailing the evaluation and priorities.

Figure 6.1 Prioritized Transit Improvement Programs and TAM Board Action Recommendations

Program Element	Program PRIORITY	*TAM Board Recommended Action*
Multi Modal Green Hubs	❶	*Approve recommendation to support two Pilot Programs with the participating jurisdictions and Transit Operators .(e.g. City of Mill Valley identifying preferred locations for Pilot Program of initial two Multi Modal Green Hubs .)*
Arterial Speed and Reliability Program	❷	*Approve recommendation to support Marin County and Local Jurisdictions to undertake necessary technical analysis to establish transit priority measures on relevant segments of Sir Francis Drake Blvd.*
Hwy 101 Key Pads and Ramps Program	❸	*Approve recommendation to support Caltrans and Transit Operators to undertake necessary operational and technical analysis to establish Tiburon Wye as a Pilot Program site.*
Local Stop Enhancement Program	❹	*Approve recommendation to Participate as a member of Technical Advisory Committee (TAC) member in Local Stop Enhancement Program and assist in development of funding program.*
Key (Bidirectional) Corridor Enhancements	(Further Study Prior to Implementation)	*Approve recommendation to support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor*

Figure 6.2 Prioritized Transit Improvement Detailed Recommendations and Evaluation

					Detailed Evaluation Based On Individual Site Improvements					
Program Element	**Program PRIORITY**	***TAM Board Recommended Action***	**Recommendations** (all Responsible Agencies)	Individual Element PRIORITY	**Funding Readiness***	**Expressions of Local Interest**	**Greatest Ridership Impact**	**Auto Driver/Passenger Travel Time Savings**	**Greenhouse Gas Emissions Reductions**	**Cost/One Way Passenger Trip****
Multi Modal Green Hubs	❶	*Approve recommendation to support two Pilot Programs with the paticipating jurisdictions and Transit Operators .(e.g. City of Mill Valley identifying preferred locations for Pilot Program of initial two Multi Modal Green Hubs .)*	**MMGH1** Support a Multi Modal Green Hubs program as a key component of future transit infrastructure in Central & Southern Marin	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation
			MMGH2 Prioritize the development of the Multi Modal Green Hubs in accordance with local jurisdictions' priorities and readiness	①	✓	✓	✓✓	✓✓	✓✓	✓✓✓
			MMGH3 Support a Multi Modal Green Hubs Pilot Program at a minimum of two sites (e.g. in Mill Valley, in collaboration with the Miller Ave. Design Study)	②	✓	✓	✓✓	✓✓	✓✓	✓✓✓
			MMGH4 Identify the Multi Modal Green Hub Pilot Program's property, access, construction and ongoing maintenance requirements	③	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓✓✓
			MMGH5 Establish a Guaranteed Transit Parking Program as a supporting element of the Multi Modal Green Hubs program	④	✓	✓	✓✓	✓✓	✓✓	✓✓✓
			MMGH6 Deliver a Multi Modal Green Hub Pilot Program of early starts at a minimum of two sites	⑤	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓✓✓
Arterial Speed and Reliability Program	❷	*Approve recommendation to support Marin County and Local Jurisdictions to undertake necessary technical analysis to establish transit priority measures on relevant segments of Sir Francis Drake Blvd.*	**ASR1** Support a multi-corridor Arterial Speed and Reliability Program as a key component of future transit development in Central & Southern Marin	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation
			ASR2 Establish a working group comprising TAM, Marin Co. and local jurisdictions to develop a memorandum of understanding (MOU) governing development and implementation of the Arterial Speed and Reliability Program	①	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓
			ASR3 Agree lead agency to undertake necessary additional operational analysis to develop a first phase of a corridor system management plan	②	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓
Hwy 101 Key Pads and Ramps Program	❸	*Approve recommendation to support Caltrans and Transit Operators to undertake necessary operational and technical analysis to establish Tiburon Wye as a Pilot Program site.*	**KPR1** Support a Key Bus Pads Development Program as a key component of future transit infrastructure in Central & Southern Marin	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation
			KPR2 Establish a working group comprising TAM, Caltrans and local jurisdictions to refine the operational concept for enhanced bus pads and ramps	①	✓	✓	✓	✓	✓	✓✓
			KPR3 Establish Key Bus Pads Pilot Program at a minimum of one site (e.g. Tiburon Wye or Paradise)	②	✓	✓	✓	✓	✓	✓✓
			KPR4 Undertake the necessary Caltrans processes (PSR, PA/ED) to deliver first Key Bus Pads Development Program site	③	✓	✓	✓	✓	✓	✓✓
			KPR5 Deliver the first Key Bus Pads Pilot Program site project (e.g. Tiburon Wye or Paradise)	④	✓	✓	✓	✓	✓	✓✓
Local Stop Enhancement Program	❹	*Approve recommendation to participate as a member of Technical Advisory Committee (TAC) member in Local Stop Enhancement Program and assist in development of funding program.*	**LSE1** Support a Local Stop Enhancement Program as a key component of future transit infrastructure in Central & Southern Marin	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation
			LSE2 Develop a priority list of local stops for enhancement in accordance with local jurisdictions' priorities, in coordination with Golden Gate Transit and Marin Transit	①	✓	✓	✓	✓	✓	✓✓✓
			LSE3 Adopt an Enhanced Local Stops amenities policy, accordance with Golden Gate Transit and Marin Transit local stop policies	②	✓	✓	✓	✓	✓	✓✓✓
			LSE4 Deliver Local Stop Enhancement Program, accordance with Golden Gate Transit and Marin Transit bus stop policies	③	✓	✓	✓	✓	✓	✓✓✓
Key (Bidirectional) Corridor Enhancements	(Further Study Prior to Implementation)	*Approve recommendation to support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor*	**KCE1** Support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor	Concept Support Recommendation	Concept Support Recommendation	Concept Support Recommendation	(Not Evaluated)	(Not Evaluated)	(Not Evaluated)	(Not Evaluated)
			KCE2 Undertake a Market Demand Analysis for additional transit service on the Mill Valley-Sausalito Welcome Corridor	①	✓	✓				
			KCE3 Based on the results of demand analysis, develop 2-year pilot of an enhanced transit service (potentially seasonal) on the Mill Valley-Sausalito Welcome Corridor, connecting local service with Muir Woods and Fort Baker services	②	✓	✓				
			KCE4 Prepare a Canal-San Anselmo Corridor transit development plan for increased service on the corridor	③	✓	✓				
			KCE5 Prepare a Station Transit Facilities and Service Plan in conjunction with SMART for future service linking the Larkspur SMART station, the Sir Francis Drake corridor and Larkspur Landing/Golden Gate Ferry Terminal	④	✓	✓				

Low	Medium	High
✓	✓✓	✓✓✓
Relative Ratings		

*Most current funding eligibility requirements

** Lower the cost the higher the rating.

6.2.4 Timeline for Recommendations

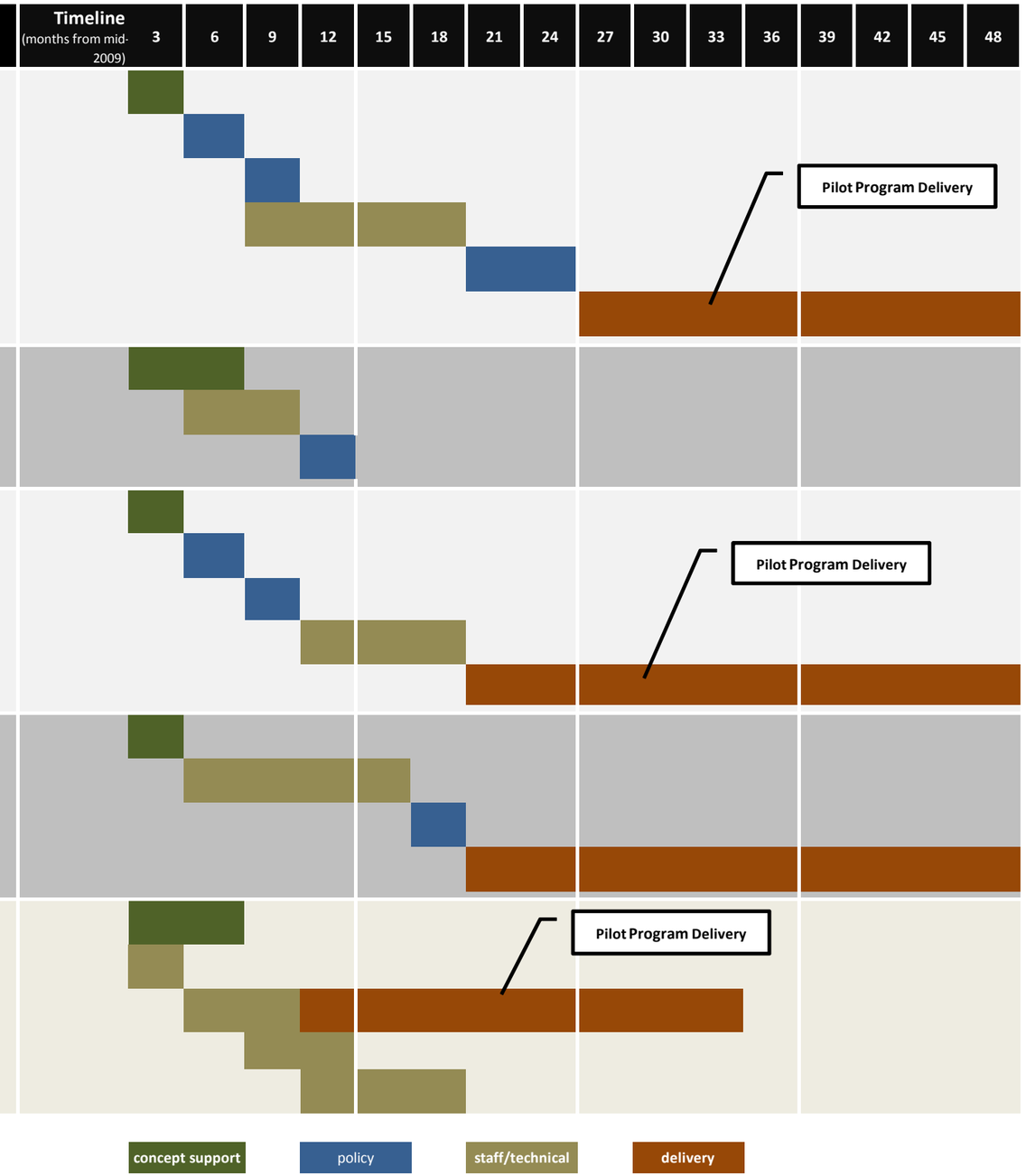
Policymaker follow-up support or adoption of the program elements are assumed to be the first step which could be completed within six to nine months of the completion of this Study in mid-2009. The subsequent recommendations are broadly chronological, and only indicative, since individual jurisdictions may choose to move forward at a pace which suits their priorities and funding readiness. For additional clarity, a timeline overview for the five program category recommendations is described in Table 6.6 on the following page.

The Study Recommendations, including the Pilot Programs, when implemented in their entirety, will deliver:

- ***Significant mobility improvements for those dependent on transit for their daily needs***
- ***The best possible opportunity for encouraging mode shift by choice riders***
- ***A major reduction in Marin's carbon footprint through the building blocks of a sustainable transit system***

Figure 6.3 Central and Southern Marin Transit Study TIMELINE OVERVIEW OF RECOMMENDATIONS

Program Element	Recommendations (all Responsible Agencies)	Participating Agency
Multi Modal Green Hubs	MMGH1 Support a Multi Modal Green Hubs program as a key component of future transit infrastructure in Central & Southern Marin	TAM
	MMGH2 Prioritize the development of the Multi Modal Green Hubs in accordance with local jurisdictions' priorities and readiness	TAM/Local/GGT/MCTD
	MMGH3 Support a Multi Modal Green Hubs Pilot Program at a minimum of two sites (e.g. in Mill Valley, in collaboration with the Miller Ave. Design Study)	TAM/City of Mill Valley/GGT/MCTD
	MMGH4 Identify the Multi Modal Green Hub Pilot Program's property, access, construction and ongoing maintenance requirements	TAM/City of Mill Valley/GGT/MCTD
	MMGH5 Establish a Guaranteed Transit Parking Program as a supporting element of the Multi Modal Green Hubs program	TAM/Local
	MMGH6 Deliver a Multi Modal Green Hub Pilot Program of early starts at a minimum of two sites	TAM/City of Mill Valley
Arterial Speed and Reliability Program	ASR1 Support a multi-corridor Arterial Speed and Reliability Program as a key component of future transit development in Central & Southern Marin	TAM/Local/GGT/MCTD
	ASR2 Establish a working group comprising TAM, Marin Co. and local jurisdictions to develop a memorandum of understanding (MOU) governing development and implementation of the Arterial Speed and Reliability Program	TAM/Marin Co./Local
	ASR3 Agree lead agency to undertake necessary additional operational analysis to develop a first phase of a corridor system management plan	TAM/Marin Co./Local
Hwy 101 Key Pads and Ramps Program	KPR1 Support a Key Bus Pads Development Program as a key component of future transit infrastructure in Central & Southern Marin	TAM/GGT/MCTD/Caltrans
	KPR2 Establish a working group comprising TAM, Caltrans and local jurisdictions to refine the operational concept for enhanced bus pads and ramps	TAM/GGT/MCTD/Caltrans
	KPR3 Establish Key Bus Pads Pilot Program at a minimum of one site (e.g. Tiburon Wye or Paradise)	TAM/GGT/MCTD/Caltrans
	KPR4 Undertake the necessary Caltrans processes (PSR, PA/ED) to deliver first Key Bus Pads Development Program site	TAM/GGT/MCTD/Caltrans
	KPR5 Deliver the first Key Bus Pads Pilot Program site project (e.g. Tiburon Wye or Paradise)	TAM/GGT/MCTD/Caltrans
Local Stop Enhancement Program	LSE1 Support a Local Stop Enhancement Program as a key component of future transit infrastructure in Central & Southern Marin	TAM/GGT/Local
	LSE2 Develop a priority list of local stops for enhancement in accordance with local jurisdictions' priorities, in coordination with Golden Gate Transit and Marin Transit	TAM/Local/GGT/MCTD
	LSE3 Adopt an Enhanced Local Stops amenities policy, accordance with Golden Gate Transit and Marin Transit local stop policies	TAM/GGT/MCTD
	LSE4 Deliver Local Stop Enhancement Program, accordance with Golden Gate Transit and Marin Transit bus stop policies	TAM/GGT/MCTD
Key (Bidirectional) Corridor Enhancements	KCE1 Support a Transit Corridor Enhancement Program focusing on the Mill Valley-Sausalito Welcome Corridor, the Larkspur SMART Station Area and the Canal-San Anselmo Corridor	TAM/Local
	KCE2 Undertake a Market Demand Analysis for additional transit service on the Mill Valley-Sausalito Welcome Corridor	MCTD/Co.
	KCE3 Based on the results of demand analysis, develop 2-year pilot of an enhanced transit service (potentially seasonal) on the Mill Valley-Sausalito Welcome Corridor, connecting local service with Muir Woods and Fort Baker services	MCTD/Local
	KCE4 Prepare a Canal-San Anselmo Corridor transit development plan for increased service on the corridor	TAM/MCTD/Local
	KCE5 Prepare a Station Transit Facilities and Service Plan in conjunction with SMART for future service linking the Larkspur SMART station, the Sir Francis Drake corridor and Larkspur Landing/Golden Gate Ferry Terminal	TAM/SMART/Local



APPENDIX 1:
EXISTING CONDITIONS ANALYSIS REPORT

APPENDIX 2:
STREETCAR FEASIBILITY DISCUSSION

APPENDIX 3:
SUMMARY OF EXISTING BUS STOP CONDITIONS & POLICIES
(DRAFT AGREEMENT TO SERVE AS A MODEL)

MEMORANDUM OF UNDERSTANDING BETWEEN THE CITY OF SAN RAFAEL, AND THE MARIN COUNTY TRANSIT DISTRICT, ALLOCATING AND DELEGATING RESPONSIBILITIES FOR LOCAL SERVING BUS STOPS WITHIN THE CITY OF SAN RAFAEL

This Agreement is made and entered into this ____ day of December, 2008, by and between the CITY OF SAN RAFAEL (hereinafter "**CITY**"), and the MARIN COUNTY TRANSIT DISTRICT (hereinafter "**MARIN TRANSIT**").

RECITALS

WHEREAS, **MARIN TRANSIT** recently surveyed over 600 bus stops in Marin County, approximately 470 of which support both regional and Marin local service and approximately 160 support local services only. Of the approximately 160 local stops, about 70 are located in the **CITY**; and

WHEREAS, there has been no uniform system in place across Marin County jurisdictions that guides roles and responsibilities regarding bus stops in terms of placement, maintenance, permitting, and related matters; and

WHEREAS, the term "bus stops" in this agreement shall include the various poles, signs, or furnishing (such as shelters, benches, lighting, waste receptacles) that are located in the public Right of Way and used to demarcate stopping points for buses or shuttles along designated routes; and

WHEREAS, while most bus stops do not currently have a maintenance plan in place, the **CITY** has an agreement in place with CBS Outdoor, or successor, that grants exclusive advertising rights and privileges on certain bus shelters in exchange for maintenance and revenues; and

WHEREAS, when properly located, adequately designed, and effectively enforced, bus stops can improve transportation service and expedite general traffic flow; and

WHEREAS, decisions regarding bus stop spacing and location call for a careful analysis of passenger service requirements (demand, convenience, and safety), the type of bus service provided, and the interaction of stopped buses with general traffic flow; and

WHEREAS, due to these needs, the **CITY,** and **MARIN TRANSIT** has formed the following agreement regarding the local serving bus stops in the **CITY** (attached as Exhibit A).

AGREEMENT

NOW, THEREFORE, the parties hereby agree as follows:

1. PROJECT COORDINATION.

   A. **CITY.** The City Director of Public Works is hereby designated the PROJECT MANAGER for the **CITY**, and said PROJECT MANAGER shall supervise all aspects of the progress and execution of this Agreement.

   B. **TRANSIT DISTRICT**. The Transit Planning Manager is hereby designated the PROJECT MANAGER for **MARIN TRANSIT**, and said PROJECT MANAGER shall supervise all aspects of the progress and execution of this Agreement.

2. BUS STOP MAINTENANCE.

MARIN TRANSIT, upon the execution of this agreement, will assume maintenance, repair, and general upkeep responsibility for those local serving bus stops in the **CITY** that are not included in the agreement with CBS Outdoor (Exhibit A includes all local serving stops). **MARIN TRANSIT** acknowledges that the **CITY** has exclusive rights regarding shelter advertising within the CITY and has granted exclusive right to advertise on bus shelters to CBS Outdoor or their authorized assignee. The **CITY**, as the owners of the Right of Way, will provide routine maintenance to the path of travel associated with bus stops, including street sweeping, striping, or curb painting.

3. BUS STOP ADDITIONS, DELETIONS, OR MODIFICATIONS.

MARIN TRANSIT shall develop transit service routes and propose bus stop additions, deletions, or modifications in coordination with **CITY** staff and shall consider traffic patterns, route operation, street design, traffic safety issues, State and Federal accessibility requirements, the **CITY**'s circulation element of the General Plan, and impacts to adjacent properties. Proposals may be initiated by **MARIN TRANSIT** or the **CITY** (and may be suggested by the public). All bus stop additions, deletions, or modifications that are proposed in San Rafael shall be approved by the **CITY**, and are subject to the encroachment permit process as defined in Chapter 11.04 of the San Rafael Municipal Code.

Following an on-site joint review between **MARIN TRANSIT** and **CITY** staff, **MARIN TRANSIT** may submit a formal application proposing an addition, deletion, or modification to the **CITY**. The **CITY**'s Traffic Engineer, under direction of the Public Works Director, shall respond to the formal application within 90 days and shall inform **MARIN TRANSIT** if there are issues for further analysis such as those including but not limited to traffic operations, planning, the California Environmental Quality Act (CEQA), State and Federal accessibility requirements or obtaining adjacent property owner consent. The Traffic Engineer may instead:

A. Grant approval, with or without conditions, of the bus stop addition, deletion, or modification, by sending a Letter of Approval to **MARIN TRANSIT** and issuing an encroachment permit, as necessary, or
B. Deny the proposal and the encroachment permit.

Upon receipt of the Letter of Approval or permit from the Traffic Engineer, and after any improvements to the street, if required, have been completed by the **CITY** (e.g., painting a red curb), **MARIN TRANSIT** will construct, eliminate, or modify the bus stop as agreed (see Exhibit B for areas of responsibility). **MARIN TRANSIT** will ensure that the "bus stops" are accessible pursuant to state and federal regulations.

MARIN TRANSIT will extend the service development process to allow the necessary time to work with the **CITY** to obtain approval. Over the next five years, **MARIN TRANSIT** and the **CITY** will work cooperatively with the goal to establish permits for all local bus stops.

4. BUS STOP GUIDELINES.

In considering adding, removing, or modifying bus stops, **MARIN TRANSIT** and **CITY** staff shall consider best practices. The following guidelines may be considered to guide staff in their decision making:

A. Bus stops are the locations where bus passengers access the **MARIN TRANSIT** system. Bus stops must therefore be convenient to the places where passengers wish to go. Convenience, safety, and speed must be balanced in determining appropriate bus stop placement, as too many bus stops can slow down travel times. Passenger usage of bus stops is an important factor when considering bus stop placements or removals.
B. Outside the downtown areas, **MARIN TRANSIT** generally seeks to have bus stops approximately ¼ mile apart. This target has been set with the goal of increasing travel speed for buses. Bus stops should be close enough that passengers can walk to them easily, but far enough apart to help buses move quickly. Discretion shall be applied to balance **MARIN TRANSIT's** goal of improving service and expediting traffic flow with consideration of passengers' safety, interests, and needs.
C. Bus stops on the street are usually located along the street curb for direct safe passenger access to and from the sidewalk, waiting, and walking areas. Stops may be located either in the intersection exit (far-side), the intersection approach (near-side), or at mid-block.
D. Far-side stops are the preferable choice for service in general because they may reduce conflicts between right-turning vehicles and stopped buses, eliminate sight-distance issues on approaches to an intersection, and encourage pedestrian crossing at the rear of the bus. Near-side stops are acceptable when a far-side stop is deemed unsafe or impractical. Mid-block stops are considered special case stops and may be used when no better alternative is available.
E. When bus stops are initiated or relocated, bus stop locations shall be chosen such

that, to the maximum extent practical, the areas where lifts or ramps are to be deployed comply with State and Federal accessibility requirements.

5. BUS STOP ENFORCEMENT.

Except as stated in other agreements, local law enforcement agencies shall enforce all state laws, local ordinances, and regulations governing bus stops.

6. FURTHER AGREEMENT.

MARIN TRANSIT anticipates pursuing one maintenance contract for local bus stops and shelters that they will maintain (excludes shelters where CITY has a maintenance agreement in place with CBS Outdoor or successor).

7. TERM OF AGREEMENT; TERMINATION.

The term of this Agreement shall be for one year commencing _____, 2008. Within fifteen (15) days after _____, 2008, **CITY** and **MARIN TRANSIT** shall discuss the actual functions and operations under this Agreement and shall make any modifications they deem necessary and upon which they agree.

At the end of the term, the Agreement shall automatically renew for an additional one year period on each successive January 1st unless one party provides written notice of termination to the other party thirty (30) days prior to the expiration of the current term.

8. NOTICES.

All notices and other communications required or permitted to be given under this Agreement, including any notice of change of address, shall be in writing and given by personal delivery, or deposited with the United States Postal Service, postage prepaid, addressed to the parties intended to be notified. Notice shall be deemed given as of the date of personal delivery, or if mailed, upon the date of deposit with the United States Postal Service. Notice shall be given as follows:

TO **CITY**: Director of Public Works
City of San Rafael
111 Morphew Street
San Rafael, CA 94901

TO **MARIN TRANSIT**: Amy Van Doren
Director of Operations
Marin County Transit District
750 Lindaro Street, Suite 200
San Rafael, California 94901

9. MUTUAL INDEMNIFICATION.

MARIN TRANSIT agrees to defend, indemnify and hold harmless **CITY,** its officers, agents, employees, and volunteers from and against any and all damages, disabilities, liabilities and expenses including, but not limited to, reasonable attorneys' fees as to which this indemnity applies, whether arising from personal injury, property damage or losses that may be asserted by any person or entity, including **MARIN TRANSIT**, arising out of or in connection with the negligent performance of **MARIN TRANSIT** hereunder, but, to the extent required by law, excluding liability due to the sole or active negligence or due to the willful misconduct of **CITY**. This indemnification obligation is not limited in any way by any limitation on the amount or type of damages or compensation payable to or for **MARIN TRANSIT** or their agents under workers compensation acts, disability benefit acts or other employee benefit acts.

CITY agrees to defend, indemnify and hold harmless **MARIN TRANSIT,** their officers, agents, employees, and volunteers from and against any and all damages, disabilities, liabilities and expenses including, but not limited to, reasonable attorneys' fees as to which this indemnity applies, whether arising from personal injury, property damage or losses that may be asserted by any person or entity, including the **CITY**, arising out of or in connection with the negligent performance of the **CITY** hereunder, but, to the extent required by law, excluding liability due to the sole or active negligence or due to the willful misconduct of **MARIN TRANSIT**. This indemnification obligation is not limited in any way by any limitation on the amount or type of damages or compensation payable to or for **CITY** or its agents under workers compensation acts, disability benefit acts or other employee benefit acts.

10. ENTIRE AGREEMENT -- AMENDMENTS.

The terms and conditions of this Agreement, all exhibits attached, and all documents expressly incorporated by reference, represent the entire Agreement of the parties with respect to the subject matter of this Agreement. If any conflicts arise between the terms and conditions of this Agreement, and the terms and conditions of the attached exhibits or the documents expressly incorporated by reference, the terms and conditions of this Agreement shall control.

The terms and conditions of this Agreement shall not be altered or modified except by a written amendment to this Agreement signed by the **CITY,** and, **MARIN TRANSIT**. The City Manager, or designee, is authorized to alter or modify the terms and conditions on behalf of **CITY** as necessary.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day, month and year first above written.

CITY OF SAN RAFAEL

_____
KEN NORDHOFF, City Manager

MARIN TRANSIT

_____
DAVID RZEPINSKI, General Manager

ATTEST:

_____
ESTHER C. BEIRNE, City Clerk

APPENDIX 4:
STAKEHOLDER COMMENTS AND RESOLUTION
&
WORKSHOP MATERIALS

Comments from TAM Executive Committee & Board Meeting Minutes

MEETING DATE	BOARD MEMBER	COMMENT(S)	ACTION(S)
11-10-2008 Executive Committee Meeting	Commissioner Boro	Asked if the intra-county trip growth is due to Marin residents who are dependent on transit to get to work within the county. David McCrossan confirmed this and stated that he would provide better graphics that quantify the growth in trips/day in the future.	Located in the *Task 2: Existing Conditions Report*, Chapter 6.0: Summary of Transit Rider Profile.
11-10-2008 Executive Committee Meeting	Commissioner Fredericks	Asked why a streetcar is preferred over having a dedicated, branded smaller bus route, to which Commissioner McGlashan responded that a bus might be the best solution, but he wanted to investigate the possibility of a streetcar.	Located in the *Task 5a: Streetcar Feasibility Discussion*, Chapter 7.0: Findings.
01-12-2009 Executive Committee Meeting	Chair Kinsey	Asked for confirmation that ferry usage is not being included in this study. David McCrossan responded that it is only being considered as a connection to GGT.	Located in the *Task 2: Existing Conditions Report*, Chapter 2.0: Existing Transit Services, Section 2.3 GGT Service Performance by Route (page 13)
01-12-2009 Executive Committee Meeting	Chair Kinsey	Asked if data exists to understand private transit that is being provided and cited some private contractors who transport seniors assisted living complexes, as well as various youth organizations. He wanted to stress that public transit isn't the only transit being talked about. Jean Hart said that she would search for possible resources that my have the data.	A list of passenger carriers in Marin County that are licensed by the California Public Utilities Commission can be found in Appendix 1.

01-12-2009 Executive Committee Meeting	Karen Nygren	Stated that the Marin City bus pad was omitted and that the pad, at least in the past, was a major transfer point for riders. David McCrossan responded that the TAC noted this omission, as well, and that it would be incorporated into the study.	Located in the *Task 2: Existing Conditions Report*, Chapter 3.0: Transit Hub and Corridor Faculties, Section 3.1 Transit Hub and Corridor Facilities (page 22)
01-12-2009 Executive Committee Meeting	David Schonbrunn	Stated that the highway pads were an afterthought installed on the brink of the paving of Hwy 101 and he believes that they were never analyzed after that point. He would like this study to review their functionality and if there may be some alternatives to using these pads. He finalized his comment by saying that he hopes the study will take into account that the Marin City bus pad involves a long detour off the highway.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.2 Hwy 101 Key Pads & Ramps Transit Program
03-16-2009 Executive Committee Meeting	Commissioner Lundstrom	Suggested adding "safe pedestrian access to bus stops" to the list of components since she estimates there are more people walking to the bus stops than biking.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.2 Hwy 101 Key Pads & Ramps Transit Program
03-16-2009 Executive Committee Meeting	Jim Schmidt	Asked for the definition of a "green hub." David McCrossan responded that it is a hub which encourages broader mobility and the environmental goals of the community.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.1 Multi-Modal Green Hubs

03-16-2009 Executive Committee Meeting	Commissioner Lundstrom	Reminded the consultants that the bus pads along Hwy 101 are shared with the Marin Airporter, which reduces traffic by taking these riders out of their cars. She requested that this service be called out in this study. She also requested that this study consider the transit dependent riders and school trips that use these local bus stops along the freeway.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.2 Hwy 101 Key Pads & Ramps Transit Program
03-16-2009 Executive Committee Meeting	Commissioner McGlashan	Stated that the parking lot between Sir Francis Drake and Center Blvd. in Fairfax tend to be a parking spot for transit riders, as does a spot on Miller Ave. in Mill Valley as a result of motorists coming out of the canyon. He asked David McCrossan if he could offer any suggestions about non-motorized access investments that could be considered for those parking areas. Additionally, he noted that there is excess parking capacity in the parking lot on Felton St.—across from the Manzanita parking lot in Mill Valley. David McCrossan said that he would contact the Commissioner to discuss ways to publicize the Felton St. lot.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.2 Hwy 101 Key Pads & Ramps Transit Program

03-16-2009 Executive Committee Meeting	Karen Nygren	Noted that the study analyzed reverse commute travel to Sausalito and Mill Valley, but failed to add Corte Madera, Tiburon, and Belvedere. Also, she stated that there is a GGT bus that crosses the Golden Gate Bridge in the direction of the Marin Headlands area and stops at Fort Baker. She suggested that this would be a good transfer spot from San Francisco. Regarding the Manzanita parking lot, she said that this location floods but the parking lot on Felton St. does not flood. She finalized her comments by asking if the study analyzed possible funding sources for the $25 million price tag. David McCrossan responded that the next task is to determine the funding sources.	The comments regarding the specific transit improvements are located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.5 Key Bidirectional Corridor Enhancements The comments regarding the funding sources is not included in this draft but will be in the *Final Draft Report*, Chapter 6.0: Conclusion and Implementation, Section 6.4 Funding and Program Implementation
03-16-2009 Executive Committee Meeting	Roger Roberts	Stated that that GGNRA is doing its own planning study, so he would like to see this study integrated with that of GGNRA.	It is acknowledged that GGNRA is doing a planning study. GGT staff has provided written comments on the Central and Southern Marin Transit Study.
03-26-2009 Board Meeting	Commissioner Lundstrom	Reiterated that she would like to see "safe pedestrian access to bus stops" added to the list of component.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.2 Hwy 101 Key Pads & Ramps Transit Program

03-26-2009 Board Meeting	Commissioner Donnell	Asked about the difference between the types of green hubs and how the parking spaces would be configured, considering that most of the land is privately owned. She also suggested that the arterial street traffic be looked at for possible increases in congestion due to these improvements. David McCrossan stated that there are different tiers for the green hubs, and not all would be considered for additional parking.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.1 Multi-Modal Green Hubs and Chapter 5.0: Benefit Assessment of Improvements, Section 5.3 Arterial Speed and Reliability Program
03-26-2009 Board Meeting	Commissioner McGlashan	Reminded the consultants about the e-mail they received from the City of Mill Valley Vice-Mayor Moulton-Peters, regarding the addition of three mini-green hubs. David McCrossan replied that the team was currently looking into it.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.1 Multi-Modal Green Hubs
03-26-2009 Board Meeting	Commissioner Donnell	Asked if the ABAG numbers were used for the Study. David McCrossan confirmed that they were.	Located in the *Task 2: Existing Conditions Report*, Chapter 5.0: Travel Forecasts and Transit Demand Projections, Section 5.1 Background and Assumptions
03-26-2009 Board Meeting	Michael Rex	Commented that he was confused about whether a single or double track was being looked at for the streetcar and the actual numbers of cars that would be used. He also stated that Ross Valley should be looked at for potential streetcar line, as well as, additional studies and "tester" streetcars should be implemented. He finalized his comment with the thought that "green" hubs should be changed to "neighborhood" or "mini" hubs.	Streetcar facts can be found in the *Task 5a: Streetcar Feasibility Discussion*. The "green" hub name did not change, as that was already agreed upon by the stakeholders.

03-26-2009 Board Meeting	Valerie Taylor	Commented that the Welcome Service should be located in Marin City rather than Sausalito.	Located in the *Final Report*, Chapter 5.0: Benefit Assessment of Improvements
04-13-2009 Executive Committee Meeting	Commissioner Kellner	Asked a question regarding whether an assessment was done in northern Marin or in the Tiburon area. Executive Director Steinhauser said that she is optimistic that additional funding will become available to study other areas of Marin. She added that SMART did an independent analysis of capturing numbers for their transit shuttles and staff did not want to trip over their efforts, which is why the central and southern part of the county was chosen to kick-off this study. David McCrossan stated that Tiburon Blvd. has been included in the scope of this study.	Located in the *Task 2: Existing Conditions Report*, Chapter 2.0: Existing Transit Services, Section 2.2 Transit Service Coverage by Corridor (page 12) and Chapter 3.0: Transit Hub and Corridor Facilities, Section 3.1 Transit Hub and Corridor Facilities (page 21)
04-13-2009 Executive Committee Meeting	Commissioner Boro	Referred to the list of public comments made at the workshop and one regarding establishing a dedicated bus lane during peak periods—he would be concerned about implementing this idea on 2nd and 3rd Streets in San Rafael. Jean Hart stated that the team has not found any corridor that has the volume that would warrant a dedicated bus lane; however, queue jump lanes at certain intersection might be considered.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.3 arterial Speed and Reliability Program

04-13-2009 Executive Committee Meeting	Chair Kinsey	Asked if the team is linking the study with the transportation system management services offered by 511.org, given their interest in moving towards the personal trip planning concept. Jean Hart said that she has not been in contact with 511.org, but would be happy to do so.	**Not in report.** 511.org has been contacted and the Real-Time Transit Hub Signs' physical requirements and specifications have been determined.
04-13-2009 Executive Committee Meeting	Chair Kinsey	Suggested that there could be a correlation to SMART as it relates to bus transit services particularly since they have funding for feeder buses.	**Not in report**
04-13-2009 Executive Committee Meeting	Karen Nygren	Suggested that when talking about bidirectional corridors, the jurisdictions of Tiburon, Belvedere, and Corte Madera should be included. Jean Hart said that it was included in the Executive Committee minutes, but not in the workshop notes.	Located in the *Final Report*, Chapter 4.0: Description of Applicable Improvements, Section 4.5 Key Bidirectional Corridor Enhancements

Public Workshop Comments *(March 26th, 2009)*

ATTENDEES	COMMENT(S)
W. Ring, SausalitoSun.com Sandy Donnell, Belvedere City Council Nancy Boyce, Marin Link Warren R. Uhte, MV Seniors for Peace Scott Stokes, Citizen-at-Large Tamara Hull, citizen Jerry Belletto, Sustainable SR Valerie Taylor, Nelson Nygaard Rachel F. Ginis, citizen Ann Spake, Tam Valley Karen Nygren, Sierra Club Marin Michael Rex Allan Nichol David Schonbrunn, TRANSDEF Margaret Jones, LWV Ron Downing, GGT Amy Van Doren, Marin Transit David Rzepinski, Marin Transit Joe Story, DKS Alex Farros-Hoeppner, HDR Doug Langille, HDR David McCrossan, HDR Jean Hart, TAM	**Getting to the Transit Services:** ▪ With an aging demographic in Marin, the elderly population will have difficulty walking the ½ mile or ¼ mile distance to transit with the topography. There should be some type of jitney service that provided a lateral transit service to the main corridors. ▪ There should be a lateral service that connects with the main corridor transit service. ▪ The local service needs to stop at more locations; it is very difficult for the seniors to get between the bus stops. ▪ Something needs to be done with the Sir Francis Drake corridor. There are over 2,000 people that use that corridor each day to get to the Larkspur ferry terminal, we should look into getting those people out of there cars. ▪ TAM should take the distributed concept one step further and consider installing 3 "Mini Multi modal Green Hubs" at existing activity centers in Mill Valley and scale back on the single Multi Modal Green Hub proposed at the E. Blithedale entrance to Hwy 101. **Streetcar:** ▪ The consultants were not asked the correct questions to make the streetcar feasible. Need to look at it from a different point of view: we need to figure out a way to get people out of their cars, not "can the current transportation users support a streetcar?" ▪ Streetcar should not be built at sea level, with the possible chance that the water levels will increase due to climate change, risk that the trail alignment could be submerged; it should be built well above sea level. ▪ Negative impact on existing wetlands. ▪ We need to keep in mind that more than just the people within the ½ and ¼ mile buffers would use the streetcar service. ▪ Are there other corridors that have the population and ridership threshold to support a streetcar in Marin County?

- If a streetcar were built, people would go out of their way to use it for commute purposes, as well as, taking their visitors on it.
- Using the bus is too complicated and not attractive; riding a trolley/streetcar has a certain charm about it.
- We need to start looking at alternative means to the everyday bus if we would like to get people out of their cars.

Other:

- Are there going to be any surveys that go out to the public to determine their views? Are Tam Valley residents going to be consulted (regarding streetcar service)?
- Marin City is the strategic gateway to Marin County from the Golden Gate. Marin City Transit Center should be considered a Major Regional Hub and improved.
- For Larkspur:
    - Improved bus access to attract choice market from Fairfax/San Anselmo and from North County (along HWY 101).
    - Charge for parking.
    - Do not increase parking capacity (Sierra Club opposes additional parking at ferry terminals).
    - Improve bike access.
    - Bring SMART close to actual ferry dock.
- GGT bus collection points need to be improved in San Francisco.
- For the San Anselmo/San Rafael Corridor, should establish one dedicated bus lane in peak direction during peaks with existing capacity (no widening). Sell this concept to public with indication of future congestion management and mode shift.
- Synchronization of 2nd and 3rd streets [in San Rafael] is too fast.
- Climate Change Policy: with the advent of AB 375 and a real mandate for investing in transit and changing land use patterns, now is the time to re-think the opportunities for transit, beyond just the limited resources of the current systems.