



ADMINISTRATION, PROJECTS & PLANNING  
EXECUTIVE COMMITTEE MEETING

FEBRUARY 12, 2024  
3:30 P.M.

TAM CONFERENCE ROOM  
900 FIFTH AVENUE, SUITE 100  
SAN RAFAEL, CALIFORNIA

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Eli Beckman

Fairfax  
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Kevin Carroll

Mill Valley  
Urban Carmel

Novato  
Rachel Farac

Ross  
P. Beach Kuhl

San Anselmo  
Brian Colbert

San Rafael  
Kate Colin

Sausalito  
Melissa Blaustein

Tiburon  
Alice Fredericks

County of Marin  
Mary Sackett  
Katie Rice  
Stephanie Moulton-Peters  
Dennis Rodoni  
Eric Lucan

*This meeting will be held in-person and via Zoom webinar.*

**How to watch the live meeting using the Zoom link:**

<https://us02web.zoom.us/j/83035113530?pwd=Ym1lVHdnUHZyclGN2VPZVlBY0Zrdz09>

Webinar ID: 830 3511 3530

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**Teleconference:** Members of the public wishing to participate via teleconference, can do so by dialing in to the following number at 3:30 PM on the day of the meeting: **+1 669 900 6833**; Access Code: 830 3511 3530; Password: 891953

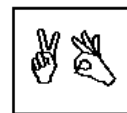
**How to provide public comment (limited to 2 minutes or less):**

**Before the meeting:** Please email your comment to [info@tam.ca.gov](mailto:info@tam.ca.gov), no later than 5:00 p.m. Sunday, February 11, 2024, to facilitate timely distribution to Committee members. Please include the agenda item number you are addressing and your name and address. Your comments will be forwarded to the Committee members and will be placed into the public record.

**During the meeting:** For members of the public participating in-person, the Committee Chair will recognize persons from the audience who wish to address the Committee during public open time or on a particular agenda item at the time that item is considered by the Committee.

If watching this meeting online, click the "raise hand" feature in the webinar controls. This will notify TAM staff that you would like to comment. If participating by phone, "raise hand" by pressing \*9 and wait to be called upon by the Chair or the Clerk. You will be asked to unmute your device when it is your turn to speak and your comments will become part of the public record.

Meeting-related comments may also be sent to [info@tam.ca.gov](mailto:info@tam.ca.gov), and will be read (up to 2-minute limit per comment) when the specific agenda item is considered by the Committee and will become part of the public record.



Late agenda material can be inspected in TAM's office between the hours of 9:00 a.m. and 5:00 p.m.  
The TAM Office is located at 900 Fifth Avenue, Suite, 100, San Rafael.

The meeting facilities are accessible to persons with disabilities. Requests for special accommodations (assisted listening device, sign language interpreters, etc.) should be directed to Jennifer Doucette, 415-226-0820 or email: [jdoucette@tam.ca.gov](mailto:jdoucette@tam.ca.gov) no later than 5 days before the meeting date.

## AGENDA

1. Chair's Report & Commissioner Comments (Discussion)
2. Executive Director's Report (Discussion)
3. Open time for public expression, up to two minutes per speaker, on items not on the agenda that are within the subject matter of the agency's jurisdiction. (While members of the public are welcome to address the Committee, under the Brown Act, Committee members may not deliberate or take action on items not on the agenda, and generally may only listen.)
4. Approval of Meeting Minutes from September 11, 2023 (Action) – **Attachment**
5. Review of the Semi-Annual Project Status Report (Action) – **Attachment**
6. Update on the Sea Level Rise Adaptation Planning for Marin County's Transportation System Project (Discussion) – **Attachment**
7. Highway 101 Interchange and Approaching Roadway Studies Update (Discussion) – **Attachment**



MEETING OF THE  
TRANSPORTATION AUTHORITY OF MARIN  
ADMINISTRATION, PROJECTS & PLANNING  
EXECUTIVE COMMITTEE

SEPTEMBER 11, 2024  
3:30 PM

TAM CONFERENCE ROOM  
900 FIFTH AVENUE, SUITE 100  
SAN RAFAEL, CALIFORNIA

**MEETING MINUTES**

Members Present: Beach Kuhl, Ross Town Council  
Chance Cutrano, Fairfax Town Council  
Eric Lucan, Marin County Board of Supervisors, Committee Chair  
Kate Colin, San Rafael City Council

Members Absent: Stephanie Moulton-Peters, Marin County Board of Supervisors

Staff Members Present: Bill Whitney, Principal Project Delivery Manager  
Dan Cherrier, Director of Project Delivery  
David Chan, Director of Programming and Legislation  
Derek McGill, Director of Planning  
Grace Zhuang, Accounting and Payroll Specialist  
Jennifer Doucette, Executive Assistant/Clerk of the Board  
Li Zhang, Deputy Executive Director/Chief Financial Officer  
Mikaela Hiatt, Associate Transportation Planner  
Nick Nguyen, Principal Project Delivery Manager  
Molly Graham, Public Outreach Coordinator  
Scott McDonald, Principal Transportation Planner

*Chair Lucan called the meeting to order at 3:32 p.m.*

Chair Lucan welcomed everyone to the meeting and asked Executive Assistant/Clerk of the Board Jennifer Doucette to conduct a roll call to ensure a quorum. A quorum of the Administration, Projects & Planning (AP&P) Executive Committee was confirmed and detailed information about how the public may participate was provided.

**1. Chair's Report & Commissioners Comments (Discussion)**

None.

**2. Executive Director's Report (Discussion)**

Deputy Executive Director/Chief Financial Officer (DED/CFO) Li Zhang reported that TAM was awarded \$518,931 to develop a Vehicle Miles Traveled (VMT) Reduction/Mobility Enhancement Toolkit for Marin County.

DED/CFO Li Zhang also reported that Caltrans released the Draft Environmental Impact Report and Environmental Assessment (Draft EIR/EA) for the State Route (SR) 37 Flood Reduction Project (Project) for public review and comment, and will host a hybrid public meeting on September 21, 2023, from 6:00 p.m. to 7:30 p.m., at the Margaret Todd Senior Center in Novato.

DED/CFO Li Zhang further reported that the California Transportation Commission (CTC) allocated \$155 million in federal Infrastructure Investment and Jobs Act (IIJA) funds to Caltrans for the SR 37 Flood Protection Project in Marin County; and that SR 37 Policy Committee members from Marin, Sonoma, Napa and Solano counties recently participated in a field tour of the SR 37 Corridor.

DED/CFO Li Zhang reported that the Safe Routes to Schools (SR2S) program hosted a parent volunteer luncheon at TAM to provide an overview of activities for the year and provide materials for promotions throughout the school year; and that TAM and the Crossing Guard Management firm have expanded efforts to hire crossing guards throughout Marin.

Lastly, DED/CFO Li Zhang reported that TAM will host the inaugural Clean Fleet Expo at the Marin County Fairgrounds on September 12. The Expo will offer an immersive electric vehicle (EV) and alternative fuels education experience for public agencies and others who manage fleets in Northern California.

Chair Lucan asked if any members of the public wished to speak or had submitted a comment by e-mail and hearing none, closed this item.

### **3. Open time for public expression**

Chair Lucan asked if any members of the public wished to speak or had submitted a comment by e-mail.

Member of the Public Clayton Smith expressed concern regarding toll fees on SR 37 and commented that gas taxes should be used to cover the cost of road maintenance. Mr. Smith also expressed concern over the use of personal data that may be associated with toll collection.

Chair Lucan clarified that the funds allocated for the replacement of the Novato Creek Bridge will not be toll-funded.

### **4. Approval of Meeting Minutes June 12, 2023 (Action)**

Chair Lucan asked if any members of the public wished to speak or had submitted a comment by e-mail, and hearing none, closed public comment and asked for a motion.

Commissioner Cutrano moved to approve the Minutes of the June 12, 2023 meeting. Commissioner Kuhl seconded the motion, which passed unanimously.

### **5. Review of the Semi-Annual Project Status Report (Action)**

Director of Project Delivery Dan Cherrier presented this item, which recommends that the AP&P Executive Committee review the Semi-Annual Project Status Report and refer it to the TAM Board for approval.

Mr. Cherrier provided updates on the Marin Sonoma Narrows (MSN); SR 37; North-South Greenway Gap Closure; Highway 101 Interchange Studies; US 101/I-580 Multimodal and Local Access Improvements; Bellam Blvd Off-Ramp from Northbound US 101; US 101 & Marin City Flood Mitigation Coordination; and US 101 Part-Time Transit Lane.

In response to Chair Lucan, Principal Project Delivery Manager Nick Nguyen explained that TAM staff would research the status of the bike path closure located underneath US 101 at the Marin/Sonoma County line.

In response to Commissioner Colin, Mr. Cherrier explained that the RAISE grant funding is offered annually and could be reconsidered, however, the Bellam Blvd Offramp Improvements project would require a National Environmental Policy Act (NEPA) clearance in order to proceed with such federal funding.

In response to Commissioner Colin, Principal Project Delivery Manager Bill Whitney explained that the US 101 Part-Time Transit Lane is currently entering the Project Initiation Document (PID) phase, which is anticipated to be completed in approximately one year.

Chair Lucan asked if any members of the public wished to speak or had submitted a comment by e-mail, and hearing none, asked for a motion.

Commissioner Colin made a motion to refer the Semi-Annual Project Status Report to the TAM Board for approval. Commissioner Cutrano seconded the motion, which passed unanimously.

## **6. Highway 101 Interchange and Approaching Roadway Studies Update (Discussion)**

Mr. Whitney introduced project consultants David Parisi of Parametrix and Carie Montero of HNTB to present this item for discussion.

Mr. Parisi provided a project overview and background; timeline and status; project objectives; preliminary purpose and need; outreach summary and feedback received; concept refinements; potential funding opportunities; and next steps.

Mr. Whitney explained that staff will continue to develop the PIDs and supporting documents as required before entering the environmental phase(s) of the project(s); and will also continue to seek grant funding opportunities as the process continues.

In response to Commissioner Colin, Mr. Whitney explained that staff will bring this item to the TAM Board at the completion of the PID phase, which is anticipated in summer 2024. Commissioner Colin expressed support for the continued use of roundabouts.

In response to Commissioner Lucan, Mr. Whitney explained that both short and long-term components of a project could be included in the environmental phase; and Mr. Cherrier explained that multiple alternatives may be studied during the environmental phase of a project. Mr. Cherrier also explained that a viable funding source is generally required by the completion of the environmental phase.

Ms. Montero explained that one purpose of a PID is to determine project costs, including mitigation and environmental permitting.

Chair Lucan asked if any members of the public wished to speak or had submitted a comment by e-mail.

WTB-TAM Director of Planning Matthew Hartzell expressed support for the proposed safety improvements to the interchanges, including multi-modal grade separations to encourage active transportation.

Mr. Smith expressed concern about potential traffic congestion and prohibitive costs associated with improvements to the highway interchanges; and commented on the importance of addressing the US 101/I-580 interchange.

Marin County Bicycle Coalition (MCBC) Policy and Planning Director Warren Wells expressed support for the proposed safety improvements to the highway interchanges; and commented that the majority of injuries sustained in accidents at these intersections involve people in motorized vehicles.


*The meeting was adjourned at 4:37 p.m.*

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**DATE:** February 12, 2024

**TO:** Transportation Authority of Marin  
Administration, Projects & Planning Executive Committee

**FROM:** Anne Richman, Executive Director   
Project Delivery Team

**SUBJECT:** Review of the Semi-Annual Project Status Report (Action), Agenda Item No. 5

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## RECOMMENDATION

The Administration, Projects & Planning (AP&P) Executive Committee reviews and refers the February 2024 TAM Project Status Report to the Board for acceptance.

## BACKGROUND

In order to provide up to date funding and expenditure information that can help the Board and the general public understand the overall status of the suite of projects that TAM manages, these project updates are presented approximately every six months. The intent of these updates is to provide a broad overview of projects directly managed by TAM, and to update and identify potential issues that may require future Board actions. As projects progress, they will require specific Board deliberations and actions, such as consultant contract amendments or acceptance of work products.

## DISCUSSION/ANALYSIS

### Project Status Report Highlights:

The Project Status Report covers key on-going projects that are active and those that are in the active planning phase. State Route 37 and Improvements in Marin City to reduce flooding have multiple components that are either in planning or active phases.

**Active Projects** covers all projects that are in environmental, design or construction phases. These projects are well defined and, in most cases, fully funded. This report includes four active projects: (1) US 101 Marin-Sonoma Narrows – B7 and B8; (2) North-South Greenway Gap Closure Project – North Segment; (3) Improve Bellam Boulevard off-ramp from Northbound US 101; and (4) State Route 37.

**Planning Projects** covers emerging high-priority projects for which TAM is studying various options. These projects most likely will become active projects in the foreseeable future. The report includes four projects in the planning phase: (1) US 101/I-580 Multimodal and Local Access Improvement, (2) Studies of Highway 101 Interchanges and Approaching Roadways, (3) the US 101 Part-Time Transit Lane, and (4) Improvements in Marin City to reduce flooding.

**FISCAL IMPACTS**

Not applicable.

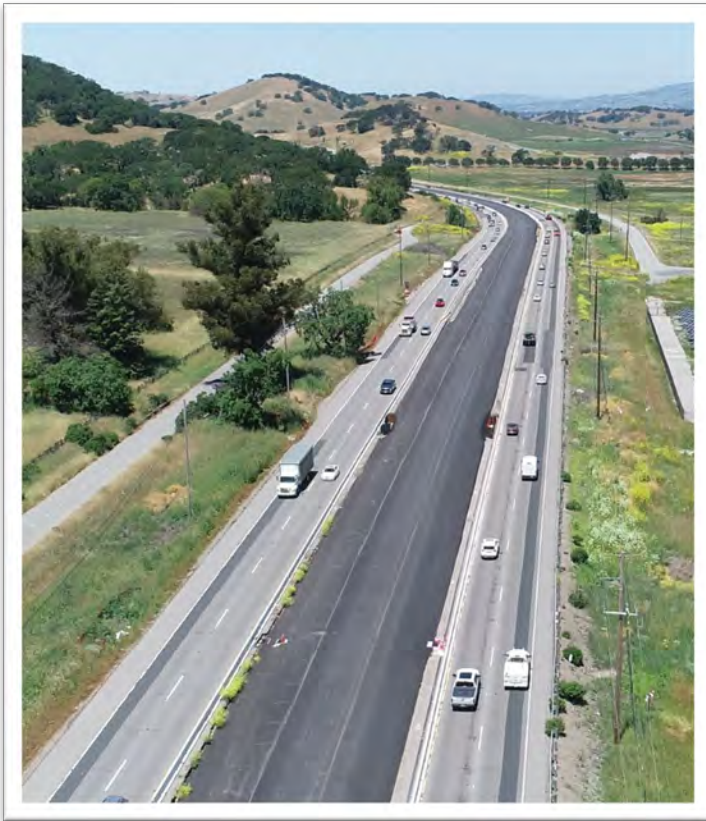
**NEXT STEPS**

The next Project Status Report update will be provided in the fall of 2024.

**ATTACHMENTS**

- Attachment A – February 2024 TAM Project Status Report
- Attachment B – PowerPoint Presentation
- Attachment C – Sate Route 37 Partnership Press Release





# Transportation Authority of Marin

## Project Status Report

*February 2024*

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**ON-GOING PROJECTS**


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**A. PROJECTS – ACTIVE**

US 101 Marin-Sonoma Narrows Overview .....	1
US 101 Marin-Sonoma Narrows – B7 and B8 .....	2
North-South Greenway Gap Closure Project – Northern Segment.....	4
North-South Greenway Gap Closure Project – Southern Segment.....	6
Improve Bellam Boulevard Off-Ramp from Northbound US 101 .....	8

**B. PROJECTS - PLANNING PHASE**

US 101/I-580 Multimodal and Local Access Improvements .....	10
State Route 37 .....	12
Highway 101 Interchanges and Approaching Roadway Studies.....	14
Marin County US 101 Part-Time Transit Lane.....	16
Marin City Flood Mitigation.....	18

**C. OTHER**

Project Phase Definitions.....	20
Acronyms and Abbreviations.....	21

**Project Status Report - Active**

**February 2024**

**Project: US 101 Marin-Sonoma Narrows Overview**

**Partners** Caltrans, Sonoma County Transportation Authority and Transportation Authority of Marin  
**Jurisdiction(s)** Novato, Petaluma

**Scope**

Widening of approximately 17 miles of US 101 from four to six lanes by adding HOV lanes in each direction; improving public transit and access to SMART rail network; installing continuous Class I and Class II bikeways between Novato and Petaluma; and constructing new interchanges and frontage roads to remove unsafe access from private properties and local roads.

Project will be completed through a series of phases based on operational priority and funding availability. As of the first quarter of 2023, all mainline HOV segments between Petaluma and Novato have been built or are under construction.

**Status**

- The final MSN HOV lane project in Marin County (MSN B7) commenced construction in July 2022 and is about half complete.
- The HOV lane project through the City of Petaluma in (MSN C2) is complete. It is the final mainline project in Sonoma County.
- Various non-mainline projects are still outstanding and will require funding.

**Issues/Areas of Concern**

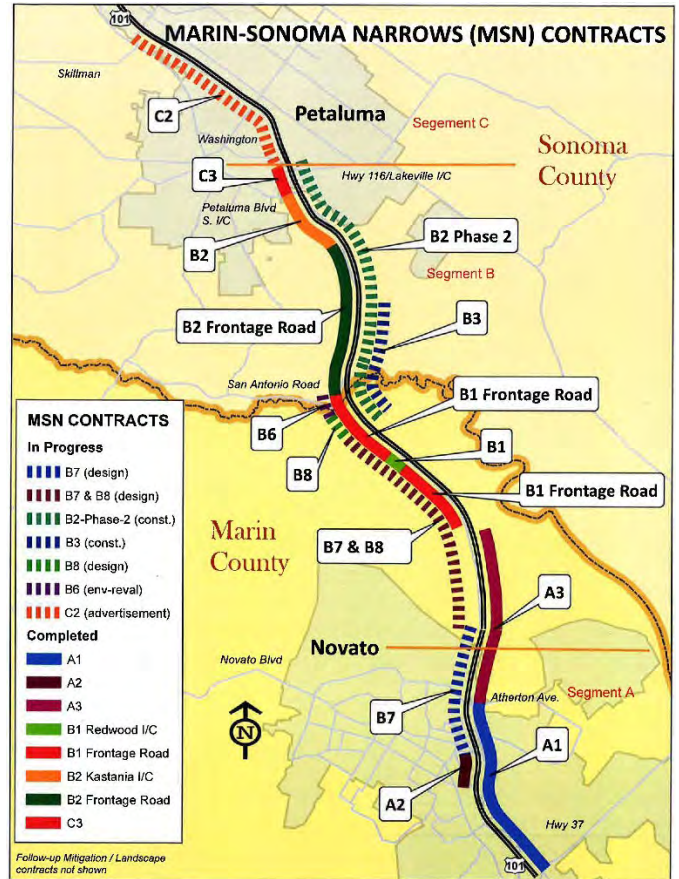
The MSN B7 project is fully funded with assistance from SB1 SCCP and MTC federal discretionary fund sources. The accompanying MSN B8 utility relocation project has entered the ROW acquisition phase and will encounter delay due to parcel owner resistance and funding. Minor vegetation restoration projects and a local San Antonio Road bridge reconstruction project (MSN B6) still remain as part of the overall MSN corridor work.

**MARIN-SONOMA NARROWS STATISTICS**

Project length.....17 miles  
 Avg. daily traffic – 2017.....153,000 vehicles  
 Avg. daily truck traffic – 2013.....6,200 trucks  
 Marin/Sonoma total populations.....258,000/495,000  
 Vehicle hours of delay (at less than 35 mph).....978,400

Funds programmed for MSN.....~\$720,819,000

Funds needed to complete MSN.....~ \$29,500,000



**Major Phase Status**

A1	Completed
A2	Completed
A3	Completed
B1 Phase I	Completed
B7 (Formerly B1-Phase II; See Fact Sheet)	In Progress
B2 Phase I	Completed
B2 Phase II	Completed
B3	Completed
B8 (Formerly A4 & B5; See Fact Sheet)	In Progress
B6	In Progress
C1	Completed
C2	In Progress
C3	Completed

**Project Status Report - Active****February 2024****Project: US 101 Marin-Sonoma Narrows – B7 and B8****Partners** Caltrans, Sonoma County Transportation Authority and Transportation Authority of Marin**Jurisdiction(s)** Novato**Scope**

Construct a southbound HOV lane from 0.3 mile south of the Marin/Sonoma County line to just south of Franklin Avenue Overhead, and a northbound HOV lane from 1.7 miles north of Atherton Avenue Overcrossing to 0.3 mile south of the Marin/Sonoma County line. Project includes bridge widening, interchange modifications, completing all HOV lanes in the NB and SB directions, standardizing shoulders, Class 2 bike lane construction and correcting the roadway alignment and vertical profiles, along with relocating remaining utilities.

**Status**

The project design is being funded with local, state and federal funds, with the HOV Lane design (MSN B7) completed in December 2020. Construction began in July 2022 and is approximately half complete. The MSN B8 design is on-going and will relocate major utility lines outside the Caltrans ROW and add Class 2 bike lanes to a county road. ROW acquisition, in terms of needed funds and resistance from property owners, is delaying completion of design.

**Issues/Areas of Concern**

- The project is an aggregate of three MSN projects, formerly called the B1 Phase 2, A4 and B5 projects. Due to the lengthy process with right-of-way (ROW) acquisition, the project was split into two concurrent paths: (1) design and construction of the HOV lanes (MSN B7) and (2) ROW acquisition and utility relocation (MSN B8).
- The project team continues to manage and monitor the construction of the MSN B7 project through various winter challenges. While they have delayed the project and resulted in change orders, they have been fortunately manageable with good partnership of the team members.
- The B8 project faces significant challenges with ROW acquisition and delay.

**Updates from Previous Report**

- B7 (HOV Lanes) is about half complete. Stage 3 of the 4 stages will start in the spring.
- Design support during construction will be augmented as construction progresses.

- Caltrans and TAM staff worked with executives to successfully preserve initial surplus of SB1 and MTC federal funds for the B7 and B8 projects to accommodate various funding shortfalls now encountered in the B7 and B8 projects.

**Schedule**

Planning	N/A
Environmental Clearance	2009
Design	2019-2020
Right of Way and Utilities	2018-2023
Construction	2022-2025

**Estimated Cost by Project Phase**

Planning	N/A
Environmental Clearance	N/A
Design	\$8,300,000
Right of Way and Utilities	11,100,000
Construction	123,100,000
<b>TOTAL</b>	<b>\$142,500,000</b>

**Funding by Source**

STIP Right of Way Excess Fund	\$4,550,000
SB1-LPP	500,000
Measure AA Sales Tax	6,905,000
STP	2,000,000
SB1-SCCP	40,118,000
RM3/MTC Fed Discretionary & Other	88,427,000
<b>TOTAL</b>	<b>\$142,500,000</b>

**Project Status Report - Active****February 2024****Project: US 101 Marin- Sonoma Narrows – B7 and B8****Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/ Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
C-FY18-12	7	Open	BKF Engineers	Design and Support Engineering Services and Construction Support	\$8,215,256	STIP ROW Fund & STP	\$7,971,214	97%
				TOTAL	\$8,215,256		\$7,971,214	97%

**Project Status Report - Active****February 2024****Project: North-South Greenway Gap Closure Project – Northern Segment****Partners** TAM, MTC, Caltrans and the City of Larkspur**Jurisdiction(s)** Caltrans and the City of Larkspur**Scope**

The Northern Segment of the North-South Greenway Gap Closure Project will close a key gap in the local and regional non-motorized transportation network between the Central Marin Ferry Connector bridge over Sir Francis Drake Boulevard and the pedestrian overcrossing of US 101 on Old Redwood Highway.

**Status**

- The new multi-use path over Corte Madera Creek opened for public use in July 2022 (Caltrans segment).
- The City of Larkspur is the implementing agency for the Old Redwood Highway Multi-Use Path (City Segment).
- All of the funding for construction has been programed directly to the City of Larkspur.
- TAM is providing Design During Construction.

**Issues/Areas of Concern**

- None.

**Updates from Previous Report**

- Construction is underway on the Old Redwood Highway segment of the Greenway. Construction is estimated to be complete by late spring or early this summer.
- The multi-use path over Corte Madera Creek has been recognized by the American Council of Engineering Companies to receive an Honor Award for Engineering Excellence. The project has also been recognized by the American Society of Civil Engineers for the Outstanding Bridge Project in California. This is in addition to the Active Transportation Project of the Year from the California Transportation Foundation.

**Schedule**

Planning	Complete
Environmental Clearance	Complete
Design	Complete
Right of Way and Utilities	Complete
Construction	2021-2024

**Estimated Cost by Project Phase**

Planning	-
Environmental Clearance	\$1,800,000
Design	\$3,400,000
Right of Way and Utilities	-
Construction	\$15,640,812
<b>TOTAL</b>	<b>\$20,840,812</b>

**Funding by Source**

RM2	\$15,000,000
CMAQ (Old Redwood Highway)	\$1,120,000
Measure A Interest Funds	\$1,225,000
SB1 LPP Incentive	\$1,500,000
LPP Formula	\$1,100,000
TDA	\$462,175
Local (City of Larkspur)	\$150,000
BAAQMD TFCA	\$283,637
<b>TOTAL</b>	<b>\$20,840,812</b>

**Project Status Report - Active****February 2024****Project: North-South Greenway Gap Closure Project – Northern Segment****Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/ Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
C-FY15-08	9	Open	Moffatt & Nichol	Environmental, Plans, Specifications and Estimates, Construction Administration (PAED, PS&E) (CON Support)	\$4,654,130	RM2, Measure AA	\$4,499,612	97%
Cooperative Agreement with Caltrans	1	Open	Caltrans	Construction and Construction Support	\$13,200,233	RM2 TDA TFCA SB1 LPP	\$13,059,429	98%
				TOTAL	\$17,650,233		\$17,559,041	99%

**Project Status Report - Active**

**February 2024**

**Project: North-South Greenway Gap Closure Project – Southern Segment (Larkspur & Corte Madera Segment)**

**Partners** MTC, SMART, the City of Larkspur and the Town of Corte Madera

**Jurisdiction(s)** Larkspur, Corte Madera

**Scope**

The Southern Segment of the North-South Greenway Gap Closure Project will close a key gap in the local and regional non-motorized transportation network between the southern terminus of the Northern Segment through a private easement (not yet secured) then along the Sonoma Marin Area Rail Transit (SMART) right-of-way south to Wornum Drive to connect to existing multi-use paths. The Gap Closure Project is being delivered in two segments, the Northern Segment and the Southern Segment. (Southern Segment shown in the adjacent graphic as red alignment.)

**Status**

- The use of the SMART right-of-way has been secured.
- The County of Marin Department of Public Works agreed to be the implementing agency for the initial alternative’s alignment analysis phase. TAM is the project sponsor.

**Issues/Areas of Concern**

- The Southern Segment requires acquisition of private right-of-way by means of easement.
- A MOU will be required between partners to identify roles and responsibilities.
- Project development has been suspended pending identification of future funding.

**Updates from Previous Report**

- No updates to report.



**Schedule**

Planning	TBD
Environmental Clearance	TBD
Design	TBD
Right of Way and Utilities	TBD
Construction	TBD

**Estimated Cost by Project Phase**

Planning	\$500,000
Environmental Clearance	TBD
Design	TBD
Right of Way and Utilities	850,000
Construction	TBD
<b>TOTAL</b>	<b>\$1,350,000</b>

**Funding by Source**

RM2	\$1,350,000
<b>TOTAL</b>	<b>\$1,350,000</b>



**Project Status Report – Active****February 2024****Project: North-South Greenway Gap Closure Project – Southern Segment****Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
A-FY14-22		Open	Marin County, Dept of Public Works	Project Management	\$1,350,000*	RM2	\$446,015	33%
A-FY14-21		Closed	SMART	Boundary Survey and Title Research	\$75,000	RM2	\$52,652	100%
A-FY18-18		Closed	SMART	Right-of-Way	\$850,000	RM2	\$850,000	100%
				TOTAL	\$2,275,000		\$1,348,667	59%

\*A portion of this allocation re-directed to another project.

**Project Status Report - Active**

**February 2024**

**Project: Improve Bellam Boulevard Off-Ramp from Northbound US 101**

**Partners** Caltrans, Transportation Authority of Marin, and City of San Rafael

**Jurisdiction(s)** Caltrans and City of San Rafael

**Scope**

Improve the Bellam Boulevard off-ramp from US 101 by creating additional storage. Traffic making a left turn at Bellam will be directed to the left lane, while traffic heading to I-580 or turning right on Bellam will stay in the right lane. Lane striping will be modified near Bellam to reduce the lane changes required to make a right on Bellam if exiting from eastbound I-580.

The off-ramps are the only freeway access to the economically disadvantaged Canal Neighborhood.

**Status**

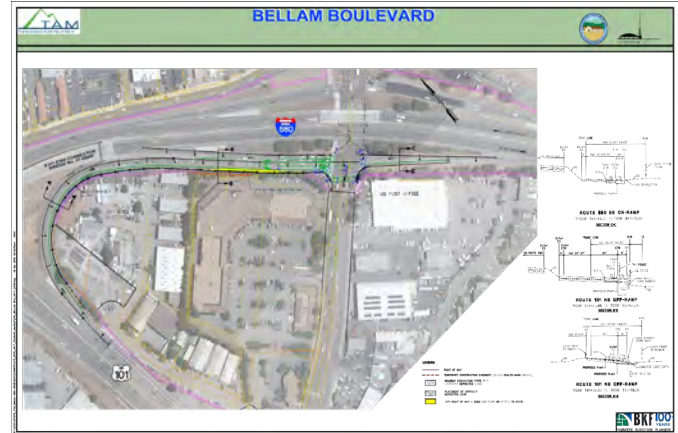
The CEQA document was recorded on August 15, 2018. Design approval from Caltrans is expected in Spring 2024. Right of Way Agreement negotiations are underway. The County of Marin has indicated that they will administer the construction contract. The Project required a redesign and is short of funds to complete.

**Issues/Area of Concern**

The design changes along with the transfer of funds from this project to the Sir Francis Drake Flyover have left a funding shortfall of approximately \$4 million. The Right of Way agreement with Marin Square has expired and will require new negotiations. Tree removal must occur during August to January.

**Updates from Previous Report**

Caltrans approval for the design exceptions has been approved. The County of Marin has agreed to work with TAM to administer the construction contract.



**Schedule**

Planning	Complete
Environmental Clearance	Complete
Design	Spring 2024
Right of Way and Utilities	Summer 2024
Construction (pending funding)	Begin Fall 2024

**Estimated Cost by Project Phase**

Planning	\$30,000
Environmental Clearance	90,000
Design	1,250,000
Right of Way and Utilities	700,000
Construction	7,100,000
<b>TOTAL</b>	<b>\$9,170,000</b>

**Funding By Source**

Measure A and AA Sales Tax	\$4,025,000
Local Partnership Program	1,164,000
<b>TOTAL</b>	<b>\$5,189,000</b>

**Project Status Report – Active****February 2024****Project: Improve Bellam Boulevard Off-Ramp from Northbound US 101****Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
C-FY17-02	3	Open	BKF Engineers	Complete design services including environmental.	\$1,176,325	Measure A/AA Sales Tax	\$1,002,663	85%
A-FY19-17		Closed	County of Marin	Agreement to manage construction including construction management*	\$63,888*	Measure A Sales Tax	\$63,888	100%
				TOTAL	\$1,240,213		\$1,066,551	86%

\*This agreement has expired.

## Project Status Report – Planning

February 2024

**Project:** **US 101/I-580 Multimodal and Local Access Improvements**

**Partners** Caltrans, Metropolitan Transportation Commission, Transportation Authority of Marin, City of San Rafael and City of Larkspur

**Jurisdiction(s)** Caltrans and City of San Rafael

### Scope

Improve access to local communities within San Rafael and Larkspur. Studies have shown that separating regional traffic from local traffic will assist in this effort. In addition, the Project will Improve local circulation on Sir Francis Drake and Bellam Boulevards. The eastbound approach to the RSR Bridge is one of only two toll bridges in the Bay Area accessed by low-speed local roads with traffic signals resulting in traffic delays on local roads and US 101.

### Status

The Project Study Report (PSR) has been approved by Caltrans. Traffic studies are continuing and should be ready to share with the TAM Board this Spring. The environmental process is scheduled to begin this Summer.

### Issues/Area of Concern

- Significant comments from Caltrans regarding ramp metering, sea level rise, VMT, and design exceptions.
- Additional funding likely needed for construction.
- Still exploring options to improve local circulation.

### Updates from Previous Report

- Targeted outreach occurred in nearby neighborhoods and a presentation of local needs was made to TAM and San Rafael
- Traffic studies for local circulation are currently being completed.
- The final Stakeholder Working Group meeting occurred in Fall 2023. A new stakeholder group is being organized to assist with the environmental process.



### Schedule

Planning	2020
Environmental Clearance	2027
Design	2029
Right of Way and Utilities	2031
Construction	2033

### Estimated Cost by Project Phase

Planning	\$1,750,000
Environmental Clearance	3,500,000
Design	9,000,000
Right of Way and Utilities	8-30 M
Construction (depends on alternative)	170-270 M
<b>TOTAL</b>	<b>\$192-315 M</b>

### Funding By Source

RM 3	\$135,000,000
Measure A/AA Sales Tax	17,000,000
<b>TOTAL</b>	<b>\$152,000,000</b>

**Project Status Report – Active****February 2024****Project: US 101/I-580 Multimodal and Local Access Improvement Project****Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/ Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
C-FY12-09	1	Closed	CSW/Stuber-Stroeh Engineering Group (Task Order 32)	Develop Alternatives, Cost Estimates, Graphic Rendering, Environmental Evaluation	\$102,000	Measure A Sales Tax	\$102,000	100%
C-FY20-01	1	Open	Kimley-Horn & Associates, Inc.	Project Approval and Environmental Document (PAED)	\$6,500,000	Measure AA Sales Tax	\$3,171,025	49%
C-FY20-02		Open	Fremier Enterprises Inc.	Project Management	\$400,000	Measure AA Sales Tax	\$274,559	69%
				TOTAL	\$7,002,000		\$3,547,584	51%

**Project Status Report – Planning & Active**

**February 2024**

<b>Project:</b>	<b>State Route 37</b>
<b>Partners</b>	Caltrans, Metropolitan Transportation Commission, and Transportation Authorities of Marin, Sonoma, Napa and Solano Counties
<b>Jurisdiction(s)</b>	Marin County

**Scope**

State Route 37 is a key transportation corridor stretching from US 101 in Marin County to Interstate 80 in Solano County. Evaluation of the corridor has been assigned to a policy committee comprised of transportation authorities from Marin, Sonoma, Solano and Napa counties to address sea level rise, traffic congestion, transit options and recreational activities.

**Status**

Segment B in Solano and Sonoma Counties was prioritized for congestion relief. Segment A consists of Marin and portions of Sonoma County. Segment C is in Solano County.

There are currently three major concurrent projects on the corridor: (1) Segment B interim improvements to relieve congestion led by MTC, (2) Segment A flood reduction project led by Caltrans and (3) Corridor-wide Planning-Environmental Linkage (PEL) study project prioritization.

**Issues/Area of Concern**

A segment of the four-lane freeway in Novato had been closed due to the flooding of Novato Creek in January and February 2017, in February 2019, and in January 2023. Heavy congestion occurs in Segment B, where there is one lane in each direction. Since the corridor is 21-miles long, spanning four counties, the solutions to making the corridor resilient and reliable are complex and very costly.

**Updates from Previous Report**

The Caltrans’ Segment A1 (Marin County) environmental clearance effort (PA/ED) was completed at the end of January 2024. New state funding (\$20 million) was allocated to begin design work when ready. Caltrans recently announced in August that it has secured \$155 million in IJA-Protect funds for construction of Phase 1 (Novato Creek Bridge) of Segment A1. No funds are currently available for Phase 2 (remainder).

MTC and Caltrans certified the final environmental document (FED) for the Sears Point to Mare Island project in Segment B during the first quarter of 2023 in coordination with a partnership agreement with regulatory agencies. Design effort is in progress for this interim

improvement project. Construction funding is still being developed with the anticipated start of construction sometime in 2025-26.

Caltrans completed the PEL study early last year, with a project prioritization exercise kicking off this spring.



**Schedule – Segment A1**

Planning	2018
Environmental Clearance	2023
Design	TBD
Right of Way and Utilities	TBD
Construction	TBD

**Estimated Cost by Project Phase – Segment A1**

Planning	NA
Environmental	\$10,000,000
Design	\$20,000,000+
Right of Way and Utilities	\$21,700,000+
Construction	\$837,400,000+
<b>TOTAL</b>	<b>\$889,100,000+</b>

**Funding by Source – Segment A1**

Caltrans SHOPP	\$10,000,000
State Earmark	\$20,000,000
IJA PROTECT	\$155,200,000
<b>TOTAL</b>	<b>\$185,200,000</b>

**Project Status Report – Planning & Active****February 2024****Project: State Route 37****Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
A-FY16-10		Closed	Solano Transportation Authority	Design Alternatives	\$40,000	City/County	\$40,000	100%
C-FY17-16	1	Closed	CSW/Stuber-Stroeh Engineering Group (Task Order 11)	Segment A - Improvement Concept Study	\$88,000	City/County	\$85,922	97%
A-FY19-10		Closed	NVTA, STA, SCTA and TAM	SR37 Travel Behavior Feasibility Study	\$11,765	City/County	\$11,765	100%
A-FY19-07		Closed	County of Marin	SR37 Adaptation Study	\$30,000	City/County	\$30,000	100%
				TOTAL	\$169,765		\$167,687	98%

## Project Status Report – Planning

February 2024

**Project:** Highway 101 Interchanges and Approaching Roadways Studies  
**Partners** Caltrans, Marin County, Marin’s Cities, Marin Transit, Golden Gate Transit  
**Jurisdiction(s)** Marin County, San Rafael, Novato and Caltrans

### Scope

The Measure AA Expenditure Plan includes a category that provides funding for studies of interchanges on Highway 101. The Studies will be used to develop multi-modal improvement concepts to Highway 101 interchanges and highway access routes to reduce congestion, improve connectivity, and improve local traffic operations.

The transportation sales tax funding will be used as “seed money” to prepare studies and reports that can support application for regional, state, and federal grants.

### Status

The studies have been developed to outline existing conditions, define constraints, and present opportunities for potential improvements to the interchanges and local roadways.

An implementation plan was prepared based on the interchange studies and results from the prioritization plan. The approved recommendation was to advance three interchange locations to the next phase of project development using Caltrans procedures. The following interchanges have advanced to the next phase of project development:

- East Blithedale/Tiburon Blvd (SR 131)
- Manual T. Freitas Parkway/Civic Center Drive
- Alameda Del Prado/Nave Drive

### Issues/Area of Concern

None.

### Updates from Previous Report

Work continues to refine the improvement concepts and develop a Project Initiation Document (PID) for the three locations.



### Schedule

Planning	2020-2022
Environmental Clearance	TBD
Design	TBD
Right of Way and Utilities	TBD
Construction	TBD

### Estimated Cost by Project Phase

Planning	\$4,431,000
Environmental	TBD
Design	TBD
Right of Way and Utilities	TBD
Construction	TBD
<b>TOTAL</b>	<b>\$4,431,000</b>

### Funding by Source

Measure AA Sales Tax	\$4,431,000
<b>TOTAL</b>	<b>\$4,431,000</b>



**Project Status Report – Planning****February 2024****Project: Studies for Twelve US 101 Interchanges and Approaching Roadways****Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
C-FY20-09		Open	HNTB Corporation	Professional Engineering Services	\$4,431,000	Measure AA Sales Tax	\$2,183,468	49%
				TOTAL	\$4,431,000		\$2,183,468	49%

## Project Status Report – Planning

February 2024

<b>Project:</b>	<b>Marin County US 101 Part-Time Transit Lane Study</b>
<b>Partners</b>	Caltrans, Marin County, Marin’s Cities, Marin Transit, Golden Gate Transit
<b>Jurisdiction(s)</b>	Marin County and Caltrans

### Scope

This project would provide part-time bus operations on the shoulder of Southbound US 101 in Marin County between Novato and San Rafael. Bus on Shoulder, or Part-Time Transit Lane, is a proven concept to improve transit reliability and speed according to FHWA guidance, and a TAM feasibility study identified benefits to both Golden Gate Transit and Marin Transit Services. The conceptual design would allow for the operation of Transit buses in existing auxiliary lanes, on/off ramps, and shoulder lane with minor modifications to the striping and lane widths on the highway.

### Status

TAM has completed a feasibility study and concept design, cost estimates and operational plans for the project among other items in October 2021. The next step will involve Project Initiation with Caltrans and determine funding availability.

### Issues/Area of Concern

Performance measurements would be required for any pilot project, these would include safety measures, CHP enforcement, and other concerns raised during the feasibility study. Potential legislation is also being sought to clarify vehicle code and enforcement concerns.

### Updates from Previous Report

Marin Transit was awarded \$1,107,000 from the MTC sponsored Transit Performance Initiative with TAM serving as the implementing agency. A local match in the amount of \$140,000 will be required. Marin Transit has submitted the application to transfer the funds to the FTA.



### Schedule

Planning	2021-2024
Environmental Clearance	TBD
Design	TBD
Right of Way and Utilities	TBD
Construction	TBD

### Estimated Cost by Project Phase

Planning	\$350,000
Environmental	\$800,000
Design	\$1,200,000
Right of Way and Utilities	TBD
Construction	\$5,000,000
<b>TOTAL (FY \$2019)</b>	<b>\$7,000,000</b>

### Funding by Source

Caltrans Planning Grant	\$350,000
<b>TOTAL</b>	<b>\$350,000</b>

**Project Status Report – Planning**

**February 2024**

**Project: Marin County US 101 Part-Time Transit Lane Study**

**Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/ Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
C-FY20-07		Closed	Kimley-Horn and Associates, Inc.	Planning Services	\$308,000	Caltrans Grant	\$308,000	100%
				TOTAL	\$308,000		\$308,000	100%

## Project Status Report – Planning & Active

February 2024

### Project: Marin City Flood Mitigation Projects

**Partners** Caltrans, County of Marin, and Transportation Authorities of Marin

**Jurisdiction(s)** Marin County

#### Scope

TAM is currently administering \$10 million in state earmark funds to distribute to Caltrans and the County of Marin for flood mitigation projects within the Marin City area of Marin County.

#### Status

Four projects have been identified by the County and one by Caltrans to be funded by the state earmark:

1. Portable Pump Station at Donahue Street
2. Permanent Pump Station in Existing Pond
3. Permanent Floodwall
4. Environmental Pond Dredging
5. Second Culvert Under Hwy 101 (Caltrans)

TAM and the County executed a funding agreement to implement the County's four projects.

#### Issues/Area of Concern

US 101 near Marin City and the Manzanita Park & Ride lot continually experience flood events due to a combination of roadway settlement, sea level rise, higher King tides, and maintenance challenges, sometimes closing off access to these areas.

#### Updates from Previous Report

TAM and the County executed a funding agreement to implement the County's four projects.

The County of Marin is working on completing the Portable Pump Station and anticipates being completed later this year.



#### Schedule

Planning	N/A
Environmental Clearance	N/A
Design	N/A
Right of Way and Utilities	N/A
Construction	N/A

#### Funding Distribution by Project/Activity

Potable Pump Station	\$2,500,000
Permanent Pump Station	\$400,000
Permanent Floodwall	\$750,000
Pond Dredging	\$3,000,000
Second Culvert	\$2,850,000
TAM Administration	\$500,000
<b>TOTAL</b>	<b>\$10,000,000</b>

#### Funding by Source

County	TBD
Caltrans IJJA PROTECT	\$20,000,000
State Earmark	\$10,000,000
<b>TOTAL</b>	<b>TBD</b>

**Project Status Report – Planning & Active**

**February 2024**

**Project: Marin City Flood Mitigation Projects**

**Contracts and Agreements Managed by TAM**

<b>Contract or Agreement No.</b>	<b>Amend No.</b>	<b>Open/ Closed</b>	<b>Agency/Consultant</b>	<b>Description</b>	<b>Appropriated Amount</b>	<b>Funding Source</b>	<b>Billed to Date</b>	<b>Percent Billed</b>
A-FY24-02		Open	County of Marin	County of Marin Mitigation Projects	\$6,650,000	State Earmark	\$265,554	4%
				TOTAL	\$6,650,000		\$265,554	4%

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**PROJECT PHASE DEFINITIONS**

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**Planning** – Complete project studies to define general project parameters.

**Environmental Clearance** – Completion of and approval of environmental studies and/or reports. Environmental analysis assesses the potential impacts a project may have on the natural and/or built environment.

**Design** – Engineer and design project leading to the preparation of plans, specifications and construction estimates. Resource agency permits are obtained in the final design stage in preparation to advertise the project for construction bidding.

**Right of Way and Utilities** – Establish cost and obtain ownership/passage through a given area for the benefit of project completion. Establish utilities needed for the project and relocation if necessary. Right-of-way certification required if using federal funds or if the project is on state highway system.

**Construction** – Includes actual construction, construction management and construction related design. Actual construction close-out duration may go for years after scheduled completion date shown.

**Project Management** – Project or construction management and oversight support of projects to carry out elements of construction. Project management is provided by in-house agency staff and consultants. Typically includes construction materials testing for contract compliance.

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**ACRONYMS AND ABBREVIATIONS**


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ABAG	Association of Bay Area Governments
ATP	Active Transportation Program
BAIFA	Bay Area Infrastructure Financing Authority
BAAQMD	Bay Area Air Quality Management District
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CMP	Congestion Management Program
CO-OP	Cooperative Agreement
CTC	California Transportation Commission
DPW	Department of Public Works
EEMP	Environmental Enhancement and Mitigation
EIR	Environmental Impact Report
EIS	Environmental Impact Study
ENV MITG	Environmental Mitigation
EV	Electric Vehicles
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GGT	Golden Gate Transit
GGBHTD	Golden Gate Bridge Highway and Transportation District
HOT Lane	High Occupancy Toll Lane
HOV Lane	High Occupancy Vehicle Lane
ITIP	Interregional Transportation Improvement Program
ITS	Intelligent Transportation Systems
LOS	Level of Service
MCBC	Marin County Bicycle Coalition
MPO	Metropolitan Planning Organization
MPWA	Marin Public Works Association
MT	Marin Transit
MTC	Metropolitan Transportation Commission
MTS	Metropolitan Transportation System

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**ACRONYMS AND ABBREVIATIONS**


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NEPA	National Environmental Policy Act
NOP	Notice of Preparation
NTPP	Non-motorized Transportation Pilot Program
OBAG	One Bay Area Grant
PA&ED	Project Approval & Environmental Document
PCA	Priority Conservation Area
PCI	Pavement Condition Index
PDA	Priority Development Area
PID	Project Initiation Document
PS&E	Plans, Specifications and Engineers Estimates
PSR	Project Study Report
PTTL	Part Time Transit Lane
RHNA	Regional Housing Needs Allocation
RM 2	Regional Measure 2
RM3	Regional Measure 3
ROW	Right of Way
ROW CAP	Right of Way Capital
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
SCS	Sustainable Communities Strategy
SLPP	State Local Partnership Program
SMART	Sonoma Marin Area Rail Transit
SR2S	Safe Routes to Schools
STA	State Transit Assistance; also, Solano Transportation Authority
STIP	State Transportation Improvement Program
STIP-IIP	Interregional Transportation Improvement Program
STIP-RIP	Regional Transportation Improvement Program
STP	Surface Transportation Program
TBD	To Be Determined
TCRP	Traffic Congestion Relief Program
TEA-21	Transportation Equity Act for the 21 <sup>st</sup> Century
TIP	Federal Transportation Improvement Program
VRF	Vehicle Registration Fee





Item 5 - Attachment B

# TAM Semi-Annual Project Update

Transportation Authority of Marin

Administration, Projects and Planning  
Executive Committee

February 12, 2024

# TAM Project Update

1. Marin-Sonoma Narrows
2. State Route 37
3. North-South Greenway Gap Closure
4. Highway 101 Interchange Studies
5. US 101/I-580 Multimodal and Local Access Improvements
6. Bellam Blvd Off-Ramp from Northbound US 101
7. US 101 & Marin City Flood Mitigation Coordination
8. US 101 Part-Time Transit Lane

# US 101 – Marin-Sonoma Narrows B7 & B8

## Current Phase:

Construction (B7) & Final Design (B8)

## Update from Prior Report:

- MSN B7 construction started in July 2022, has gone through two winter seasons, and will be moving to Stage 3 of 4 work (NB lanes).
- MSN B8 (utility relocation and Class 2 bike lane on San Antonio Rd.) is in final design but is delayed due to difficult and costly right-of-way (ROW) acquisition.
- Funding solution for B7 stormwater compliance and B8 ROW acquisition shortfalls has been initially identified, in partnership with Caltrans and MTC.

## Issues:

- During construction of the MSN B7 project, field challenges and cost must be managed effectively.
- MSN B8 ROW acquisition will continue to be challenging.

## Upcoming Activities:

- Continue construction of B7
- Secure funds for shortfalls, apply for environmental permits, and complete the design package for B8.



# State Route 37

## Current Phase:

Planning and Environmental Clearance

## Update from Prior Report:

- Segment A1 (Marin) – Caltrans released the Final Environmental Document in January 2024. Design and construction funds for “Phase 1 – Novato Creek Bridge” were secured. TAM is negotiating with Caltrans for a design cooperative agreement for Phase 1 and 2.
- Segment B, Sears Point to Mare Island Improvement project – Design work is ongoing and targeted for completion by 2025 and into construction by 2026. A full funding plan for construction is yet to be finalized.
- SMART is working with Caltrans Division of Rail and Mass Transportation to prepare a Project Initiation Document (PID) to study passenger rail service concepts in the corridor. Draft information was provided at the February 1st Policy Committee meeting.
- A new partnership structure is being finalized for the SR 37 corridor to include new state and regional agencies, including the tribal community.
- Funding:
  - \$155 million in IIJA-Protect program for Marin Segment A1 was secured by Caltrans for construction. Additional construction funds will be needed.
  - CTC tolling authority was approved for Segment B.
  - RM3 funds are being released



# State Route 37 (cont.)

## Issues:

- Additional environmental review for Tolay Creek and Strip Marsh East continue for Segment B
- Additional funding needed for environmental work for Ultimate project
- Construction funding needed for all segments

## Upcoming Activities:

- Ongoing discussions regarding Segment B
- Transit planning for corridor (near-term, related to Segment B)
- Partners will work to prioritize PEL project segments for ultimate condition
- Pursuit of funding



# North-South Greenway Gap Closure

## Current Phase:

Construction of Old Redwood Highway Segment

## Update from Prior Report:

- Programmed construction funding
- Finalized construction documents
- City of Larkspur Awarded Construction Contract

## Issues:

- None

## Upcoming Activities:

- City of Larkspur is the implementing Agency for the project during the construction phase
- TAM will provide Design Services during construction



# Highway 101 Interchange Studies

## Current Phase:

Project Initiation Document (PID) Phase for the three selected interchange locations:

1. East Blithedale/Tiburon Blvd (SR 131)
2. Manual T. Freitas Parkway/Civic Center Drive
3. Alameda Del Prado/Nave Drive

## Update from Prior Report:

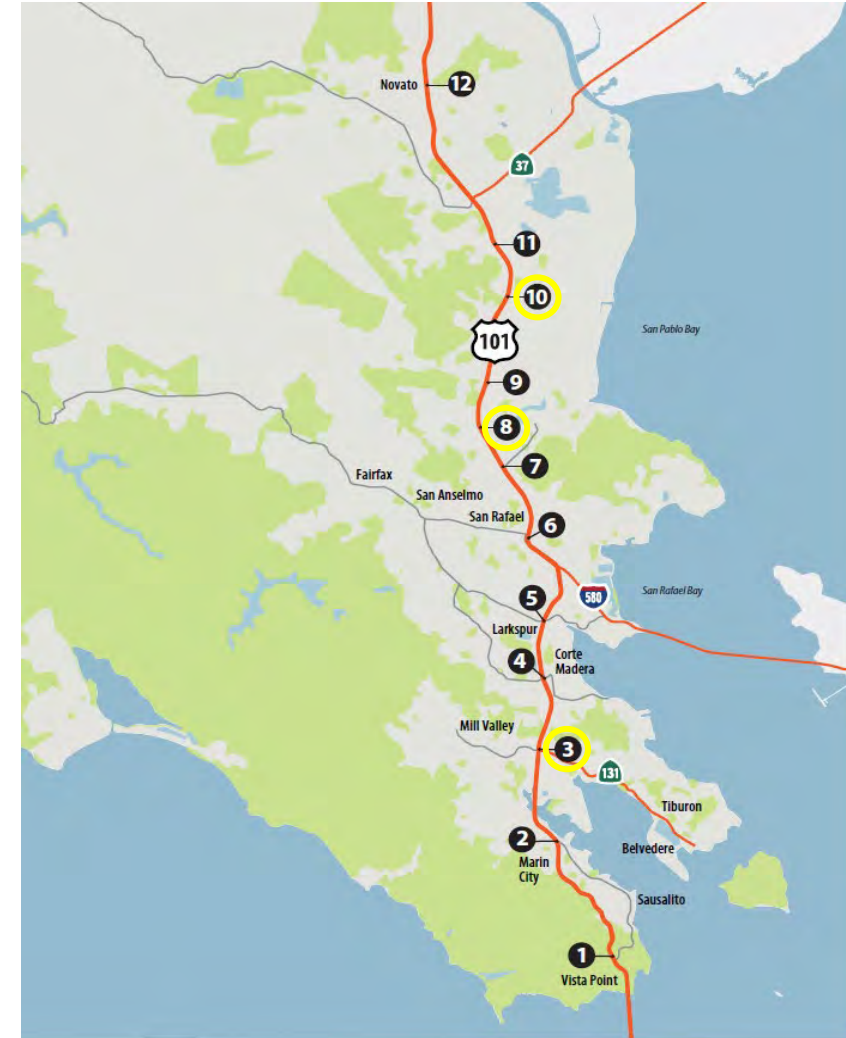
- Continue with Preparation of PID

## Issues:

- None

## Upcoming Activities:

- Continue PID development working with Caltrans, Transit Agencies and the County, Cities & Towns



# 101/580 Multi-Modal & Local Access Improvements

## Current Phase:

Planning

## Update from Prior Report:

- Project Study Report (PSR) approved
- Preliminary traffic studies completed

## Issues:

- Caltrans approval of non-standard features
- Caltrans comments on VMT, Sea Level Rise and ramp metering
- Funding shortfall for construction
- Exploring ideas to alleviate Bellam Blvd. congestion

## Upcoming Activities:

- PAED Cooperative Agreement with Caltrans
- Begin environmental process
- Bring MOU between agencies to TAM Board for consideration





# Bellam Boulevard Off-Ramp Improvements

## Current Phase:

Design

## Update from Prior Report:

- Design exceptions approved
- Final Design Submitted to Caltrans
- Right of Way appraisal and negotiations underway
- County of Marin has agreed to administer construction

## Issues:

- Over \$4M budget shortfall
- Tight construction window due to tree removal

## Upcoming Activities:

- ROW negotiation
- Interagency Agreement with Marin County
- Determine funding plan



# US 101 & Marin City Flood Mitigation Coordination

## Current Phase:

Planning & Design

## Update from Prior Report:

- County is designing the portable pump project and anticipates the project to be in place by end of 2024.
- Funding agreement with County of Marin has been executed.

## Issues:

- US 101 near Marin City and the Manzanita Park & Ride lot experiences flood events due to a combination of roadway settlement, sea level rise, higher King tides, and maintenance challenges; sometimes closing off access to these areas.

## Upcoming Activities:

- Staff is actively engaged with Caltrans and County of Marin to plan and monitor improvement projects.



Photo courtesy of Pacific Sun

# US 101 Part-Time Transit Lane (Bus on Shoulder)

## Current Phase:

Pre-Project Initiation Document (PID) Activities

## Update From Prior Report:

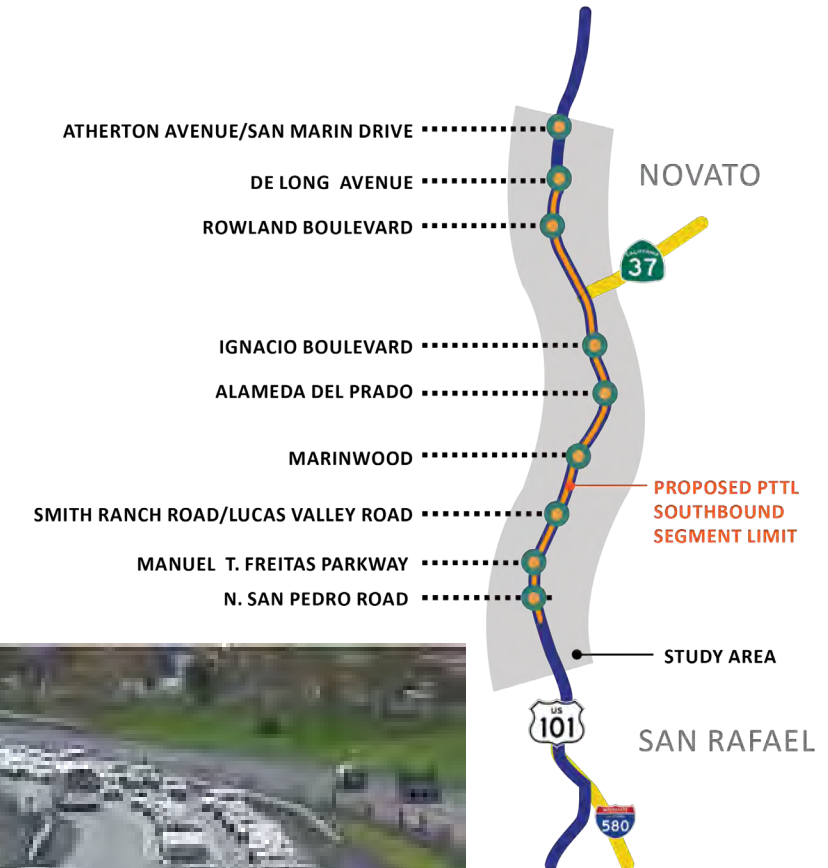
- MTC approved \$1.1M funding for PID and PA/ED phase of project

## Issues:

- None

## Upcoming Activities:

- Transfer Funds to FTA and Initiate Agreement with Marin Transit
- Initiate Cooperative Agreement with Caltrans



# Questions?

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## Questions & Discussion



**Date:** February 1, 2024

**Contact:** Bart Ney

[Bart.Ney@dot.ca.gov](mailto:Bart.Ney@dot.ca.gov)

**Phone:** (510) 715-7212

**FOR IMMEDIATE RELEASE**

**STATE ROUTE 37 TRANSFORMATION BUILDS MOMENTUM WITH EXPANDED PARTNERSHIP**

New Leadership Structure Includes Tribes, Environmental Agencies and Federal and State Leaders

**NORTH BAY** – Building on significant progress and numerous milestones over the past year on State Route 37 (SR-37), several new agencies are joining the Resilient SR-37 partnership team to collaborate on near- and long-term solutions to transform the entire 21-mile corridor between U.S. 101 in Novato and Interstate 80 in Vallejo. Formalized at the multi-county SR-37 Policy Committee meeting today in Napa – which included virtual appearances by California’s secretaries of transportation and natural resources – the expanded partnership highlights the collaborative, multi-layered approach to creating a resilient, climate-friendly corridor.

In another important development, Caltrans today announced completion of the environmental documents needed to begin design work on the SR-37 Flood Reduction Project in Marin County. These milestones come on the heels of a busy 2023 that included securing new funding, completing key project studies and reports, and receiving tolling authority from the California Transportation Commission (CTC).

“We continue to gain momentum to transform SR-37 into a resilient, multimodal corridor focused on mobility, equity and the environment,” said California Transportation Secretary Toks Omishakin. “Through this expanded partnership, we can help ensure those objectives come to fruition by collaborating directly with the local communities along with experts in resource management, science, and engineering. Working together, we will help this vital corridor, the communities it connects, and its surrounding ecosystems thrive for generations to come.”

One of the key new agencies entering the partnership is the California Natural Resource Agency. “We’re looking forward to a new level of partnership on reimagining SR-37 that elevates our ambition on climate resiliency and restores critical bay habitat,” said Natural Resources Secretary Wade Crowfoot. “This corridor can be a national model for climate resilient transportation infrastructure and we’re continuing to pursue federal funding to accelerate this important work.”

Current partners are excited to see momentum building on the SR-37 Corridor.

“Bringing new organizations into the partnership will help ensure that we meet our environmental and equity goals while also increasing mobility and reducing traffic congestion,” said Solano County Supervisor and SR-37 Policy Committee Chair Erin Hannigan. “We are working on an organizational structure that will include other resource agencies and North Bay tribes. This more inclusive team will promote accountability to all the affected communities along the corridor.”

The Resilient SR-37 Partnership agencies — which include Caltrans, the Metropolitan Transportation Commission, the Transportation Authority of Marin, Napa Valley Transportation Authority, Solano Transportation Authority, Sonoma County Transportation Authority and Sonoma Marin Area Rail Transit District (SMART) — look to work closely with colleagues from the United States (U.S.) Army Corps of Engineers, the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the California Natural Resource Agency, the California Department of Fish and Wildlife, the San Francisco Bay Regional Water Quality Board and the San Francisco Bay Conservation and Development Commission, as well as the Federated Indians of Graton Rancheria and the Yocha Dehe Wintun Nation.

The Resilient SR-37 Partnership agencies last year secured \$205 million in funding for key projects along the corridor. This includes \$155 million from the federal Infrastructure Investment and Jobs Act and \$50 million from the state Local Transportation Climate Adaption Program. Federal dollars will be used to replace Novato Creek Bridge with an elevated structure that will address projected sea-level rise for the next century. State money will help replace the Tolay Creek Bridge in Sonoma County and restore Strip Marsh East, a tidal marshland west of Mare Island in Vallejo. The partners continue to seek additional funding to deliver other planned corridor improvements and environmental enhancements.

The following is a list of accomplishments in 2023 as well as a look at what is ahead for SR-37 this year:

## 2023 Highlights and Accomplishments

- Near-term Sears Point to Mare Island Improvement Project
  - Completion of the Final Environmental Impact Report
  - Secured \$50 million LTCAP Grant for near-term transportation resilience

- Received authority to toll the route from CTC
- Long-term Flood Reduction Project (Hwy 101 to Atherton)
  - Released Draft Environmental Impact Report
  - \$155M for Novato Creek Bridge
- Fairgrounds Drive Intersection Improvement Project fully funded
- SMART
  - Started the Project Initiation Document phase
  - Planning study initiated for passenger rail between Novato and Suisun
- Novato Creek Baylands Strategy
  - Initiated the effort
  - \$400K to develop the strategy
- North Baylands Regional Conservation Investment Strategy (RCIS)
  - Released draft conservation strategy
- SR 37 Partnership
  - Completed SR 37 Partnership Agreement
  - Developed expanded organization to deliver upon commitments
  - Expanded Tribal engagement
- Public Engagement
  - Conducted tours/developed virtual tour- <https://www.resilient37.org/>
  - Held more than a dozen outreach events.

## 2024 Look Ahead

- Near-term Sears Point to Mare Island Improvement Project
  - Complete Tolay Creek Bridge and Strip Marsh East environmental analysis
  - Obtain Contract Manager/General Contractor
  - Apply for state and federal funding
- Long-term Flood Reduction Project (Hwy 101 to Atherton)
  - Finalize EIR/EA
  - Begin Final design and permitting phase
- SR 37 Rail
  - Draft & Final Rail Study
- Novato Creek Baylands Strategy
  - Develop draft strategy
- North Bay Baylands RCIS
  - Finalize RCIS
- Expanded Partnership structure implemented

For more information on SR-37, please visit:

<https://dot.ca.gov/caltrans-near-me/district-4/d4-projects/d4-37-corridor-projects>

or [resilient37.org](https://www.resilient37.org).

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**DATE:** February 12, 2024

**TO:** Transportation Authority of Marin  
Administration, Projects & Planning Executive Committee

**FROM:** Anne Richman, Executive Director *Anne Richman*  
Mikaela Hiatt, Associate Transportation Planner

**SUBJECT:** Update on the Sea Level Rise Adaptation Planning for Marin County's  
Transportation System Project (Discussion), Agenda Item No. 6

---

## RECOMMENDATION

Discussion item only. The Administration, Projects & Planning (AP&P) Executive Committee reviews and provides feedback on the Sea Level Rise Adaptation Planning for Marin County's Transportation System Project.

## BACKGROUND

TAM has been coordinating with partner agencies and stakeholders in Marin County and the region to advance adaptation planning for sea level rise. The Measure AA ½-Cent Transportation Sales Tax Expenditure Plan sets aside 1% of the transportation sales tax under "Category 2.3: Develop projects to address transportation impacts from sea level rise (SLR)". The expenditure plan states:

"This funding would be utilized to support protecting and adapting Marin's roadways and related infrastructure to the effects of sea level rise and flooding. These funds can be used to serve as seed money to find solutions, attract matching grants and leverage private investments to meet the challenges and vulnerabilities identified in numerous planning efforts including those of Bay Wave, and CSMART."

Staff presented to the TAM Board on October 27, 2022 and the Board was interested in focusing TAM's role on identifying projects for the project development process, supporting smaller local projects and multimodal locations, supporting operational responses prior to storm events, and developing proof of concept projects. On April 27, 2023, the TAM Board reviewed and approved the scope of work and contract for ARUP, the consultant to this planning effort, to help lead the Sea Level Rise Adaptation Planning for Marin County's Transportation System.

This effort is intended to build off previous adaptation planning efforts conducted in Marin County and the region to develop an implementation plan for TAM to support Marin County's Transportation System.

## DISCUSSION/ANALYSIS

Since the contract authorization, staff has been working with the technical advisory committee (TAC) developed to help support the planning process. The TAC consists of members from the Marin County Department of Public Works (DPW) and Community Development Agency (CDA), local jurisdictions' sustainability coordinators and public works directors, the Metropolitan Transportation Commission (MTC), the San Francisco Bay Conservation and Development Commission (BCDC), and Caltrans

District 4 staff. The TAC members have all helped complete the initial tasks identified in the scope of work.

The scope of work for the contract includes the following tasks:

1. Agency Coordination (Includes the development of the TAC and a series of focus/stakeholder groups.)
2. Existing Plan Review
3. Identification of Vulnerable Locations
4. Identification of a Range of Adaptation Measures
5. Governance Review
6. Implementation Plan Development
7. Draft and Final Report
8. Project Management

Discussion today will focus on the Existing Plan Review and the Identification of Vulnerable Locations. In tandem with the TAC, the project team completed a thorough review of the existing planning efforts throughout the county to build off the work conducted to date and lay the foundation for the plan.

With the information gathered from the Existing Plan Review, ARUP and their subconsultant Pathways Institute helped develop Vulnerable Location Focus Areas. These focus areas evaluate the impacts that sea level rise, groundwater inundation, and storms will have throughout Marin County on the system's roadways, the transportation assets, Equity Priority Communities (EPCs), and critical assets (such as hospitals, wastewater treatment centers, and more). In total, there are 19 focus areas identified throughout the County that are expected to be impacted by sea level rise. The results of the Vulnerable Location Focus Areas were reviewed in draft by the TAC at the most recent meeting in December 2023 and the project team incorporated the feedback received into the final report which is currently under review by the TAC members. The Focus Areas are being shared with the AP&P Executive Committee at this stage in order to gain any feedback before finalizing the report.

Staff will return to the Committee and Board in the coming months with additional updates including the Identification of a Range of Adaptation Measures in Task 4 and the Governance Review in Task 5. This effort will support identifying co-benefits, stakeholders and potential project development decisions at vulnerable locations and guide the Measure AA program development.

## **FISCAL CONSIDERATION**

Funding for the Sea Level Rise Adaptation Planning for Marin County's Transportation System Agreement is available through Measure AA, Category 2.3 Sea Level Rise. The current contract amount is \$550,000, expected to be spent over the next two fiscal years.

## **NEXT STEPS**

Staff will continue to develop Tasks 4 and 5 of the plan and present further information to the AP&P Executive Committee in the coming months.

## **ATTACHMENTS**

Attachment A – Staff Presentation  
Attachment B – Existing Conditions Memo



# Sea Level Rise Adaptation Planning for Marin County's Transportation System

## Transportation Authority of Marin

### Administration, Projects, and Planning Executive Committee Meeting

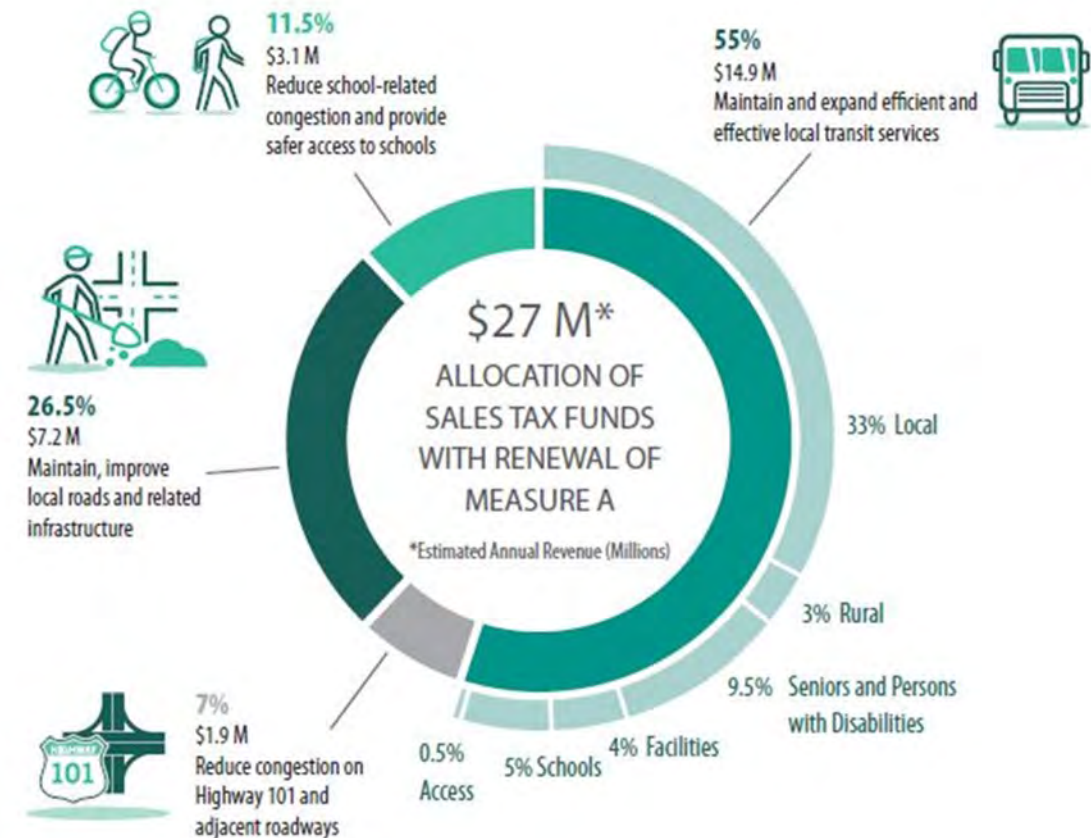
# Agenda

- Project Overview
- Existing Plan Review
- Vulnerability Focus Areas
- Next Steps



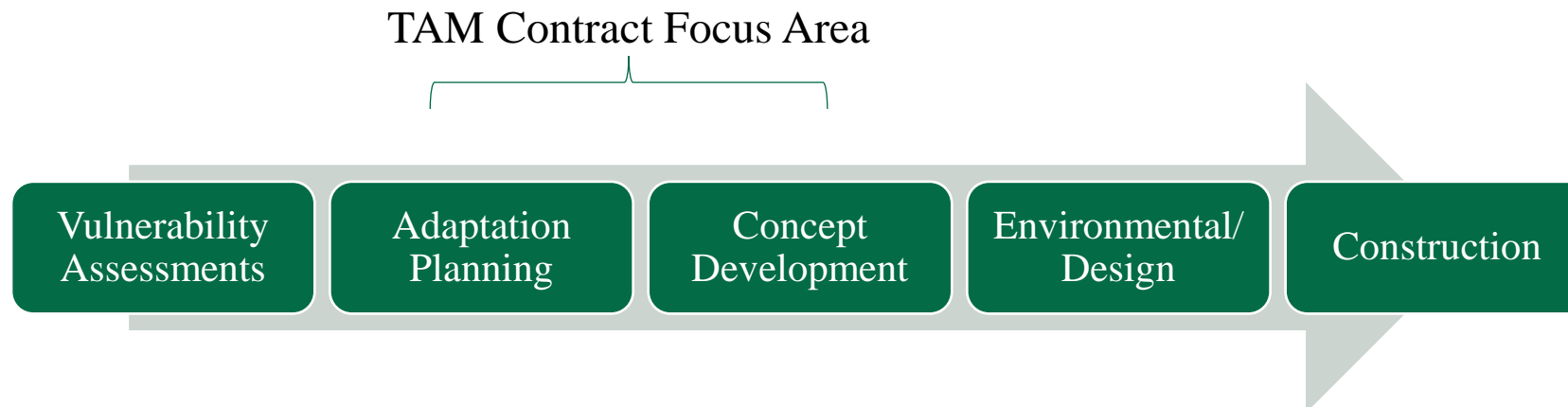
# TAM Sea Level Rise Program

- Measure AA Category 2.3
  - 1% set aside to develop projects to address transportation impacts from sea level rise (SLR)
  - Support protecting and adapting Marin's roadways and related infrastructure to the effects of SLR and flooding
  - Can be seed money for solutions, matching grants, and the leverage of private investments
- Efforts underway in Marin County include:
  - BayWAVE and C-SMART
  - Local Jurisdiction Plans
  - Bay Conservation and Development Commission (BCDC), San Francisco Estuary Institute (SFEI), other regional efforts



# Previous Board Direction

- Previous Board Discussions
  - Initial Input - November 2020
  - Discussion on Draft Scope of Work - October 2022
  - Contract Award – April 2023
- Board Direction
  - Move from planning into initial conceptual design
  - Identify potential projects for project development



# Project Overview

## TAM Sea Level Rise Adaptation Planning

**TAM's Role:** support countywide transportation planning

**Climate Adaptation:** protect assets from sea level rise & flooding

**Funding:** federal, state, & local sources, including Measure AA



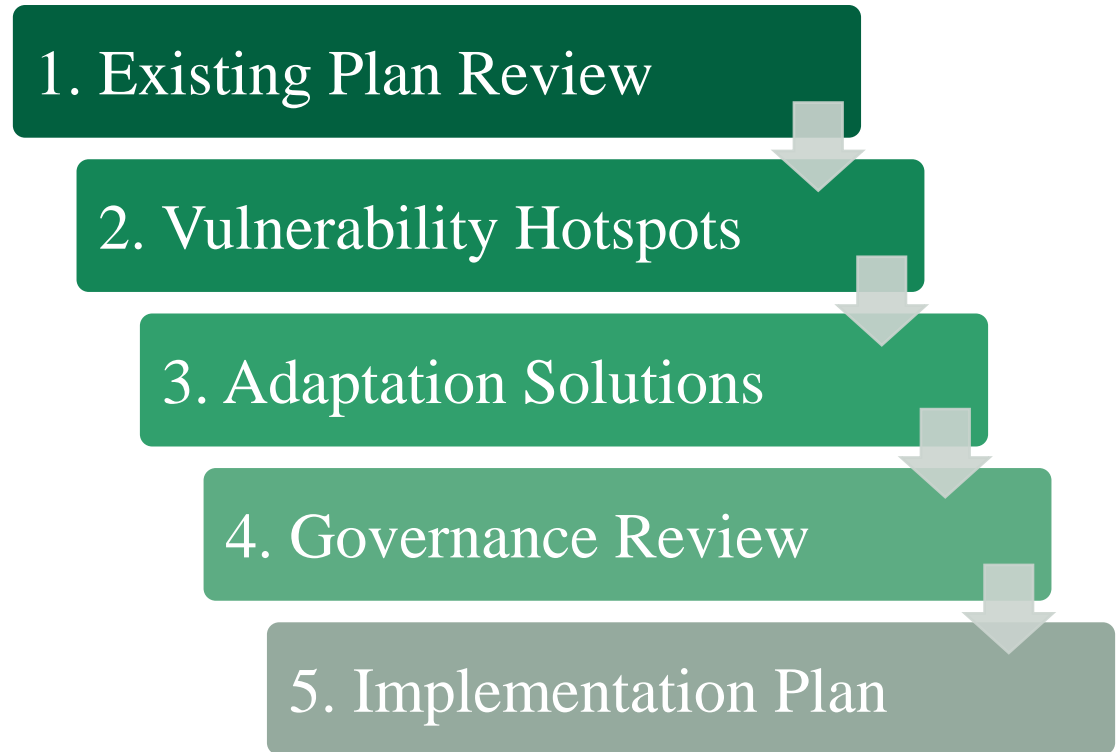


# Project Overview

## TAM Sea Level Rise Adaptation Planning

### Objectives

- (1) Identify potential SLR solutions
- (2) Guide future implementation of infrastructure & TAM funding programs







# Project Schedule



↑  
~50%

# Existing Plan Review



# Existing Plan Review

## Contents

1. Executive Summary
2. Plans and Studies  
Including Bay Adaptation Joint Platform Regional Strategy for a Rising Bay Implementation Brief (2022), Caltrans D4 Climate Change Vulnerability Assessment (2019), Stinson Beach Nature-based Adaptation Study (2021), and 29 others local, regional, and state plans
3. National and Global Adaptation Precedents
4. Initial Adaptation Concepts
5. Baseline GIS Dataset
6. Key Takeaways



# Existing Plan Review

## Key Takeaways

- The Marin coastline has been studied extensively
- US-101, SR-37, and I-580 have received most focus to date within transportation vulnerabilities context
- *Most* adaptation concepts and solutions studied involve interventions outside of the ROW for most vulnerable assets
- High potential in Marin for inter-agency coordination leading to direct and indirect sea level rise protection benefits



# Vulnerability Focus Areas



# Vulnerability Focus Areas

## Goal of Task

Identify transportation locations vulnerable to sea level rise and flood hazards, evaluating for transportation and community impacts to help create manageable study areas for further analysis.

## Methods

Spatial analysis of hazards and assets (more detail next slide).

## Results

Nineteen (19) vulnerability Focus Areas identified. Adaptation solutions will be assessed for these Focus Areas in the next phase (Task 4).



# Spatial Analysis

## Hazard exposure

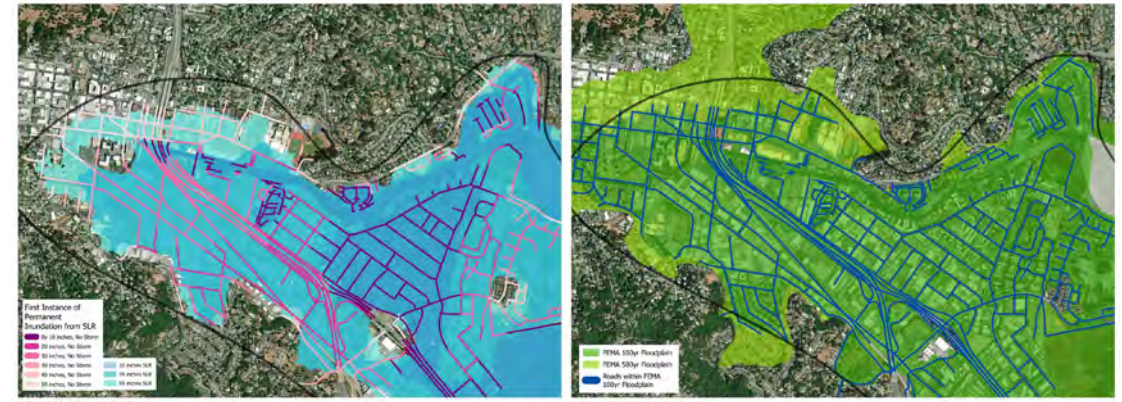
- Coastal flooding (SLR, storm surge & waves)
- Groundwater (Shallow, Emergent, + SLR)
- FEMA Floodplain (Riverine)

## Exposed assets

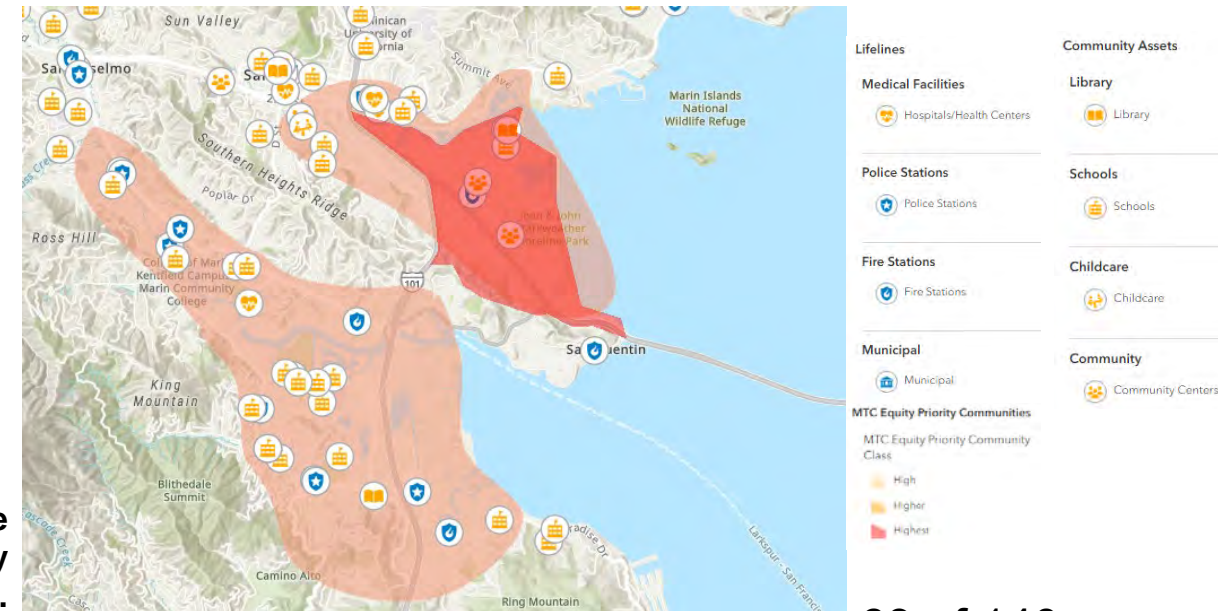
- Transportation (e.g., roads, bus stops & routes)
- Community (e.g., hospitals & schools)
- Lifelines (e.g., police & fire stations)

## Equity layer

- MTC Equity Priority Community



Roads in San Rafael Focus Area exposed to SLR & coastal flooding (left) and riverine flooding (right).












San Rafael, Kentfield, Larkspur, and Corte Madera Areas showing Community Assets, Lifelines, and Equity layers.

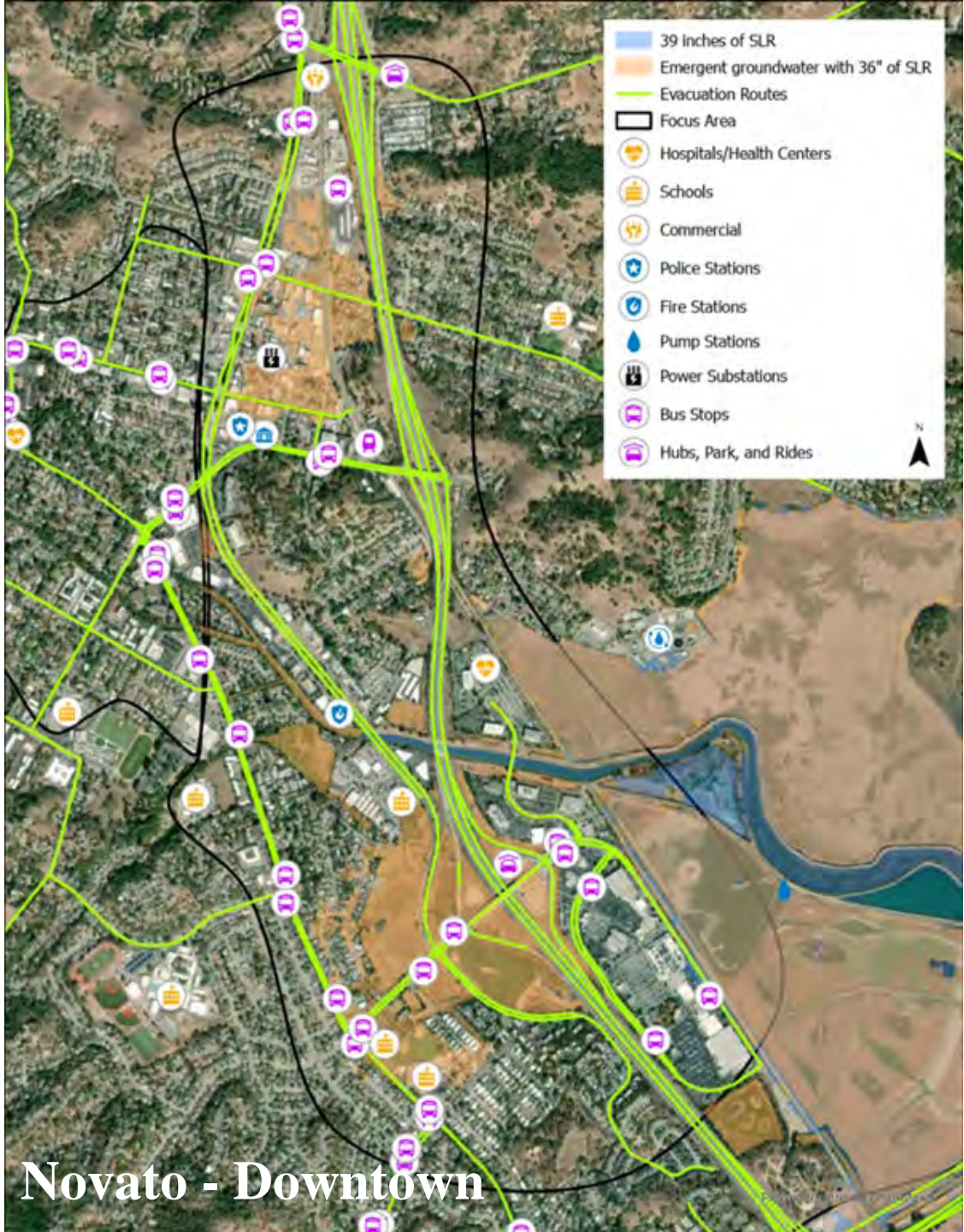
# Summary of 19 Focus Areas

- Bel Marin Keys
- Belvedere/Tiburon
- Bolinas
- Corte Madera
- Hamilton Wetlands
- Inverness
- Kentfield
- Larkspur
- Marin City
- Manzanita/Tam Junction
- Mill Valley
- Novato – Downtown
- Novato – West
- San Rafael
- Santa Venetia
- Sausalito
- Stinson Beach
- SR 37/US101
- Terra Linda









- 39 inches of SLR
- Emergent groundwater with 36" of SLR
- Evacuation Routes
- Focus Area
-  Hospitals/Health Centers
-  Schools
-  Commercial
-  Police Stations
-  Fire Stations
-  Pump Stations
-  Power Substations
-  Bus Stops
-  Hubs, Park, and Rides



**Novato - Downtown**

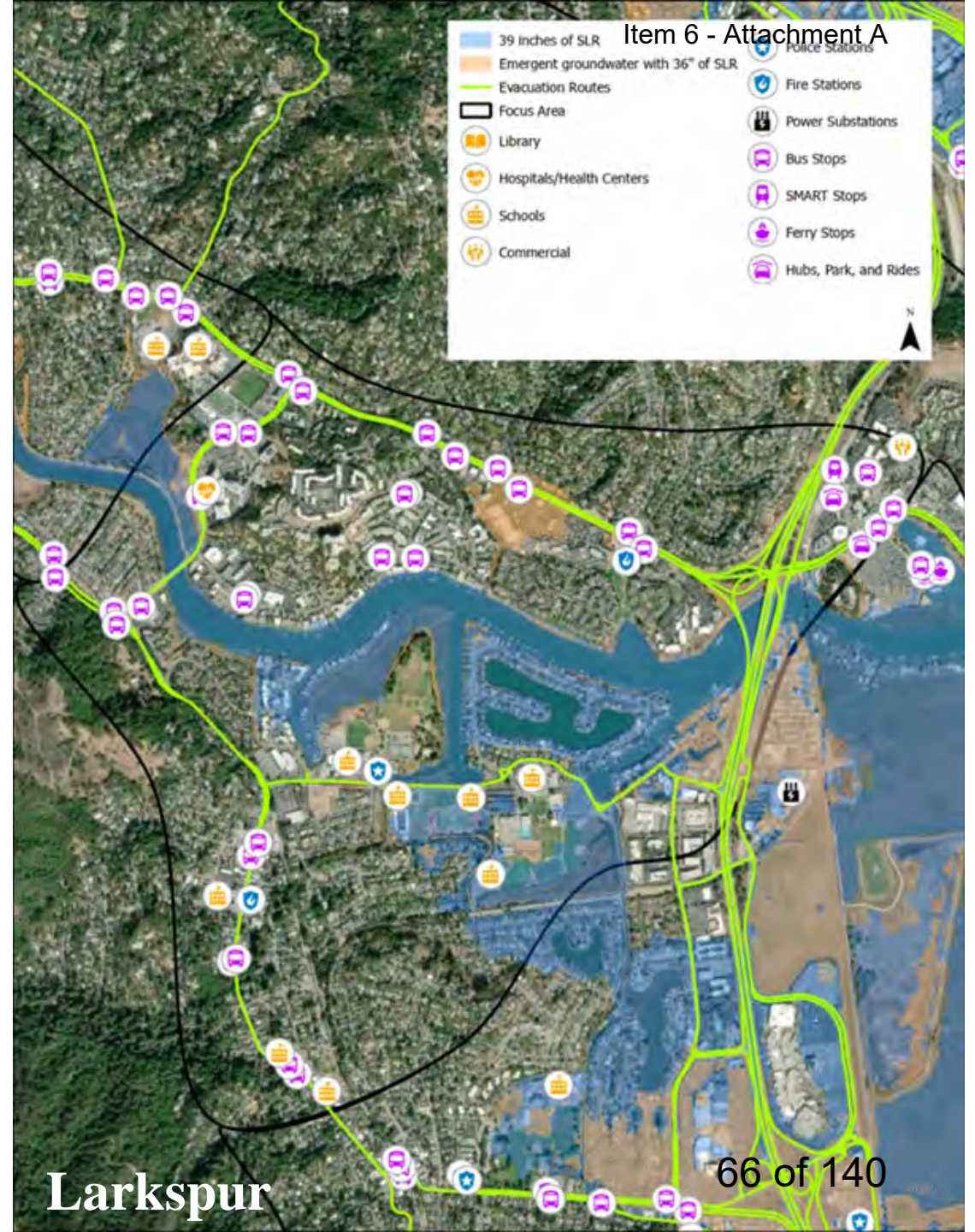
- Item 6 - Attachment A
- Emergent groundwater with 36" of SLR
  - Evacuation Routes
  - Focus Area
  -  Library
  -  Schools
  -  Fire Stations
  -  Bus Stops



**Hamilton Wetlands**



Marin City



Larkspur

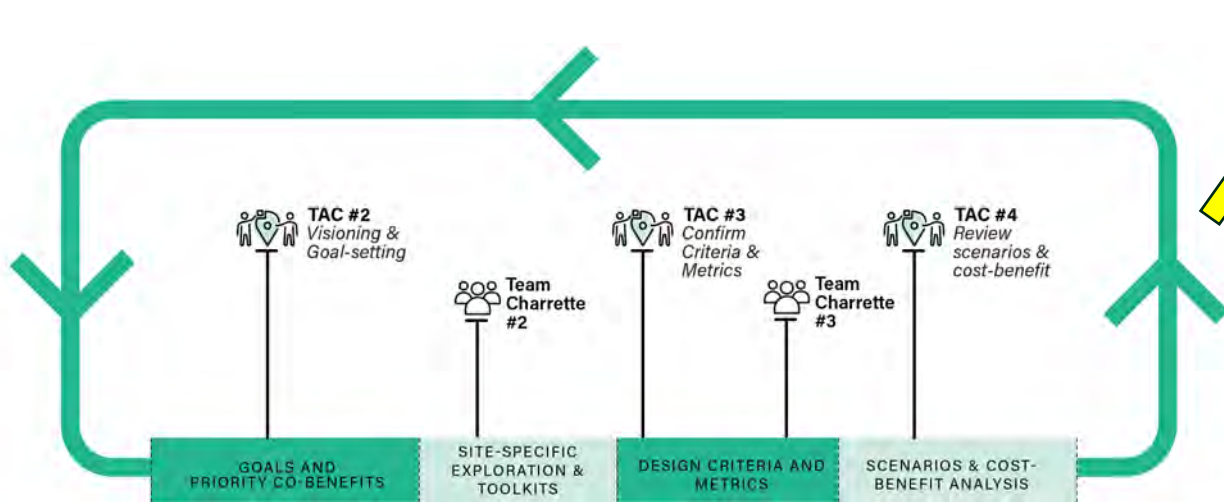
# Next Steps





# Next Steps

TAM Sea Level Rise Planning	Summer 2023		Fall 2023		Winter 2024		Spring 2024		Summer 2024		Fall 2024	
TASK												
Existing Plan Review	█	█	█									
Vulnerability Hotspots		█	█	█	█	█						
Adaptation Solutions				█	█	█	█	█				
Governance Review						█	█	█	█			
Implementation Plan								█	█	█	█	
Final Report										█	█	█
TAC Meetings			█			█			█			█



Progress  
Tasks 4 & 5

Updates to  
Board



# Questions & Discussion

**Thank you!**

Mikaela Hiatt  
TAM Associate Transportation Planner  
[mhiatt@tam.ca.gov](mailto:mhiatt@tam.ca.gov)

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Transportation Authority of Marin

# Sea Level Rise Adaptation Planning for Marin County's Transportation System Project

## Existing Plan Review Memo

Reference: Final Draft

V1 | October 18, 2023



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This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 295823-00

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## Document Verification

**Project title** Sea Level Rise Adaptation Planning for Marin County's Transportation System Project  
**Document title** Existing Plan Review Memo  
**Job number** 295823-00  
**Document ref** Final Draft  
**File reference**

Revision	Date:	Filename			
	18 Aug 2023	<b>Description</b> Draft of Plan Review Memo.			
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Meg Ackerson	Jack Hogan	Brooke Dubose
		<b>Signature</b>			
	18 Oct 2023	<b>Filename</b> <b>Description</b> Revised draft of Plan Review Memo. Referred to as Final Draft.			
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Meg Ackerson	Jack Hogan	Jack Hogan
		<b>Signature</b>			
		<b>Filename</b>			
		<b>Description</b>			
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>			
		<b>Signature</b>			

Issue Document Verification with Document





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A.2	Critical Assets and Communities by Jurisdiction	1

## Abbreviations

<b>Abbreviation</b>	<b>Definition</b>
ABAG	Association of Bay Area Governments
ABC Waters	Active, Beautiful, Clean Waters
AGOL	ArcGIS Online
ARC	Adaptation and Resilience Collaboration
ART	Adapting to Rising Tides
BARC	Bay Area Regional Collaborative
BayWAVE	Bay Waterfront Adaptation and Vulnerability Evaluation
BCDC	Bay Conservation and Development Commission
BOD	Basis of Design
CA	California
CalOES	California Office of Emergency Services
Caltrans	California Department of Transportation
CCJPA	Capital Corridor Joint Powers Authority
CMA	Congestion Management Agency
C-SMART	Collaboration: Sea level Marin Adaptation Response Team
D4	District 4 (Caltrans)
DFE	Design Flood Elevation (DFE)
ESA	Environmental Science Associates
FEMA	Federal Emergency Management Agency
FL	Florida
FME	Feature Manipulation Engine
GGBHTD	Golden Gate Bridge, Highway and Transportation District
GIS	Geographic Information System
HOV	High-occupancy vehicle
I-580	Interstate 580
LA	Louisiana
LHMP	Local Hazard Mitigation Plan
MA	Massachusetts
MCM	Marin County Multi-Jurisdictional
MTC	Metropolitan Transportation Commission
NY / NYC	New York / New York City
OBAG	One Bay Area Grant (MTC)
OLU	Operational Landscape Unit
PEL	Planning and Environmental Linkages
PM	Postmile
RFI	Request For Information
P+SET	Permaculture + Social Equity Team (Resilient by Design Bay Area Challenge)
SF	San Francisco
SFEI	San Francisco Estuary Institute
SLR	Sea level rise
SPUR	San Francisco Bay Area Planning and Urban Research Association
SR-37	State Route 37
TAM	Transportation Authority of Marin

<b>Abbreviation</b>	<b>Definition</b>
TIP	Transportation Improvement Program
TX	Texas
UK	United Kingdom
US-101	US Highway 101
USA	United States of America
VA	Virginia
VE	High-risk coastal flood zone with at least 1-in-4 chance of flooding over 30 years (FEMA)

# 1. Executive Summary

As the County Transportation Agency (CTA) for Marin County, TAM works closely with local jurisdictions as well as other partners in the region and state to plan, coordinate and deliver a wide range of transportation projects and programs, including sea level rise planning for the countywide transportation system. This project, the “Sea Level Rise Adaptation Planning for Marin County’s Transportation System Project”, will deliver an implementation plan to address sea level rise and flooding for transportation assets in the county. In the first phase of the project, a review of existing plans and GIS datasets was completed to establish a baseline dataset and understanding of relevant previous and ongoing work in the county to guide this project, inform later phases of work, and help avoid duplicating prior efforts.

## 1.1 Purpose

The goals of the Existing Plan Review were threefold:

1. Establish a baseline level of awareness and understanding of the breadth and depth of existing work related to sea level rise adaptation regionally and in Marin County.
 

Much work has been done to understand and plan for the impact of sea level rise in the Bay Area and in Marin County. In this project and related efforts, it is critical to avoid, to the extent possible, duplication of previous work. Reviewing prior work also allows TAM and its project team to develop an up-to-date familiarity with studies completed by local and regional partners to benefit collaboration.
2. Create a shortlist of potentially viable sea level rise adaptation strategies that are compatible with the Marin context and pre-identify (i.e., before GIS analysis) known vulnerability “hotspots” from prior works; accomplish this through broad review of:
  - Existing or planned projects in Marin
  - Vulnerable sites / areas in Marin (as identified from previous studies)
  - Adaptation strategies from national/international precedents

The focus on projects, vulnerable areas, and precedent strategies prepares the team for later tasks of this project, in which concept-level adaptation measures will be identified for potential implementation in the county.
3. Develop a GIS geodatabase from prior efforts to be used in this project and held by TAM for future planning efforts.
 

As a companion deliverable of this Existing Plan Review, a geospatial inventory of assets and projects has been provided to TAM in the form of a geodatabase. This baseline GIS dataset builds the foundation for the first technical task of this project, in which vulnerable assets and locations will be identified from the dataset.

## 1.2 Approach

The approach to this work followed these steps.

- **Request for Information (RFI):** Relevant data, plans, and studies were identified by name. The list was shared with TAM and was used in collecting documents from local and regional partners.
- **Existing Plan Inventory Review:** The collected data, plans, and studies were then reviewed for the following information:
  - Near and long-term solutions developed from previous work
  - Critical assets and communities identified by previous work

- **Precedents Review:** A high-level review of national and global precedents was undertaken to obtain examples of strategies potentially relevant to the Marin context.
- **Baseline GIS Dataset:** Geospatial information was collected through TAM and public sources online; this data was cleaned and added to a project database.
- **Existing Plan Review Memo:** The preceding work was summarized in this memo.

### 1.3 Outcomes

The five outcomes of this plan review set the foundation for upcoming work in this project.

1. **Existing Plan Review Memo:** Synthesis of plans, projects, and studies conducted in Marin or relevant to the county. This document summarized previously completed work to build project understanding.
2. **Shortlist of Adaptation Strategies:** Categorized as near- or long-term, this list of strategies is a starting toolkit for measures to consider in Marin.
3. **Pre-identified Critical Assets and Communities:** Cataloging vulnerable communities and transportation assets previously identified informs TAM where ongoing or completed work has been directed.
4. **National and International Precedents:** Examples of other regions globally, and the strategies they have implemented helps inform the project team about what could be possible in Marin.
5. **GIS Geodatabase and Inventory:** Geospatial data is critical to seeing where projects and studies have occurred, where vulnerable communities are located, and where SLR will reach in the future.

## 2. Plans and Studies

The documents reviewed were developed by local and regional bodies and include plans, studies, and projects with a bias towards transportation. These documents were examined for information about SLR vulnerability and adaptation in Marin County. The list has been summarized by scale: Regional, County, and Community/Project.

Given that local knowledge cannot be fully absorbed from a plan review, this exercise aimed to capture the landscape of SLR adaptation projects and planning at the regional, county and sub-county levels. More detail will be woven into this study through the engagement process with the Technical Advisory Committee and the Focus Groups.

### 2.1 Regional, County, and Community/Project Review

**Table 1: Plans, studies, and project reports reviewed at the regional level, covering the San Francisco Bay Area.**

<b>Regional</b>
<ul style="list-style-type: none"> <li>• Adapting to Rising Tides (ART) Bay Area (BCDC, 2020)</li> <li>• BARC Raising the Bar on Regional Resilience (BARC, 2018)</li> <li>• BARC Shared Workplan for Regional Climate Adaptation (BARC, 2022)</li> <li>• Bay Adapt Joint Platform Regional Strategy for a Rising Bay Implementation Brief (BCDC, 2021)</li> <li>• CalOES California Adaptation Planning Guide (CalOES, 2020)</li> <li>• Caltrans District 4 Climate Change Vulnerability Assessment (Caltrans, 2019)</li> <li>• Capital Corridor Joint Powers Authority SLR Vulnerability Assessment (CCJPA, 2014)</li> <li>• Plan Bay Area 2050 (MTC/ABAG, 2021)</li> <li>• San Francisco Bay Shoreline Adaptation Atlas (SFEI/SPUR, 2019)</li> </ul>

Takeaways relevant to Marin from the review of regional documents include:

1. There is significant agreement on where SLR impacts will occur, but there is low agreement on when impacts will occur and specifically what tipping points may exist. There are several projection timelines used with specific SLR levels which differ by climate scenario. For implementing SLR adaptation projects in Marin, it would be important to have consistency in the defined projection scenarios for practitioners to use for specific applications (e.g., transportation infrastructure planning).
2. Significant effort has gone into evaluating transportation assets in the Bay Area and their exposure to SLR. Examples include the vulnerability assessments by Caltrans and by Capital Corridor Joint Powers Authority. In Marin, this previous work provides a solid foundation upon which to build the present study. Identifying tipping points is one area of potential improvement.
3. Much of the Bay Area's critical transportation assets are located along the bay and ocean coast, particularly in Marin. This means that transportation assets, and the network more broadly, is highly vulnerable to SLR based on elevation and a lack of regional shoreline flood defense infrastructure, as identified and discussed in these regional documents.
4. Adaptation cost estimates are significant. For Marin, the total cost of protecting against two feet (2') of SLR is estimated to be \$1.75B according to Plan Bay Area 2050. Regional documents acknowledge that

there is a major gap in funding between what is needed and what is potentially available from existing sources.

5. A focus on the transportation system can be an effective strategy at moving the needle on SLR adaptation. More funding has become available to address coastal resilience and transportation needs, including the state level Caltrans SB1 grants and the PROTECT program at the federal level.

**Table 2: Plans, studies, and project reports reviewed at the county and community levels.**

<b>County</b>
<ul style="list-style-type: none"> <li>• Marin County Multi-Jurisdictional Local Hazard Mitigation Plan (MCM LHMP)</li> <li>• Marin Ocean Coast Sea Level Rise Adaptation Report (C-SMART, 2018)</li> <li>• Marin Ocean Coast SLR Vulnerability Assessment (C-SMART, 2016)</li> <li>• Marin Shoreline Sea Level Rise Vulnerability Assessment (BayWAVE, 2017)</li> <li>• Safety Element Update to the Countywide Plan Draft (Marin County, 2023)</li> </ul>
<b>Community/Project</b>
<ul style="list-style-type: none"> <li>• ART Richardson Local Assessment (BCDC, 2020)</li> <li>• ART San Rafael Local Assessment (BCDC, 2020)</li> <li>• Corte Madera Climate Adaptation Assessment (Town of Corte Madera, 2021)</li> <li>• Corte Madera Creek Flood Risk Management Project – Phase 1 Components (2020)</li> <li>• Lower Corte Madera Creek Improvement Study (2020)</li> <li>• Marin City Pond Flood Reduction Project – Drainage Study (2018)</li> <li>• Miller Avenue Streetscape Project (2017)</li> <li>• Mill Valley Flood Management and Drainage Master Plan (2021)</li> <li>• Resilient by Design Bay Area Challenge The People’s Plan by Permaculture + Social Equity Team (P+SET, 2018)</li> <li>• Santa Venetia Floodwall Basis of Design and Project Alternatives (2023)</li> <li>• Sausalito General Plan (City of Sausalito, 2021)</li> <li>• Shallow Groundwater Response to Sea Level Rise (2022)</li> <li>• State Route 37 Corridor Planning and Environmental Linkages Study (SR 37 PEL Study) Draft (Caltrans, 2022)</li> <li>• Stinson Adaptation and Resilience Collaboration (Stinson ARC, 2022)</li> <li>• Stinson Beach Nature-based Adaptation Study (Coastal Conservancy/ County of Marin/ESA, 2021)</li> <li>• TAM Annual Report 2022 (TAM, 2022)</li> <li>• Tomales Bay Bulkhead Vulnerability Assessment Marin County, California (County CDA, 2022)</li> <li>• Tomales Bay Living Shorelines Feasibility Project (ESA, 2022)</li> </ul>

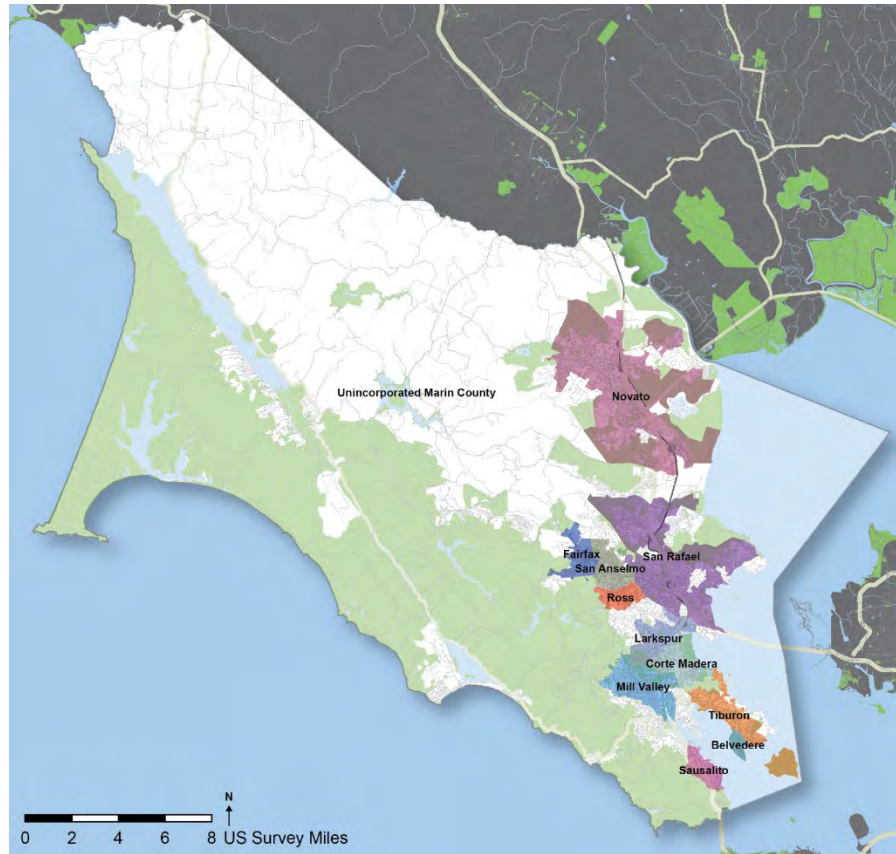
Takeaways relevant to Marin from review of local reports, biased towards transportation, include:

1. Much effort has been spent to study and identify the exposed assets and communities in the county, and there is considerable consensus on vulnerable areas in the county, such as US101/580 interchange, State Route 37, Highway 1, and the Manzanita Park & Ride.
2. Strong interest exists for adaptation solutions that complement or enhance the natural environment, such as the Living Shorelines study in Tomales Bay, dune restoration study in Stinson Beach, and permaculture concepts in Resilient by Design project The Peoples Plan. These proposals align with the high value placed on nature and open space areas by Marin residents and political leaders. A robust discussion of tradeoffs is still needed to better understand the limitations of nature-based solutions and the effectiveness of these strategies compared to others.
3. Larger-scale flood and SLR adaptation work crosses jurisdictional boundaries which complicates implementation and calls for the county to play a key role in helping guide or facilitate action. Understanding the work completed or planned to date, and the near- and long-term needs, will support decision-making at the county level to implement appropriate adaptation solutions.
4. Still needed is a shortlist of potential project types and locations, a further understanding of processes and program cycles that agencies are obligated to follow, and crucial potential implementation roadblocks. These are all focus areas for TAM sea level rise planning.

## 2.2 Critical Vulnerable Assets

Appendix A.2 provides an overview of critical vulnerable assets and communities in Marin County. Assets and communities are categorized by City, Town, and Unincorporated Marin County. Below is a summary of high-level considerations for each jurisdiction in Marin County with respect to sea level rise.





**Figure 1: Incorporated Cities, Towns, and Unincorporated Marin County**

### Belvedere

The City of Belvedere is located in southeastern Marin County on San Francisco Bay (and offshoot Richardson Bay) and includes Belvedere Island, Belvedere Lagoon, and Corinthian Island. Access to Belvedere is dependent on low-lying roads exposed to inundation under future SLR conditions.

### Corte Madera

The Town of Corte Madera is located on San Francisco Bay in central Marin County, along the US-101 Corridor on the San Francisco Bay. Approximately 10,000 people live in this low-lying coastal town. Historically, much of this area was marshland, which leaves most lower elevation residential and commercial areas in the Town vulnerable to coastal flooding. Key roadways have been identified in regional documents as vulnerable to flooding, like Lucky Drive and the US-101 corridor through downtown.

### Fairfax

The Town of Fairfax sits over 100ft above sea level in inland Marin. Residents rely on the road network to access other communities in Marin and the greater Bay Area. Though none of the infrastructure in the town is exposed to coastal hazards, the essential roadways that connect Fairfax to the region may be impacted by sea level rise. Additionally, Fairfax Creek, San Anselmo Creek, and their tributaries run through the town, which may expose the town to riverine flooding.

### Larkspur

The City of Larkspur, located in central Marin, encompasses Corte Madera Creek and touches San Francisco Bay, exposing it to coastal and riverine flood hazards. The Larkspur Ferry Terminal connects the area to San Francisco via ferry while US-101, which runs through the city, provides vital connection to other communities in Marin and the Bay Area. Roadways in Larkspur also provide vital connectivity to Marin General Hospital.

### Mill Valley

The City of Mill Valley touches Richardson Bay, part of San Francisco Bay, and extends upland towards Mount Tamalpais. The coastal areas of the city include Bothin Marsh, contain transit centers, commercial districts, and residences, among other assets and services. Onramps to US-101 corridor and key ingress/egress routes are vulnerable to flooding and SLR due to elevation, existing drainage capacity, and proximity to creeks and Richardson Bay.

### Novato

The northernmost city in Marin, Novato sits on San Pablo Bay, part of San Francisco Bay. The city includes wetland areas and Novato Creek, which runs through the main commercial district. SR-37 and US-101 meet in the city. This interchange has been identified as a critical transportation asset vulnerable to sea level rise from previous studies, discussed in Appendix A.2.

### Ross

The town of Ross is a small, inland community of roughly 2,000 residents. It is located along the Corte Madera Creek, upstream of Larkspur. It is connected to nearby communities via Sir Francis Drake Boulevard, a major corridor that connects to US-101. Though none of the infrastructure in Ross is directly exposed to coastal hazards, the tidal influence from the San Francisco Bay is expected to extend upstream in Corte Madera Creek as a result of future sea level rise which could worsen the existing riverine flood issues along this creek during future extreme rainfall and high tide events. The essential roadways that connect Ross to the region may also be impacted by sea level rise.

### San Anselmo

The Town of San Anselmo sits about 50ft above sea level in inland Marin. Residents rely on the road network to access other communities in Marin and the greater Bay Area. Though none of the infrastructure in the town is exposed to coastal hazards, the essential roadways that connect San Anselmo to the region may also be impacted by sea level rise. San Anselmo Creek and its tributaries run through the town, which expose the town to riverine flooding. The tidal influence from the San Francisco Bay is expected to extend upstream in Corte Madera Creek as a result of future sea level rise which could worsen the existing riverine flood issues in San Anselmo during future extreme rainfall and high tide events.

### San Rafael

The City of San Rafael is situated on San Rafael Bay, part of the San Francisco Bay. Approximately 60,000 people reside in the city, which contains wetlands and rivers (Gallinas Creek, South Fork Gallinas Creek, and San Rafael Creek) that border or cross important infrastructure. US-101 and I-580 converge in San Rafael, and this interchange has been identified as a critical asset in previous studies (discussed in Appendix A.2) due to it being a low-lying asset susceptible to flooding and a key connection point for regional traffic.

### Sausalito

The City of Sausalito is located along the coastline of San Francisco Bay into Richardson Bay in southern Marin. The Sausalito Ferry Terminal and the main downtown ingress/egress route to downtown, Bridgeway, are key infrastructure assets that connect the city to the region and are vulnerable to SLR. US-101 forms the western border of Sausalito, bypassing the downtown area, but onramps and offramps to the highway may be vulnerable to flooding due to elevation, existing drainage infrastructure, creek crossings, and proximity to Richardson Bay.

### Tiburon

The Town of Tiburon comprises a peninsula that extends from main Marin into the San Francisco Bay. Tiburon Boulevard (CA-131), which connects the town (and adjacent Belvedere) to the mainland, is a key transportation asset exposed to coastal hazards like sea level rise.

### Unincorporated Communities

Unincorporated communities in the County of Marin include Greenbrae, Kentfield, Marin City, Bolinas, Dillon Beach, Forest Knolls, Inverness, Lagunitas, Marshall, Nicasio, Olema, Point Reyes, San Geronimo, Stinson Beach, and Tomales.<sup>1</sup> Many of these communities are connected via vulnerable roadways, like SR-37, Shoreline Highway (SR-1), Lucky Drive, Sir Francis Drake Boulevard (Inverness), US-101, and Donahue Street (Marin City) as key examples. See the following figure for network link volumes in the county for a typical weekday, noting significant number of trips that pass through the eastern half of Marin.

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<sup>1</sup> [Marin Communities - County of Marin \(marincounty.org\)](https://www.marincounty.org)

### 3. National and Global Adaptation Precedents

This high-level review of national and global SLR adaptation precedents aimed to identify areas outside of the county that have implemented strategies relevant to the Project. The goal was to identify additional adaptation solutions that might be compatible with the Marin context despite not being included in existing plans or studies present in the region. Their strategies have been grouped by theme in this section.

The areas evaluated included coastal cities in the USA with bays and estuaries, like New York City, New Orleans, and Boston, and international cities that have implemented unique solutions to address SLR, including Singapore, Hamburg, Rotterdam, and the United Kingdom. The locations and the plans reviewed can be found in the following table, along with a description of governance structures that support implementation of the plans.

**Table 3: National and global precedents reviewed for this project.**

City / Region	Plans Reviewed	Governance Structures
Singapore, Singapore	ABC Waters	The Public Utility Board developed references for developers and professionals on how to implement resilience solutions. <sup>2</sup>
Hamburg, Germany	Hamburg HafenCity Master Plan	A private company that is a subsidiary wholly owned by the city oversees development.
North Atlantic (USA) -Boston, MA -New York City, NY -Norfolk, VA	Climate Ready Boston (2016) Boston Coastal Flood Resilience Design Guidelines NYC Climate Resilience Design Guidelines North Atlantic Coast Comprehensive Study Report Norfolk Coastal Storm Risk Management	- Climate Ready Boston was an initiative led by the City of Boston Planning Department. They developed Coastal Flood Resilience Design Guidelines and recommended that the City of Boston implement initiatives.  - New York City Council passed Local Law 41 requiring public projects to follow the established guidelines. <sup>3</sup>  - Collaboration between the City of Norfolk and the USACE identified vulnerable assets and the City of Norfolk undertook planning and implementation of strategies.
South Atlantic / Gulf of Mexico (USA) -Miami Beach, FL -New Orleans, LA	Resilient 305 – Greater Miami & The Beaches (2010) New Orleans Masterplan (2018)	- Greater Miami & the Beaches is a partnership of Miami-Dade County, the City of Miami, and the City of Miami Beach. Resilient 305 prioritizes intergovernmental and community collaboration to achieve shared goals.

<sup>2</sup> <https://www.pub.gov.sg/abcwaters/designguidelines>

<sup>3</sup> <https://climate.cityofnewyork.us/initiatives/climate-resiliency-design-guidelines/>

		- New Orleans's Masterplan is a planning and policy document for the use of elected officials who will adopt it and fund its implementation.
Rotterdam, Netherlands	Rotterdam Masterplan (2019)	Planning document by the city to align development with vision.
United Kingdom	Managing the Coast in a Changing Climate	An independent climate change committee published the document to provide guidance to communities facing sea level rise challenges.



**Figure 2: Map showing areas explored for national and international case studies with strong SLR adaptation strategies.** These regions have implemented overlapping strategies, which have been collected into the following themes.

### 3.1 Short-Term Safety Procedures

Cities can implement near-term safety solutions while long-term projects are identified and developed. As one example, in Hamburg, evacuation routes are posted and prioritized in coastal areas as road elevation (a long-term solution) is planned. Communication modes, incident management, and response measures would need to be evaluated and developed (perhaps coordinated with local emergency responders), but they can be implemented in shorter timelines than SLR adaptation projects.

The United Kingdom (UK National Flood and Coastal Erosion Program, 2018) has partnered with Google to alert people of flooding. Flood warnings now appear on Google Search and through Google Maps with live alerts becoming visible seconds after they have been issued. The warnings include vital information on steps people can take to keep themselves and their property safe when flooding is expected.

Safety measures may be a compelling immediate measure for Marin to prioritize road elevation projects and prevent traffic delays, miscommunication, and potential loss of life during flood events.

### 3.2 Coastal Zoning Ordinances

Zoning can be a powerful tool to manage and guide SLR adaptation. Coastal Zoning Ordinances, such as limiting the areas of development or requiring flood protection measures, have been implemented in various places globally.

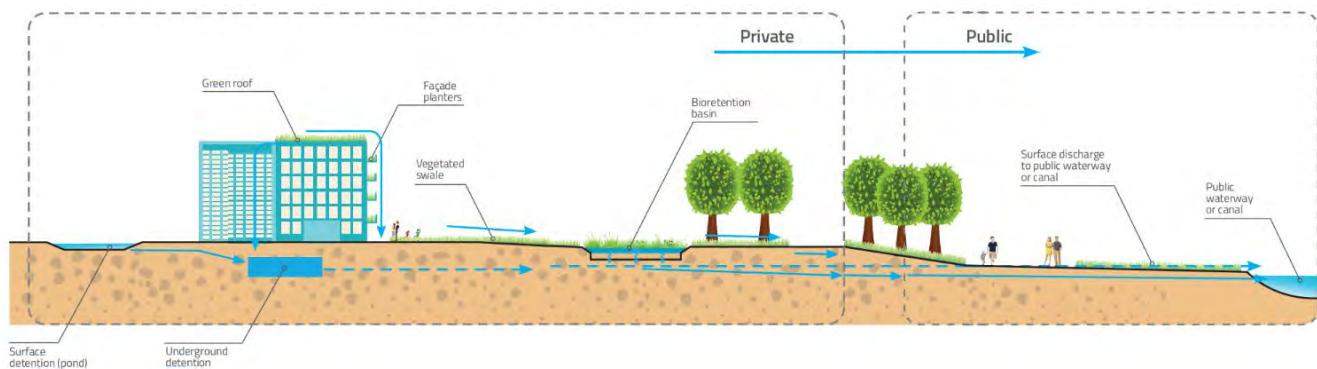
In Hamburg, Germany, building development has been restricted within 66ft (20m) of the water. The shoreline area has been zoned as public open space and moves the city closer to its goal of having interconnected green spaces throughout its jurisdiction. Restricting development at the waterfront can be a compelling strategy for areas of high vulnerability while allowing the potential addition of public spaces or new transportation corridors such as bike trails.

In Singapore, minimum crest levels for certain properties may be 5 feet or more above adjacent street levels. Designs require sizing setback distances as well as ramps, stairs, and landscaping to enhance this feature of the property and benefit the public realm. Additionally, new developments are permitted to consider deployable flood barriers only when elevating the building platform is cost prohibitive or otherwise infeasible. Barriers can be static like concrete walls or deployable like gates. In applications of this strategy, new buildings see reduced flood risk while surface streets are temporarily left at existing elevations.

### 3.3 Living Shorelines

Living shorelines rely on natural features, like vegetated marshes and dunes, to address coastal erosion. This approach differs from traditional grey infrastructure strategies, like concrete seawalls, by working with the natural environment and depending on local ecosystem functions to prevent erosion.

In 2006, Singapore set an ambitious goal to become the City of Gardens and Water and launched its Active, Beautiful, Clean Waters (ABC Waters) program. Through ABC Waters, Singapore seeks to provide a “transition zone” between public waterways and amenities. The following figure shows a cross-section of this transition zone, which gently slopes upward away from the water and contains significant vegetation and public walkways before reaching city infrastructure and buildings. The transition zone includes a deep landscape setback that provide enough horizontal space for gradual slope up to building entry with amenities including plantings, walking paths, seating, and other amenities. Planters with integrated seating soften the transition between elevated hardscape and vegetated public areas along the shoreline.



**Figure 3: Strategies implemented as part of Singapore's ABC Waters program.**

In Miami Beach, FL, high groundwater and saltwater intrusion affect what vegetation can be planted along the shoreline and throughout the city. Outdoor spaces are required to have flood-resistant, saltwater-tolerant species. This requirement enhances resilience to both coastal and stormwater flooding. Trees with high evapotranspiration rates also help mitigate extreme heat events.

Another living shoreline strategy is called managed realignment, which has the goal to set back the shoreline and restore coastal environments. This strategy usually involves (1) removing or deliberately breaching flood defenses to allow flooding up to higher ground or create a new defense line or (2) realigning coastal cliff frontages to allow cliff erosion. It has advantages in removing long-term financial commitments to maintain

defenses and in restoring natural environments and processes. Managed realignment can create new habitat area that acts as a natural buffer to coastal waves and is much cheaper to maintain over the long-term. This was applied to the Twitchell Marsh area in the UK by creating a breach in the sea wall to connect existing salt marsh creeks. Seawater was able to enter the brackish marsh and flood it with the tide, turning it into a tidal salt marsh. This new habitat, along with new associated mudflats, is attractive to many coastal bird species, and it also serves as a better natural defense against coastal erosion when combined with the sea wall (Managing the Coast in a Changing Climate, 2018).

### 3.4 Hybrid Elevate-in-Place and Retreat

In Germany, the HafenCity neighborhood within the city of Hamburg has begun making its climate-ready vision a reality from its 2000 Masterplan. Similar to Marin, the area is connected to the surrounding region via bridges, an established road network, and public transportation (including regional rail and buses). Areas of HafenCity are already subject to regular flooding, particularly along the canals.



**Figure 4: HafenCity area along Elbe River (HafenCity Masterplan).**

Hamburg is Europe's largest inner-city urban development area and is seen as a blueprint for the new European city on the waterfront. Due to the dynamic interplay of the water and buildings, Hamburg has identified an innovative set of practices including the use of ground floors in buildings as flood barriers.

Strategies include elevating new structures, including buildings, 25ft (7.6m) above ground (which is the expected storm surge elevation under future SLR levels), constructing elevated roadways to ensure access for emergency services during high tides or storm events, and hardening existing assets to prevent potential damage from future storm surges under higher sea levels. A setback of 66ft (20m) from the water edge has created public open space along the water and interconnected green spaces.



**Figure 5: View of development happening in Hafencity. Note elevation of area above water level (Miguel Ferraz, hafencity.com).**

The development of the area has been managed by a port and location development company called Hafencity Hamburg GmbH, a wholly owned subsidiary of Hamburg (“Free and Hanseatic City of Hamburg”). Its supervisory board is comprised of city officials, who oversee the development of Hafencity. As described on Hafencity’s website<sup>4</sup>,

By concentrating non-official functions in a dedicated development company of its own, Hamburg can ensure the integrated planning and realization of the district and the efficiency and quality of the urban development project. It also creates the conditions for a strong focus on innovation while guaranteeing a high degree of public accountability.

### 3.5 Sponge Cities

Resilience-focused stormwater management is referenced in guidelines for many cities. The goal of stormwater management with an emphasis on resilience is to absorb runoff and allow water to circulate as naturally as possible to prevent or significantly reduce overland flooding. Several strategies focus on buildings, which might be appropriate for transportation-affiliated buildings, such as maintenance facilities or transit stops.

Copenhagen’s Cloudburst program shows how beneficial it can be to prioritize rainwater capture. To address runoff during short storm events (i.e., cloudburst), adaptation strategies include designing blue/green roofs and other appropriate landscape elements to maximize onsite rainwater capture and reuse.

In Rotterdam, green roofs help absorb rainfall and reduce heat stress on the city. Rotterdam also serves as a prominent example for utilizing public spaces as water storage basins during extreme rainfall. The “Water Square” in Benthemplein holds three large rainwater collection ponds which, when the weather is dry, can be used as amphitheaters, basketball and volleyball courts, or skateboarding rinks.

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<sup>4</sup> [Hafencity Hamburg GmbH - Hafencity](#)





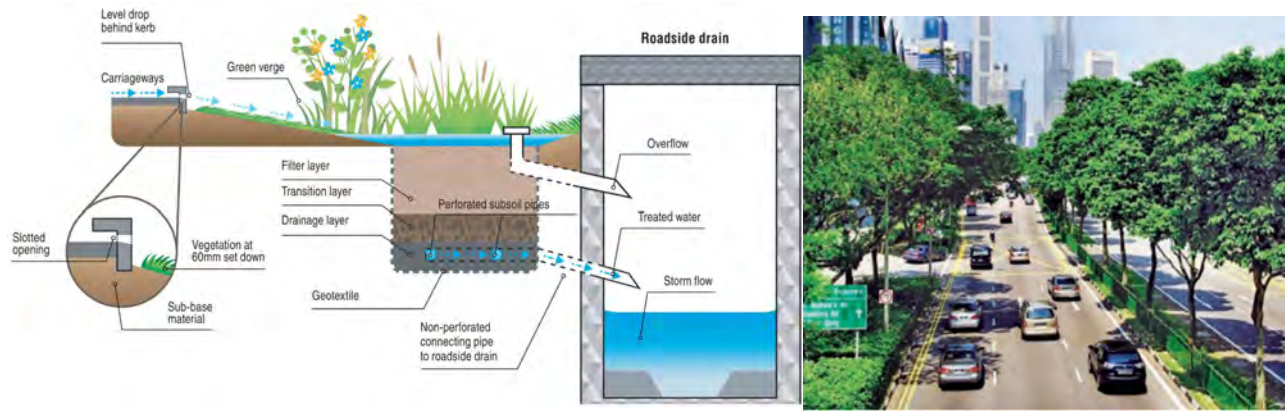
**Figure 6: Submerged features in the public square can act as stormwater retention basins during flood events.**

Singapore's ABC Waters program has implemented many Sponge City concepts through their stormwater management practices. The program aims to reduce stormwater flooding and filter runoff before it enters Singapore's waterways. Rain gardens (bioretention basins), vegetated swales, and sedimentation basins help collect rainwater, slow runoff, and filter the water.

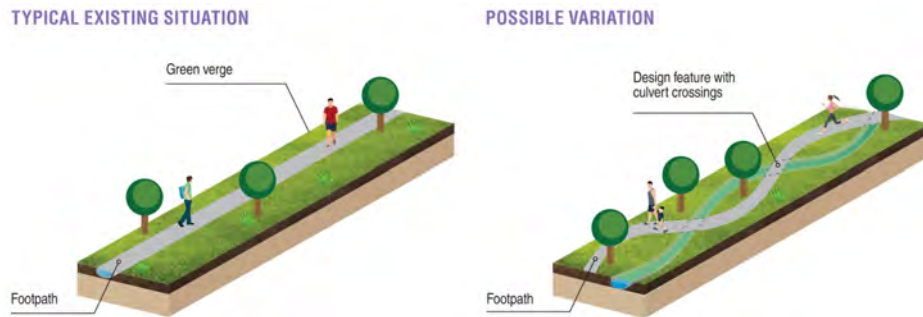


**Figure 7: Natural drainage basins in Sg Ulu Pandan (left) and Kallang River at Potong Pasir (right) (ABC Waters).**

An example strategy for roads is shown below, in which water collected from roads moves through green and blue features into the stormwater drainage pipes. The dual action of collecting excess flow and slowing runoff into the stormwater system help reduce flooding and prevent overwhelm of the drainage system.



**Figure 8: Bioretention system that slows runoff from roads, depicted schematically (left) and along expressway (right) (ABC Waters).**



**Figure 9: Strategy for incorporating water features along pedestrian walkways proposed by Singapore's ABC Waters.**

### 3.6 Hold the Line

Some regions have employed protective strategies, like hardening buildings and armoring their coastlines, to prevent water from reaching their people and buildings. In conjunction with the other overarching themes described in this section, holding the line can be a viable option for areas of Marin County. These types of strategies have even been proposed for Corte Madera OLU and Novato OLU in the Marin County SLR Adaptation Framework report.

In New Orleans, LA, an extensive pump system maintains livability in the city, much of which lies below today's mean sea level. The system's buildings, power supply, and mechanical and electrical equipment should be submersible or otherwise proven to be operable in significant future flood events (i.e., including SLR) in order to protect the city. The pump strategy works in coordination with the levee system. The pumps address groundwater and stormwater flood issues, while the levees prevent coastal hazards (e.g., storm surge) from inundating the city. Other cities like New York (Urban Waterfront Adaptive Strategies, 2013), Boston (Climate Ready Boston, 2019), and Norfolk, VA (Resilient Norfolk, 2020) also reference the use of pumps as a key part of dry proofing buildings.

Norfolk, VA has identified a number of hold the line measures that includes construction new seawalls, levees, and gates. Specifically, phase 1 of the Norfolk plan identifies replacing an existing flood wall and increasing its height as well as a proposed storm surge barrier for highly sensitive areas.

During Hurricane Harvey, the Mayor of Houston, TX issued an order for all residents to shelter-in-place during the flood. Analysis after this event found that an evacuation order could have led to a significantly higher death

toll<sup>5</sup>. As a result, Miami Beach recommends residential units should be above the first floor of a building, designed to safely accommodate shelter-in-place orders. This strategy could also be employed for buildings that act as emergency community shelters.

## 4. Initial Adaptation Concepts

This section distills the near- and long-term adaptation strategies collected from the review of previous studies and global precedents research into a shortlist of initial adaptation concepts that will be used in the Task 4 planning and design efforts. Here “near-term” refers to strategies that could be implemented within ten years, while “long-term” refers to strategies that take decades to implement.

Climate change adaptation strategies have typically been grouped into three categories: Protect, Accommodate, and Retreat (or Avoid). “Protect” strategies aim to reinforce existing assets against future sea levels, whereas “Accommodate” strategies allow water to move where it intends and work with the changing shoreline. When people move from flood-prone areas or assets are relocated to higher ground, the “Retreat” strategy is employed. Typically these strategies are combined into “Hybrid” approaches best suited to local conditions and community needs. The following image depicts the three strategies.

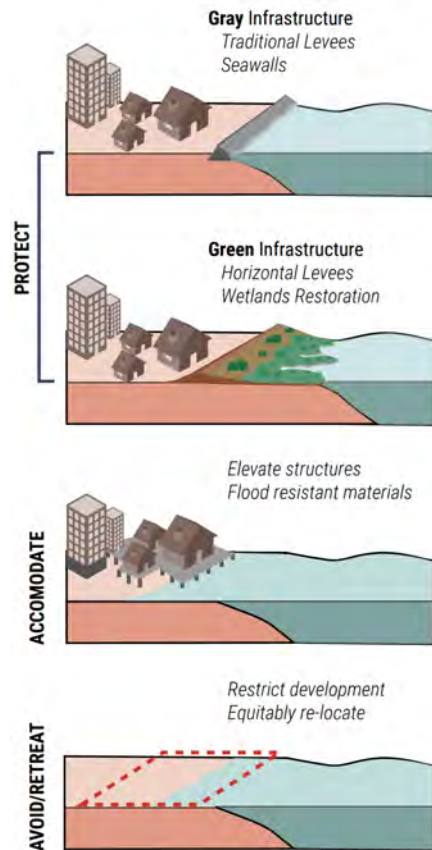


Figure 10: Three categories of adaptation strategies, as depicted in Bay Adapt (BCDC, 2021).

<sup>5</sup> <https://www.npr.org/sections/thetwo-way/2017/08/28/546721363/why-didn-t-officials-order-the-evacuation-of-houston>

The following table shows strategies categorized as near- or long-term solutions and whether they are structural (physical) or non-structural (policy). These strategies fall into a blend of the three categories of Protect, Accommodate, and Avoid/Retreat. The full list of strategies can be found in Appendix A.1.

**Table 4: Adaptation strategies summarized as near- or long-term and as structural (physical) or non-structural (policy) solutions.**

	Near-term	Long-term
<b>Structural / Physical</b>	<ul style="list-style-type: none"> <li>Elevate key assets – utility connections, mechanical equipment, etc.</li> <li>Backup power – for pumps, electrical/mechanical systems, etc.</li> <li>Rooftop landscaping for stormwater management</li> <li>Enhance drainage, for example by upsizing pumps and pipes</li> <li>Design new structures to withstand future hydrostatic, hydrodynamic, and impact loads</li> <li>Plant flood-resistant vegetation (and saltwater-tolerant where applicable)</li> <li>Seal utility connections</li> <li>Submersible pump systems</li> <li>Design pedestrian access routes to be flood-resistant</li> <li>Build flood-resistant landscaping</li> <li>Anchor movable components that could cause damage if moved by water (e.g., tanks, gates, ramps)</li> <li>Incorporate mold-resistant, water-resistant, and corrosion-resistant materials into exposed assets</li> <li>Ensure vents, drains, conduit boxes, utility manholes, and access openings are sealed or sealable and include backflow prevention</li> <li>Install backflow valves in buildings at sewer lines</li> <li>Dry and wet flood-proof stairs, elevators, doors, and other ingress/egress to remain operable during flood event</li> </ul>	<ul style="list-style-type: none"> <li>Maximize infiltration and detention to delay drainage and manage stormwater runoff (sedimentation basins, bioswales, etc.)</li> <li>Use parking lots and plazas for stormwater detention</li> <li>Build new seawalls and revetments</li> <li>Raise existing levees</li> <li>Elevate key corridors and assets – roads, rail, ferry terminals, trails, etc.</li> <li>Floodproof marinas to adjust to fluctuations of water level</li> <li>Land reclamation or waterfront bulkheads to raise levels above future SLR</li> <li>Retrofit existing buildings and structures to withstand hydrostatic, hydrodynamic, and impact loads</li> <li>Realign shoreline areas with new waterfront protection features, i.e., levees</li> <li>Install flood gates on tidally influenced canals or creeks to control water levels</li> <li>Install new pump stations to evacuate stormwater during high tide events</li> <li>Living shorelines incorporating habitat enhancement with waterfront protection</li> <li>Enhance offstream detention areas along creeks to reduce peak flow events</li> </ul>

	Near-term	Long-term
<b>Non-Structural / Policy</b>	<ul style="list-style-type: none"> <li>• Designate shelter-in-place locations</li> <li>• Temporary closures and reroute traffic or provide alternative means of transportation</li> <li>• Public flood notices via warnings and alerts</li> <li>• Establish risk-based criteria for selecting projections</li> <li>• Determine credible climate hazards and identify climate change projections to inform design</li> <li>• Coastal flood zone ordinances restricting new development or requiring new flood protection for properties</li> </ul>	<ul style="list-style-type: none"> <li>• Designate all residential units to be located above first floor of buildings for shelter-in-place</li> <li>• Develop climate resilient design guidelines</li> <li>• Managed realignment or relocation and buyouts in high-risk areas</li> </ul>

This list of strategies is by no means exhaustive, especially because areas for adaptation concept development (Task 4) will not be selected by the project team until the vulnerability study has been completed (Task 3). This initial list will help guide the project team without limiting them to the strategies herein.

## 5. Baseline GIS Dataset

Arup developed a baseline GIS dataset that aggregates existing transportation asset information, including data on road, transit, and bike/ped infrastructure. This baseline GIS dataset is intended to identify previously studied transportation infrastructure in previous sea level rise studies conducted throughout Marin County, including BayWAVE and C-SMART.

### 5.1 Approach

Arup submitted a request for information (RFI) to TAM which included a list of transportation infrastructure assets, proposed projects, right-of-way information, and other asset information that would be considered within this analysis. Data was aggregated from previous planning and GIS databasing efforts from a variety of sources including Marin County, the Metropolitan Transportation Commission (MTC), and Caltrans. Data linked or received through the RFI was downloaded and reviewed utilizing a GIS log and GIS project standards.

The GIS log included review parameters including whether the initial request had been adequately met, if the dataset covered the required extent, if the spatial accuracy of the dataset met project requirements, if the terms of the dataset were fully understood and if they permit the project to use the data, if the dataset contains attributes which meet the project requirements, if the dataset requires any processing prior to usage, if the data have a coordinate system which is correctly assigned, if the dataset naming convention has been followed correctly, if the dataset metadata had been populated correctly, and if it meets basic sense checks, spot checks, or similar.

Utilizing the Feature Manipulation Engine (FME), Arup cleaned the downloaded geospatial data, reprojected to a NAD\_1983\_HARN\_StatePlane\_California\_III\_FIPS\_0403\_Feet coordinate system, clipped to Marin County Boundary, and added attribute information related to the date.

The geospatial data was compiled into a geodatabase and shared with TAM and the project team. Data can also be viewed on the project ArcGIS Online (AGOL) site. It is recommended that TAM maintains a copy of the GIS data in a format that allows TAM to view, manipulate, and analyze the data. This analysis can be done via online GIS service, such as AGOL, or other enterprise GIS platform.

## 5.2 Limitations

Some documents and data were not obtained through the RFI process, but they will be incorporated into the next phase of this project. Outstanding reports include San Rafael Flood Risk and Sea Level Rise Adaptation Report, Canal Community Resilience Project, I-580/US-101 Direct Connector, Local Coastal Program Environmental Hazards Update, and Richardson Bay Shoreline Study.

Similarly, geospatial data for the following items have not been incorporated into the GIS Baseline Dataset, but will likely be incorporated as TAM identifies of vulnerability hotspots and develops initial adaptation concepts:

- Existing coastal protection infrastructure, including available information on location, asset type, performance standards & condition
- Right-of-way information for transportation infrastructure
- Facilities for service and maintenance for Bus, Ferry, and Rail lines
- Rail yards and depots
- Toll, interstate, and state bridges
- Management centers for traffic/transportation
- Sidewalk network

Asset data from the BayWAVE project was available and generously shared with the team. Vulnerability information, which connect previously used SLR scenarios to assets, was unfortunately not available at the time of this report. This data may need to be recreated in Task 3.

## 6. Key Take-aways

Key take-aways from the plan review include the following:

- There is a need for consistency between sea level rise scenarios and projections used within Marin County for SLR adaptation planning. Furthermore, clarity around potential tipping points (i.e., when will SLR trigger the need for local-scale and larger-scale improvements) is lacking across the various studies and plans that have been commissioned to-date.
- The protect, accommodate, and retreat framework does provide a consistent categorization of SLR interventions. In more detailed studies, many intervention concepts do fall between categories into a “hybrid” classification which is often overlooked.
- Many of Marin’s most significant flooding and SLR vulnerabilities surround existing tidally influenced creeks including Coyote Creek, Corte Madera Creek, San Rafeal Canal, Novato Creek and others; there is no clear consensus among the plans and studies reviewed with regards to the set of interventions that could reduce flood risk and address sea level rise long-term.
- Some areas in Marin County have been studied extensively and already begun SLR adaptation work. These areas include key interchanges in the county along US-101 (with SR-37 and I-580) and on/off-ramps to these corridors. Concept designs have been proposed in other areas, such as dune restoration in Stinson Beach. There does not appear to be a consistent approach to the design of interventions, as some

efforts focus on engineering upgrades to an existing system (e.g., upgrading flood protection infrastructure along Lower Corte Madera Creek) and others involve a more holistic approach with significant community feedback and larger scope (e.g., the design concept approach in The People's Plan for Resilient by Design team P+SET).

- A significant gap exists in the lack of vulnerability data in geospatial form. Individual asset layers were downloaded from publicly available sites maintained by the County of Marin, MTC, Caltrans, and others, including shared by the BayWAVE project team. Unfortunately, vulnerability data (such as inundation depth at a road asset under 3ft SLR) from the BayWAVE analysis or data from previous SLR or flood assessments were not available.
- It is recommended that TAM obtains a GIS license for viewing and analyzing the data collected from this project. The geodatabase format cannot be viewed easily without GIS software or custom scripts developed by a geospatial professional.

In the next task, hazard data will be layered onto the asset data. This hazard data will add to analysis from previous studies, and it includes layers for present-day and future groundwater, pluvial and riverine flood, coastal flood, and sea level rise hazard scenarios. Assets and communities will be evaluated for vulnerability and identified for the next scope of work, building towards an implementation plan to address these hazards and support the communities on the road to adaptation and resilience.

## A.1 Adaptation Strategies

See below for excerpt of adaptation strategies identified, along with their categorization by scale (County/City/Asset) and time horizon (near- or long-term).

Scale			Time Horizon		Guideline / Solution	Commentary
County	City	Asset	Near-term	Long-term		
	X	X	X		Backup power - pumping	Consider backup power systems specifically for stormwater pumping systems, enabling the building to continue pumping operations through power outages of up to 12 hours
		X	X		Elevate mechanical equipment	All mechanical equipment and critical utility connections shall be elevated to at least the minimum platform level.
		X	X		Rooftop landscaping - stormwater	Design green/blue roofs and/or other appropriate landscape elements that maximize onsite rainwater capture and reuse.
		X	X		Enhanced drainage	Design roof and site drainage to remain outside of the façade and prevent ponding and overflow into protected areas. All structures with dry-floodproofed areas should be equipped with the appropriate size sump pump. Ensure there are overflow pathways from the roof to mitigate floods caused by drains clogging.
X	X	X		X	Establish risk-based criteria for selecting projections	The selection of climate change projections depends on risk tolerance. Projects with a high risk tolerance can opt for less conservative climate change projections and those with a low tolerance would select more conservative projections. It is recommended that criteria be established to outline how risk tolerance can be assessed and how climate change projections can be appropriately matched to various tolerance levels.
		X	X		Hydrostatic, hydrodynamic, and impact loads	The structure should be designed to withstand the forces imposed by hydrostatic bodies, hydrodynamic loads, and loads delivered by objects carried by flood waters with climate change and sea level rise taken into account.
		X	X		Shelter-in-place	All residential units should be above first floor of building and designed to safely accommodate shelter-in-place orders.
X	X	X	X		Flood resistant vegetation	All outdoor spaces below the platform level will be designed with flood resistant vegetation including saltwater tolerate planting. Include high evapotranspiration-rate tree species to mitigate heat and stormwater events.
		X	X		Utility Connections	The structure should have all utility connections sealed in accordance with guidelines in Floodproofing Non-Residential Buildings (FEMA 2013). This includes utility chases on the exterior of walls for electrical lines, plumbing, gas, communications, or ductwork.
X	X	X	X		Temporary closure / rerouting traffic	A nonstructural/management option during extreme events A nonstructural/management option during extreme events could be to close part or all parts of select roadways. Planning alternative routes, or providing additional means of transportation (ferries instead of bridges) would be required
		X	X		Submersible pumps	Mechanical and electrical pumps, back-up systems, or any other mission-critical components which are needed to maintain pump functionality, including those located in other buildings, should be submersible or otherwise proved to remain operable up to the DFE+SLR.
		X	X		Below grade flood protection	Protect areas below grade from groundwater flooding
X	X	X	X	X	Maximize infiltration and detention	Minimize increases in impervious surface; Utilize strategies that infiltrate, evaporate, or reuse rainwater to achieve stormwater volume reductions; choose low impact development strategies that detain (delay drainage) to manage the rate of the stormwater flow into the utility drainage system; Install stormwater infiltration, detention, and storage
		X	X		Interior water management	When implementing perimeter protections, ensure that interior water management is also accounted for
		X	X		Underground utility protection	Explore interventions to protect underground utility and telecommunications infrastructure from water damage
		X	X		Flood resistant access ways	Any stairs, ramps or walkways in the transition zone up to platform level should be designed to resist flood loads.
		X	X		Floodproofing basements	All indoor spaces within the building below the platform level (basements) will be wet and dry floodproofed.
	X	X	X	X	Parking and/or Plazas as detention	Explore opportunities for designing underground parking garages and/or outside plazas for stormwater detention.
X	X		X	X	Public flood notices	Provide flood warnings and alerts
	X	X		X	Develop climate resiliency design guidelines	Develop climate resiliency design guidelines for design elements at the building and district scale.
		X		X	Determine minimum platform level	Platform level refers to the general ground level of a proposed development. The platform level of new developments will not be lower than the DFE+SLR elevation.
X	X	X		X	Elevate roads	Construct elevated roadways to provide access for fire and ambulance services in the event of king tides or storm tides.



Scale			Time Horizon		Guideline / Solution	Commentary
County	City	Asset	Near-term	Long-term		
X	X	X	X		Flood resistant landscaping (e.g., bioswales, sedimentation basins)	All outdoor spaces below the platform level will be designed with flood resistant landscaping with publicly accessible plaza where possible. Public spaces or temporary programmable space is acceptable below the platform level. If sited above the platform level, public spaces must provide context-sensitive, visually accessible, and gradual vertical transition up to platform level.
	X			X	Flood proof marinas	In marinas also watercrafts can be allowed to adjust to fluctuations of water level.
X	X			X	Land claim	The main objective of land claim is neither erosion nor storm reduction. The aim of land claim is to create new land from areas that were previously below high tide. These measures can be taken to reduce the exposure of these areas to coastal flooding.
X	X			X	Managed realignment	Looks to set back the shoreline and restore coastal environments. This strategy usually involves removing or deliberately breaching flood defenses to allow flooding up to higher ground or a new defense line; or realigning coastal cliff frontages to allow cliff erosion. It has advantages in removing long-term financial commitments to maintain defenses and in restoring natural environments and processes. Managed realignment can create new habitat area that acts as a natural buffer to coastal waves and is much cheaper to maintain over the long-term.
		X		X	Foundation	Design foundation elements, including mat slabs, shallow footings, and piles for the hydrostatic uplift forces corresponding to the DFE+SLR.
		X		X	Wall Systems	Wall systems below the DFE+SLR should be constructed to withstand all hydrostatic and hydrodynamic forces imposed on the wall by the DFE.
	X	X		X	Build revetments	Revetments are onshore structures with the principal function of protecting the shoreline from erosion. Revetments typically consist of a cladding of stone, concrete, or asphalt to armor sloping natural shoreline profiles.
X	X	X		X	Determine credible climate hazards	A multi-hazard assessment will be applied to an individual site in order to determine the credible threats influenced by climate. Hazards to be considered should include, but not be limited to, extreme heat, precipitation, wind, storm surge, stormwater flooding, fluvial flooding, tidal flooding, waves, sea level rise inundation, groundwater flooding.
X	X	X		X	Identify climate change projections	For each credible climate hazard, appropriate climate change projections will be collected to inform design.
		X		X	Anchor movable contents	Anchor any submersible content located below the DFE+SLR that could cause damage to the structure if moved by water. Includes tanks, ramps and gates.
		X		X	Mold resistant materials	The structure should include high strength, non-organic materials with no potential for deterioration, corrosion or warping for all structural and core elements.
		X		X	Water resistant materials (Wall Sealants)	Select waterproof exterior materials that prevent entry of water into any essential area of the building. Use sealed membranes in areas within 5ft of the DFE+SLR, including door and window openings.
		X		X	Windows and doors	On the ground floor, windows and doors should be sealed, watertight and designed to withstand high water pressures.
		X		X	Gaskets and Seals	Ensure that all vents, drains, conduit boxes, utility manholes and access openings are also sealed or sealable and include backflow prevention. Self-sealing compression seals should be utilized as they are more reliable and can be used in conjunction with pneumatic seals for a redundant configuration, which provides more protection.
		X		X	Electrical Outlets	Install electrical outlets above DFE+SLR and wire ground floor system independently to prevent short out of other building areas.
		X		X	Backflow Valves	Install check valve or similar back flow device at the point of entry into the building on the main discharge sewer line to prevent sewage from potentially flowing back into the building during a flood event.
		X		X	Envelope	Ensure building envelope is protected against any water intrusion through use of waterproofing membranes in areas within 5ft of the DFE+SLR and essential facades sealed, without openings to rainfall or wind driven rain.
		X		X	Stairs	Stair framing elements and their connections are designed and detailed to maintain support of the design dead and live loads during flooded conditions of the primary structure and external access is achievable on the second-floor level or above the DFE.
		X		X	Doors	Egress doors and first floor windows are designed to accommodate surges such that they remain operable following the design level flood.
		X		X	Elevators	Elevators that operate below the platform level will be dry and wet floodproofed to ensure resilience against flooding up to the DFE+SLR.
X	X	X		X	Categorize climate change projections based on project type	For each type of project, appropriate climate change projections should be pre-identified and recommended. Project types include infrastructure improvements, mixed use development, utility upgrades, etc.
X	X	X		X	Design based on future climate data	Identify appropriate basis of design (BOD) requirements for each credible climate hazard and incorporate climate change projections. The credibility of specific hazards will trigger hazard-specific design requirements using existing Federal, State, and Local guidance. Hazard-specific design guidelines will be combined with climate change projections to determine appropriate climate-resilience design levels.
X	X	X		X	Design for critical loads - stormwater	Increase capacity of stormwater drainage systems by designing for critical loads that incorporate future extreme climate projections for rainfall-runoff.

Scale			Time Horizon		Guideline / Solution	Commentary
County	City	Asset	Near-term	Long-term		
X	X	X		X	Build/update barriers	Construct a moveable or permanent barrier (tidal gates). Tide gates can potentially protect a significant length of upstream shoreline relative to the length of the tide gate. May be the only viable solution where right of way for other solutions cannot be obtained. These can have negative environmental impacts.
X	X	X		X	Build levees	Raise, strengthen, or build levees. Levees are not a great option on the open coast due to high wave energy environment, need to armor levee slope. Levees could be used in tidally influenced creeks and rivers though.
X	X	X	X	X	Build walls	Build new sea walls or raise the height of existing ones; can also incorporate buildings as flood protection features. Both seawalls and revetments were found to have a negative net cost benefit as a result of high construction cost in past erosion mitigation
	X	X		X	Determine minimum crest level	Crest level refers to the bottom level of any openings (including ventilation and services openings) or summit level of a ramp or accessway leading into or away from an underground or basement structure or facility, including the summit level of any exits from the underground facilities. The crest level of new developments will not be lower than the platform level plus a to-be-determined amount of freeboard.
X	X	X		X	Flood Barrier	New developments will raise the platform level and/or crest level to the highest possible levels before considering flood barriers. Where flood barriers are used, they must be designed to provide at least the same level of protection that minimum platform and/or crest levels would provide for the building.
X	X	X			Transition zone	Provide “transition zone” between the back of sidewalk up to the crest level, with deep landscape setback to provide enough horizontal space for gradual slope up to building entry with amenities including plantings, walking paths, seating and other amenities. Use planters with integrated seating to soften the transition between elevated hardscape and sidewalk
X	X			X	Land reclamation	Develop an extension of the land, natural or unnatural (port), to provide wave energy dissipation

## A.2 Critical Transportation Assets and Communities by Jurisdiction<sup>6</sup>

### 6.1.1 City of Belvedere

The City of Belvedere is located in southeastern Marin County on San Francisco Bay (and offshoot Richardson Bay) and includes Belvedere Island, Belvedere Lagoon, and Corinthian Island.

Asset	
Airports	0
Golden Gate Transit Stops	0
Golden Gate Ferry Terminals	0
Marin Transit Stops	1
SMART Stations	0
Caltrans Maintenance Facilities	0
Park and Ride	0
State Highway Bridges	0
Road Tunnels	0
Bikeways (Existing and Proposed)	<1 mile
HOV Lanes	0 miles
Trails	<1 mile
Roadways	26 miles

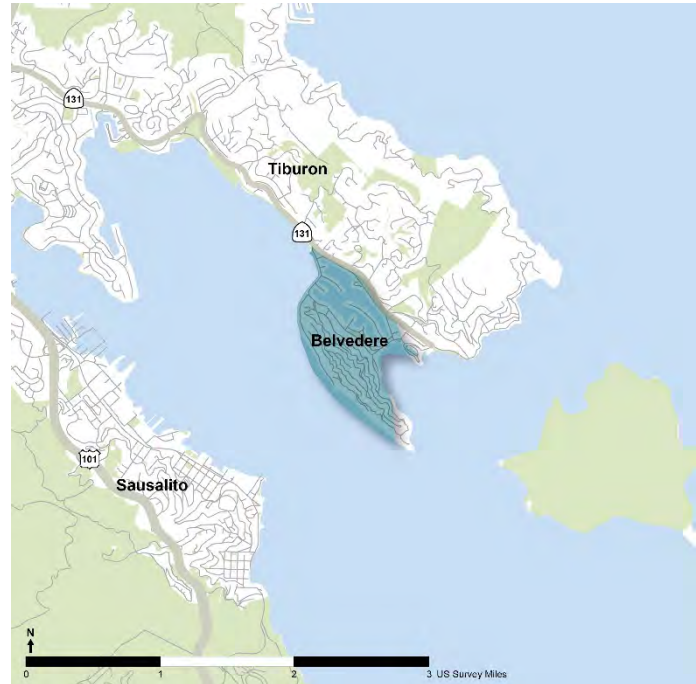


Figure 11 Belvedere City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- San Rafael Ave. and Beach Rd. are the two primary ingress/egress routes connecting Belvedere Island to the Tiburon peninsula, both of which are waterfront roads on the west and east sides of the Lagoon respectively; these roads represent key vulnerable assets for Belvedere with respect to sea level rise. They are exposed to inundation under 24” (2.0ft or 0.6m) SLR (ART Bay Area, BCDC, 2020). The Protect Belvedere (Belvedere Critical Infrastructure Project) seeks to address improvements to these roads and the levees they sit atop (MTC/ABAG & BCDC Sea Level Rise Framework Shoreline Project Inventory, 2021).

<sup>6</sup> This list is not entirely comprehensive and is a query of the data best available.

6.1.2 City of Larkspur

The City of Larkspur, located in central Marin, encompasses Corte Madera Creek and touches San Francisco Bay, exposing it to coastal and riverine flood hazards. The Larkspur Ferry Terminal connects the area to San Francisco via ferry while US-101, which runs through the city, provides vital connection to other communities in Marin and the Bay Area. Roadways in Larkspur also provide vital connectivity to Marin General Hospital.

Asset	
Airports	0
Golden Gate Transit Stops	2
Ferry Terminals	1
Marin Transit Stops	34
SMART Stations	1
Caltrans Maintenance Facilities	0
Park and Ride	3
Transit Hubs	1
State Highway Bridges	3
Road Tunnels	0
Bikeways (Existing and Proposed)	30 miles
HOV Lanes	5 miles
Trails	21 miles
Roadways	134 miles

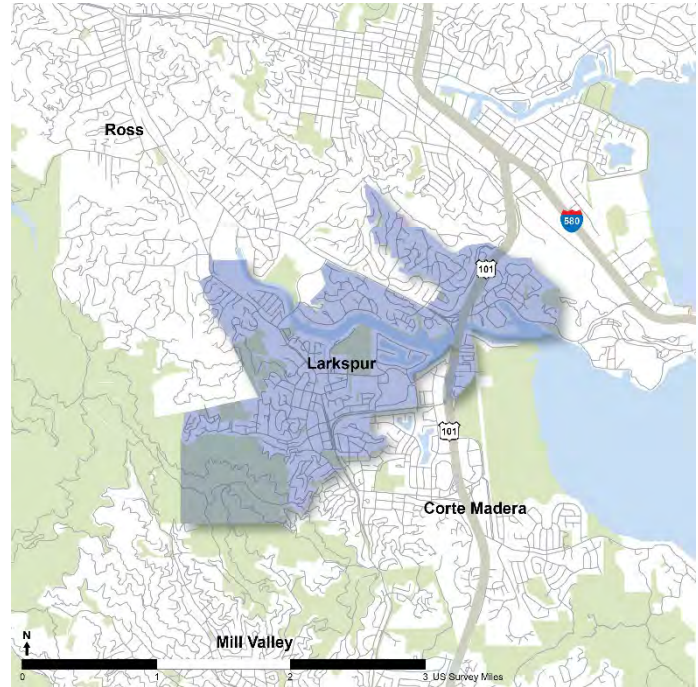


Figure 12 Larkspur City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- The Larkspur Ferry Terminal was identified in the Marin Shoreline Sea Level Rise Vulnerability Assessment as vulnerable to coastal flooding. There are plans to improve the site, parking capacity, and dock operating systems in response to SLR. Identified in Marin Shoreline Sea Level Rise Vulnerability Assessment (BayWAVE, 2017).
- Lucky Drive floods during present-day king tide events and is also susceptible to riverine flooding from Corte Madera Creek. This relatively short stretch is an essential connector between Corte Madera, Larkspur, Kentfield, and other Central Marin communities to US-101 (Corte Madera Climate Adaptation Assessment, 2021) (BayWAVE, 2017).
- The US-101 corridor is known to be vulnerable to sea level rise and flooding in Marin; the section through Larkspur is mostly elevated but on/off ramps are low-lying and flood prone.

6.1.3 City of Mill Valley

The City of Mill Valley touches Richardson Bay, part of San Francisco Bay, and extends upland towards Mount Tamalpais. The coastal areas of the city, include Bothin Marsh, contain transit centers, commercial districts, and residences, among other assets and services.

Asset	
Airports	0
Golden Gate Transit Stops	26
Golden Gate Ferry Terminals	0
Marin Transit Stops	27
SMART Stations	0
Caltrans Maintenance Facilities	0
Park and Ride	0
State Highway Bridges	0
Road Tunnels	0
Bikeways (Existing and Proposed)	34 miles
HOV Lanes	0 miles
Trails	28 miles
Roadways	191 miles

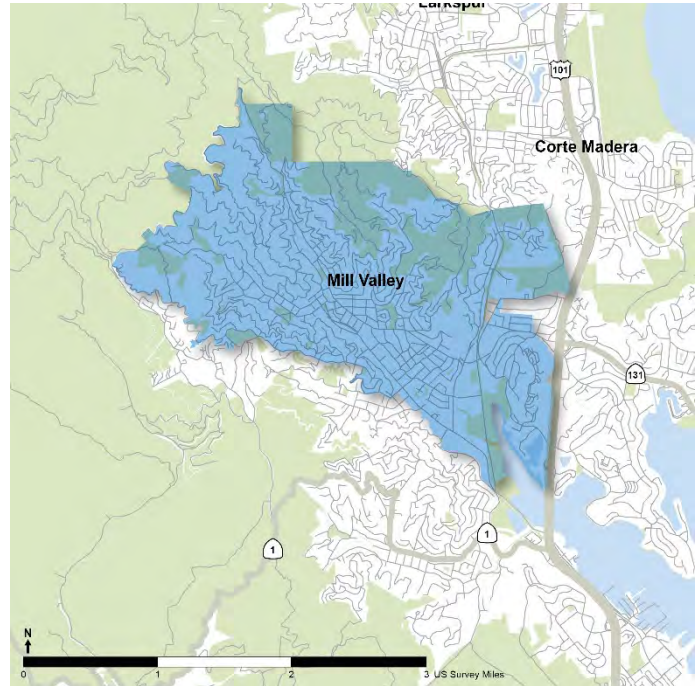


Figure 13 Mill Valley City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- The US-101 corridor is known to be vulnerable to sea level rise and flooding in Marin; the section through Mill Valley is mostly elevated but on/off ramps and frontage roads are low-lying and flood prone.
- Extreme precipitation combined with drainage capacity issues, rising shallow groundwater tables, and high tides is a known issue in Mill Valley; this impacts several local roads, bridges and bus routes/stops, particularly those nearby creeks and the Richardson Bay (Shallow Groundwater Response to Sea Level Rise, 2022).
- East Blithedale Ave., Miller Ave., and Camino Alto are all key roadways for ingress/egress to and from many of Mill Valley’s main commercial and residential areas; due to elevation, existing drainage capacity, and proximity to creeks and Richardson Bay, these roads are all vulnerable to flooding and sea level rise.
- Bothin Marsh restoration work includes strategies such as ecotone levees, sediment management, and enhancement of the natural tidal marsh ecosystem (MTC/ABAG & BCDC Sea Level Rise Framework Shoreline Project Inventory, 2021).

### 6.1.4 City of Novato

The northernmost city in Marin, Novato sits on San Pablo Bay, part of San Francisco Bay. The city includes wetland areas and Novato Creek, which runs through the main commercial district. SR-37 and US-101 meet in the city. This interchange has been identified as a critical transportation asset vulnerable to sea level rise from previous studies, discussed below.

Asset	
Airports	0
Golden Gate Transit Stops	29
Golden Gate Ferry Terminals	0
Marin Transit Stops	126
SMART Stations	3
Caltrans Maintenance Facilities	0
Park and Ride	2
Transit Hubs	4
State Highway Bridges	26
Road Tunnels	0
Bikeways (Existing and Proposed)	118 miles
HOV Lanes	22 miles
Trails	118 miles
Roadways	564 miles

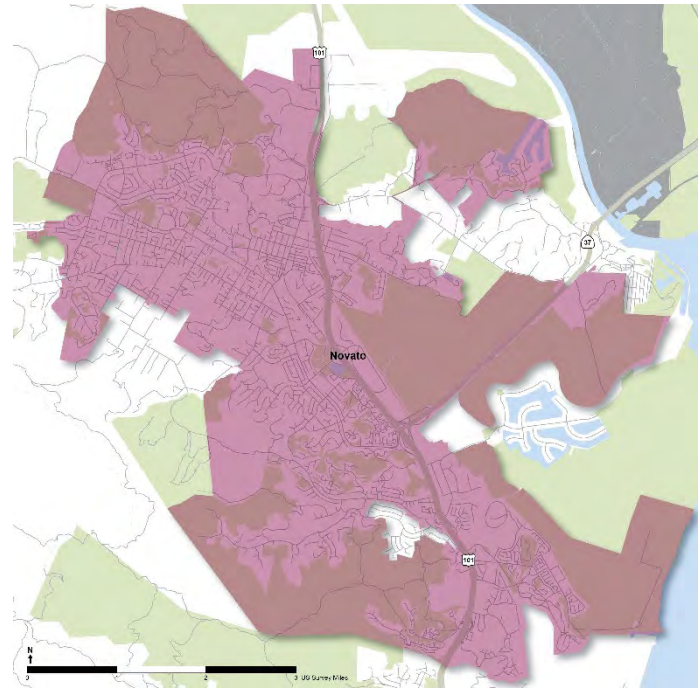


Figure 14 Novato City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- The US-101 corridor is known to be vulnerable to sea level rise and flooding in Marin; the section through Novato is mostly elevated but many on/off ramps are low-lying and flood prone. Additionally, the section of US-101 passing the Gness Field Airport is vulnerable to flooding due to elevation and proximity to nearby wetlands and creeks.
- SR-37 connecting Novato and Vallejo was expected to be permanently submerged by 39in (3.3ft or 1.0m) SLR, according to Caltrans D4 Vulnerability Assessment (Caltrans, 2019) and SR 37 PEL Study (Caltrans, 2022). Near-term maintenance projects include SR 37 Pavement Rehabilitation between US-101/SR-37 interchange and Petaluma River and SR 37 Bridge Preservation project at Petaluma River Bridge at the border of Marin and Sonoma counties. Long-term implementation plan includes elevating SR-37 on a raised facility between US-101 and Atherton Avenue, where it meets the already elevated SR-37. Improvements to on- and off-ramps and bicycle and pedestrian facilities are also planned along the SR-37 corridor through Novato and Marin County (TAM Annual Report, 2022).
- The SMART train is vulnerable to flood issues in Novato as about 4-5mi of track is vulnerable to inundation in future SLR, as identified in Marin Shoreline Sea Level Rise Vulnerability Assessment (BayWAVE, 2017). SMART has identified opportunities along SR-37 to align rail infrastructure with

the highway between Novato and Sears Point, according to SR 37 PEL Study (Caltrans, 2022); extending SMART along the SR 37 corridor will require SMART to address known flooding and sea level rise vulnerabilities.

- The Novato Creek Flood Control Project was completed in 2006, and the Novato-Hamilton levee system is the only FEMA-accredited system in Marin, but extensive damage to the levees and stormwater pumping systems was experienced in 2014 and 2017 flood events. (Marin LHMP)
- Novato OLU Case Study in Marin County SLR Adaptation Framework (2019) calls out low-lying Highway 37 and rail lines and the Bel Marin Keys neighborhood as vulnerable. Eroding marshlands may cause issue because they protect the bayside of the levees.

6.1.5 City of San Rafael

The City of San Rafael is situated on San Rafael Bay, part of the San Francisco Bay. Approximately 60,000 people reside in the city, which contains wetlands and rivers (Gallinas Creek, South Fork Gallinas Creek, and San Rafael Creek) that border or cross important infrastructure. US-101 and I-580 converge in San Rafael, and this interchange has been identified as a critical asset in previous studies (discussed below) due to it being a low-lying asset susceptible to flooding and a key connection point for regional traffic.

Asset	
Airports	Smith Ranch
Golden Gate Transit Stops	55
Golden Gate Ferry Terminals	0
Marin Transit Stops	117
SMART Stations	2
Caltrans Maintenance Facilities	-San Rafael Landscape Storage
Park and Ride	5
Transit Hubs	1
State Highway Bridges	21
Road Tunnels	0
Bikeways (Existing and Proposed)	119 miles
HOV Lanes	22 miles
Trails	57 miles
Roadways	540 miles

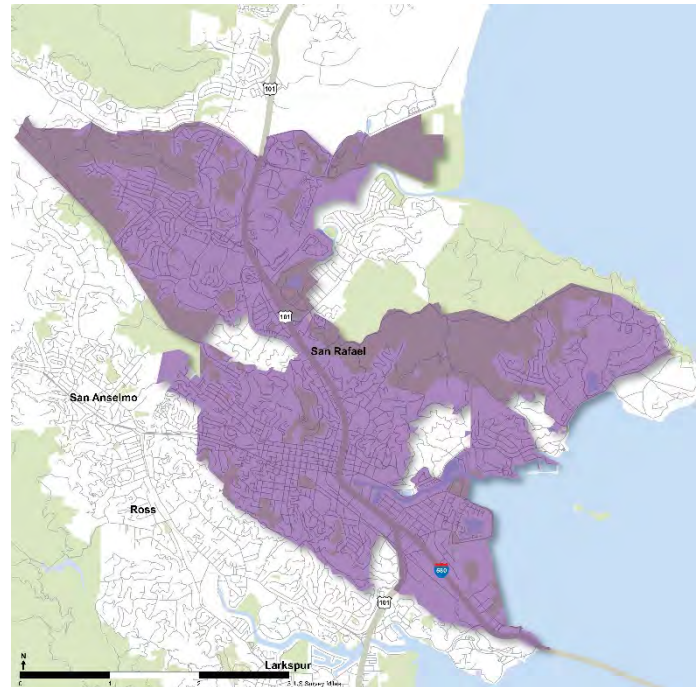


Figure 15 San Rafael City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- TAM is leading project development for the US-101/I-580 interchange, which has been identified as a critical regional transportation asset vulnerable to climate hazards in the BARC Raising the Bar on Regional Resilience report, ART Bay Area (BCDC, 2020), and other studies. Though sections are elevated, many ramps and feeder roads could flood and impede travel through the city and county, and they become vulnerable to inundation by 12” (1.0ft or 0.3m) SLR (ART Bay Area, BCDC, 2020).
- The Canal District is exposed to flooding and sea level rise from the canal and bay and has been identified as a socially vulnerable neighborhood in the BARC Raising the Bar on Regional Resilience report. The Gerstle Park/Bret Harte neighborhood and Montecito/Happy Valley neighborhood are also exposed to flooding, as identified in the BARC Raising the Bar on Regional Resilience report. Portions of downtown San Rafael currently experience flooding in extreme rainfall plus high tide events.
- The SMART train may experience flood issues in San Rafael along mile posts 15.9-16.9 (San Rafael/Santa Venetia) and 19.8-20.9 (Central San Rafael). The San Rafael Transit Center was identified as the only SMART stop vulnerable to tidal flooding at 60” (5ft or 1.5m) SLR. Identified in Marin Shoreline Sea Level Rise Vulnerability Assessment (BayWAVE, 2017).



- The Golden Gate Bridge, Highway and Transportation District (GGBHTD) headquarters and depot, multiple yacht harbors, and parts of the Bay Trail in San Rafael are vulnerable to inundation under 10” (0.8ft or 0.25m) SLR, as identified in the Marin Shoreline Sea level Rise Vulnerability Assessment (BayWAVE, 2017).
- The San Rafael Airport and Loch Lomond Marina were also identified in the Marin Shoreline Sea Level Rise Vulnerability Assessment as vulnerable to medium-term SLR, experience inundation in 20” (1.7ft or 0.5m) SLR (BayWAVE, 2017).
- The San Francisco Bay Trail and Water Trail are vulnerable to flood under 12” (1.0ft or 0.3m) SLR (ART Bay Area, BCDC, 2020).
- The Irwin Street Bridge crossing San Rafael Creek/Canal, which was recently replaced and connects northbound vehicles from US-101 to downtown San Rafael currently has minimal freeboard during high tide events.
- The San Rafael Transit Center is vulnerable to flooding from extreme precipitation, existing drainage capacity and proximity to the tidally influenced sections of San Rafael Creek/Canal. This is a key transit hub for the region, including multiple bus stops and the SMART downtown San Rafael station. It is the highest ridership station in the North Bay. Note that FEIR has been completed, and design is underway.
- Key connector roads in San Rafael that are known to be vulnerable to flooding and sea level rise due to elevation, existing drainage infrastructure, and proximity to creeks and the San Francisco Bay include N. San Pedro Rd., Point San Pedro Rd., Irwin St., Grand Ave., Second St., Lincoln Ave., Anderson Dr., Francisco Blvd. E., Francisco Blvd. W., and Bellam Blvd.

6.1.6 City of Sausalito

The City of Sausalito is located along the coastline of San Francisco Bay into Richardson Bay in southern Marin. The Sausalito Ferry Terminal and the main downtown thoroughfare, Bridgeway, are key infrastructure assets that connect the city to the region. US-101 forms the western border of Sausalito, bypassing the downtown area.

Asset	
Airports	0
Golden Gate Transit Stops	1
Golden Gate Ferry Terminals	20
Marin Transit Stops	14
SMART Stations	0
Caltrans Maintenance Facilities	0
Park and Ride	1
Transit Hubs	1
State Highway Bridges	5
Road Tunnels	Waldo Tunnel
Bikeways (Existing and Proposed)	11 miles
HOV Lanes	0 miles
Trails	16 miles
Roadways	98 miles

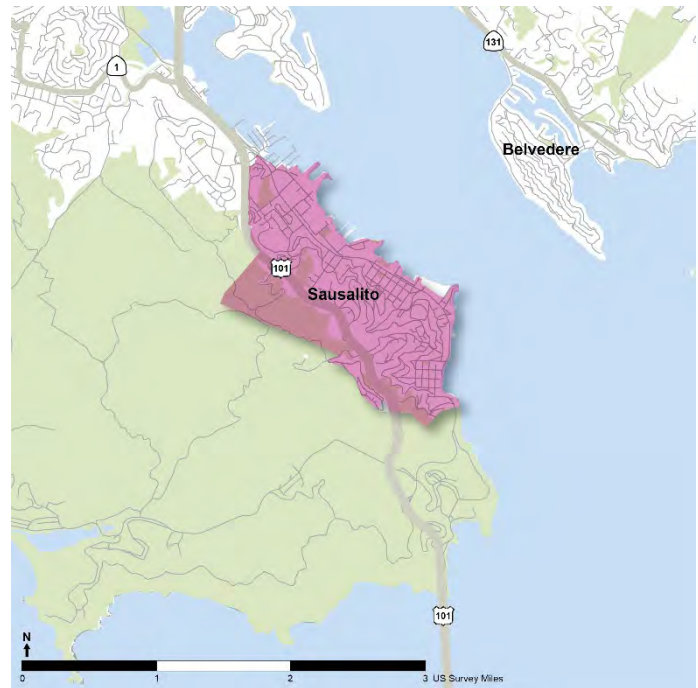


Figure 16 Sausalito City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- The San Francisco Bay Trail and Water Trail are vulnerable to flood under 12” (1ft or 0.3m) SLR (Richardson Bay ART).
- The City of Sausalito is aware of flooding, land subsidence and associated impacts to infrastructure along Gate 5 Road that will only increase with further SLR.
- Bridgeway is the main connector road through Sausalito that provides a vital ingress/egress route; this roadway is vulnerable to flooding due to elevation, existing drainage infrastructure, multiple creek crossings, and proximity to Richardson Bay. On/offramps to US-101 as well as N Bridge Blvd on the north end of Sausalito are known to be vulnerable to flooding for many of these same reasons.
- The Sausalito Ferry Plaza and several waterfront marinas are also known to be vulnerable to future flooding as a result of sea level rise.
- Stormwater pump stations are also known to be vulnerable to coastal flooding in Sausalito due to elevation and proximity to Richardson Bay.
- Mill Valley to Sausalito Path and the North-South Greenway Path contain the highest usage of Marin’s Active Transportation facilities.
- Infrastructure and access to the Marinship and Floating Homes Community.

6.1.7 Town of Corte Madera

The Town of Corte Madera is located on San Francisco Bay in central Marin County, along the US-101 Corridor on the San Francisco Bay. Approximately 10,000 people live in this low-lying coastal town. Historically, much of this area was marshland, which leaves most lower elevation residential and commercial areas in the Town vulnerable to coastal flooding.

Asset	
Airports	0
Golden Gate Transit Stops	2
Golden Gate Ferry Terminals	0
Marin Transit Stops	32
SMART Stations	0
Caltrans Maintenance Facilities	0
Park and Ride	1
Transit Hubs	0
State Highway Bridges	3
Road Tunnels	0
Bikeways (Existing and Proposed)	39 miles
HOV Lanes	8 miles
Trails	12 miles
Roadways	123 miles

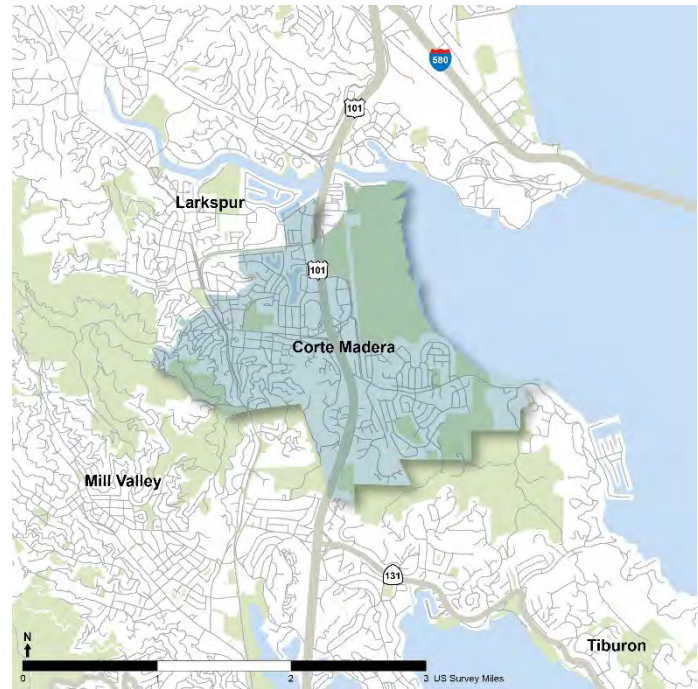


Figure 17 Corte Madera City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- Wornum Drive Bridge (US-101 PM 8.02) and Tamalpais Drive Overcrossing (US-101 PM 7.37) may be exposed to scour starting in 20” (1.6ft or 0.5m) SLR and may require protection measures. Identified in Caltrans D4 Vulnerability Assessment.
- US-101 through downtown Corte Madera, extending north outside of city boundaries, has been identified as a regional “hot spot” in Bay Adapt Regional Strategy, using data from ART Bay Area Regional Sea Level Rise Vulnerability and Adaptation Study with 108” (9.0ft or 2.7m) SLR. US-101 has been identified as vulnerable in the Marin County SLR Adaptation Framework (2019) and BayWAVE (2017).
- Lucky Drive floods during present-day king tide events and is also susceptible to riverine flooding from Corte Madera Creek. This short corridor represents an essential connection between Corte Madera, Larkspur, Kentfield, and other Central Marin communities to US-101 (Corte Madera Climate Adaptation Assessment, 2021) (BayWAVE, 2017).
- Paradise Drive connects Tiburon to the County and US-101, and it is part of the Bay Trail. Parts of the road are vulnerable to flood under 66” (5.5ft or 1.7m) SLR, though may experience inundation during storm events under less SLR (Corte Madera Climate Adaptation Assessment, 2021).

- SMART and GGBHTD corridors through Corte Madera Marsh sit on elevated berms which protect parts of Corte Madera from tidal flooding. The Corte Madera Climate Adaptation Assessment has identified the marshland area for potential integrated adaptation strategies (2021).
- Casa Buena Drive floods during extreme precipitation events, and as a key connector to Tamalpais Drive for residents and businesses, it's a key vulnerable asset in Corte Madera (Corte Madera Climate Adaptation Assessment, 2021).
- Mill Valley to Sausalito Path and the North-South Greenway Path contain the highest usage of Marin's Active Transportation facilities.

6.1.8 Town of Fairfax

The Town of Fairfax sits over 100ft above sea level in inland Marin. Residents rely on the road network to access other communities in Marin and the greater Bay Area. Though none of the infrastructure in the town is exposed to coastal hazards, key connector routes may be vulnerable to sea level rise. Also Fairfax Creek, San Anselmo Creek, and their tributaries run through the town, which may expose the town to riverine flooding.

Asset	
Airports	0
Golden Gate Transit Stops	0
Golden Gate Ferry Terminals	0
Marin Transit Stops	15
SMART Stations	0
Caltrans Maintenance Facilities	0
Park and Ride	0
Transit Hubs	0
State Highway Bridges	0
Road Tunnels	0
Bikeways (Existing and Proposed)	18 miles
HOV Lanes	6 miles
Trails	12 miles
Roadways	71 miles

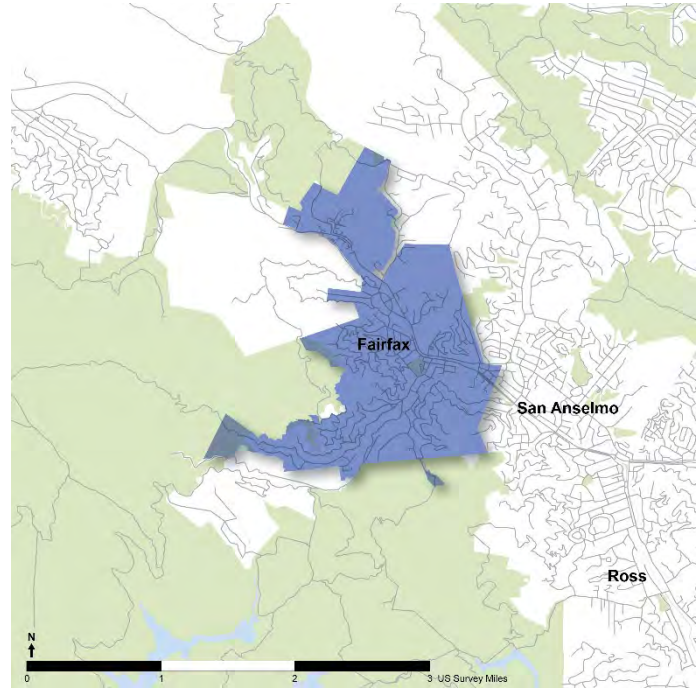


Figure 18 Fairfax City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- No assets exposed to coastal hazards, but riverine flood has caused damage in the past, including to major roads (MCM LHMP).
- Key corridors that connect Fairfax to the region may be impacted by sea level rise. See San Rafael, Larkspur, and Corte Madera sections for more information on these routes. See the following plot for network link volumes, noting the significant volume from the coast inland to Fairfax.

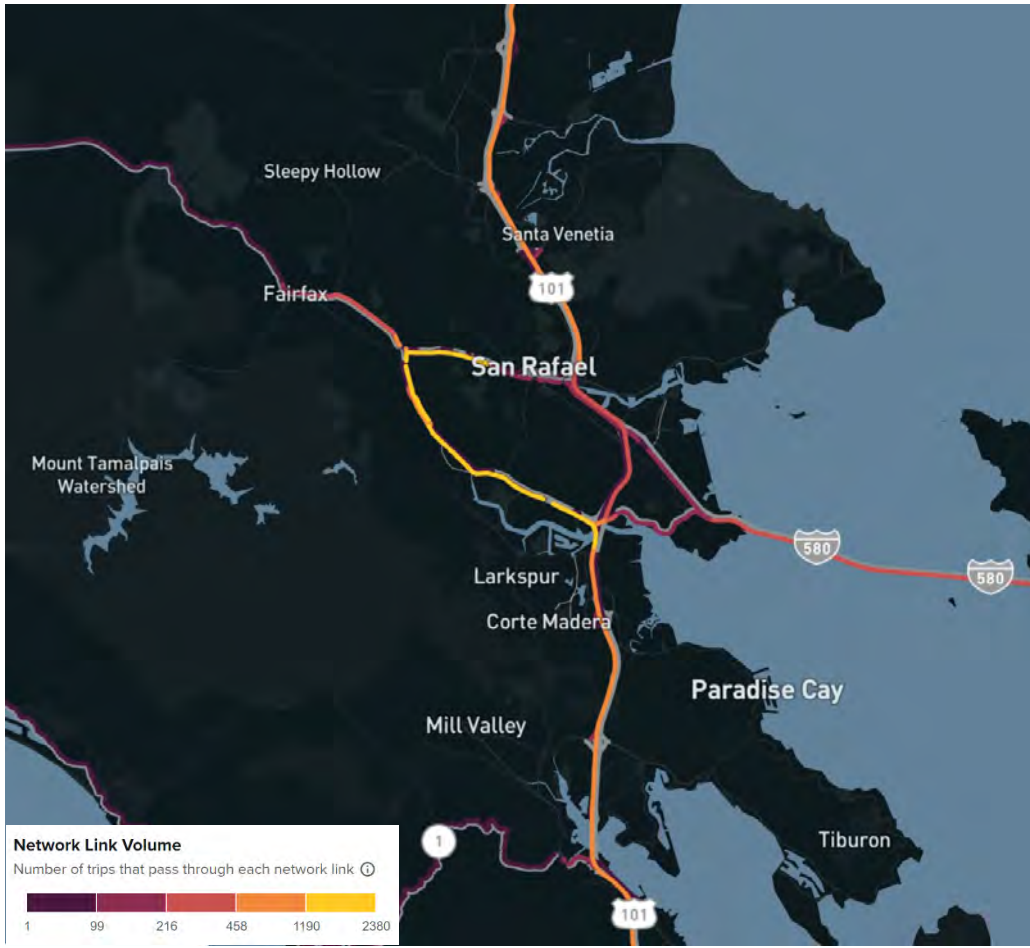


Figure 19: Network Link Volume data from Replica (replicahq.com).

6.1.9 Town of Ross

The town of Ross is a small, inland community of roughly 2,000 residents. It is located along the Corte Madera Creek, upstream of Larkspur. It is connected to nearby communities via Sir Francis Drake Boulevard, a major corridor that connects to US-101. None of the infrastructure in Ross is exposed to coastal hazards although the tidal influence from the San Francisco Bay is expected to extend upstream in Corte Madera Creek as a result of future sea level rise which could worsen the existing riverine flood issues along this creek during future extreme rainfall and high tide events.

Asset	
Airports	0
Golden Gate Transit Stops	0
Golden Gate Ferry Terminals	0
Marin Transit Stops	4
SMART Stations	0
Caltrans Maintenance Facilities	0
Park and Ride	0
Transit Hubs	0
State Highway Bridges	0
Road Tunnels	0
Bikeways (Existing and Proposed)	5 miles
HOV Lanes	0 miles
Trails	2 miles
Roadways	44 miles

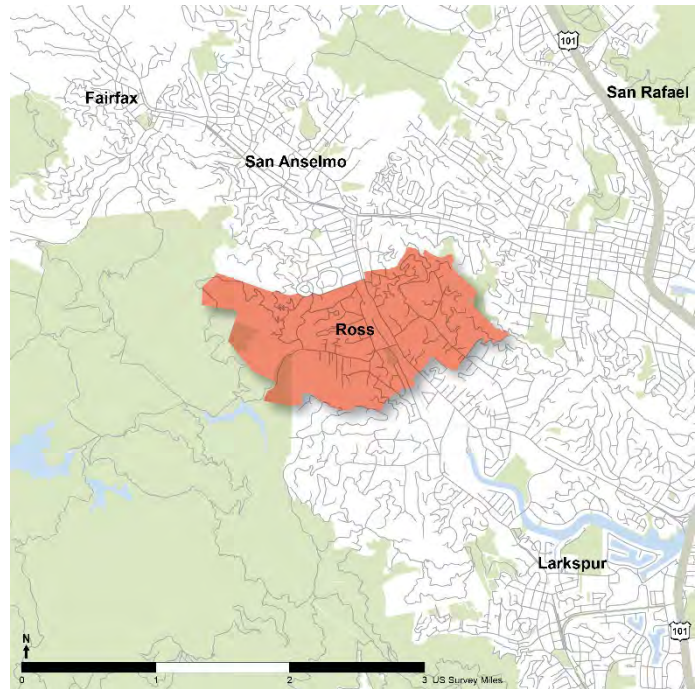


Figure 20 Ross City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- No assets exposed to coastal hazards, but riverine flood has caused damage in the past, including to major roads (MCM LHMP).
- Key corridors that connect Ross to the region may be impacted by sea level rise. See San Rafael, Larkspur, and Corte Madera for more information. See the following plot for network link volumes, noting the significant volume from the coast inland to Ross (due of where it says ‘San Anselmo’ in the image).

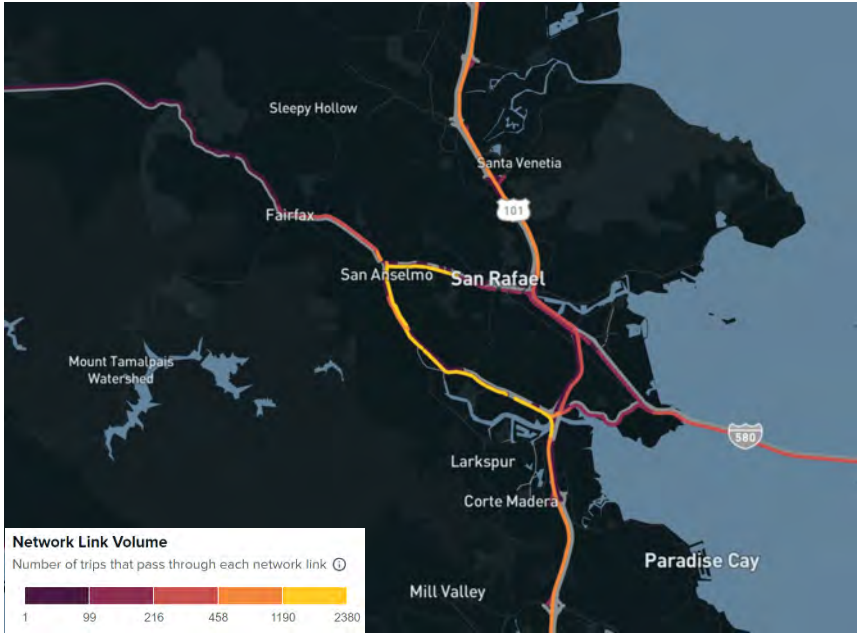


Figure 21: Network Link Volume data from Replica (replicahq.com).



6.1.10 Town of San Anselmo

The Town of San Anselmo sits about 50ft above sea level in inland Marin. Residents rely on the road network to access other communities in Marin and the greater Bay Area, though none of the infrastructure in the town is exposed to coastal hazards like sea level rise. San Anselmo Creek and its tributaries run through the town, which expose the town to riverine flooding. The tidal influence from the San Francisco Bay is expected to extend upstream in Corte Madera Creek as a result of future sea level rise which could worsen the existing riverine flood issues in San Anselmo during future extreme rainfall and high tide events.

Asset	
Airports	0
Golden Gate Transit Stops	3
Golden Gate Ferry Terminals	0
Marin Transit Stops	20
SMART Stations	0
Caltrans Maintenance Facilities	0
Park and Ride	0
Transit Hubs	1
State Highway Bridges	0
Road Tunnels	0
Bikeways (Existing and Proposed)	25 miles
HOV Lanes	0 miles
Trails	4 miles
Roadways	108 miles



Figure 22 San Anselmo City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- No assets exposed to coastal hazards, but riverine flood has caused damage in the past, including to major roads (MCM LHMP).
- Key corridors that connect San Anselmo to the region may be impacted by sea level rise. See San Rafael, Larkspur, and Corte Madera for more information. See the following plot for network link volumes, noting the significant volume from the coast inland to San Anselmo (located at the intersection west of San Rafael).

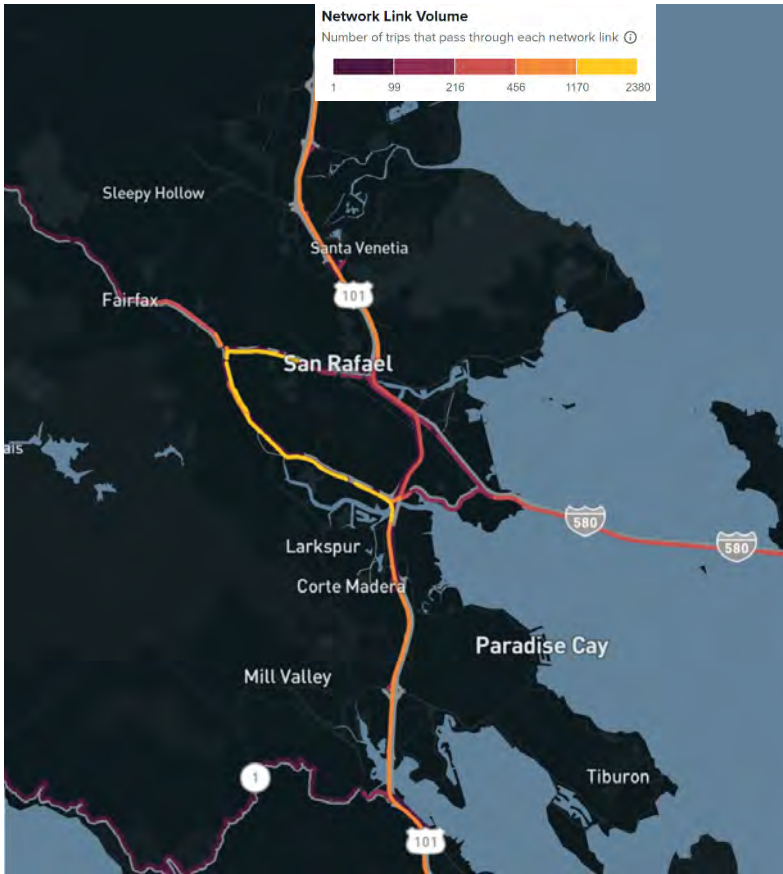


Figure 23: Network Link Volume data from Replica (replicahq.com).

6.1.11 Town of Tiburon

The Town of Tiburon comprises a peninsula that extends from main Marin into the San Francisco Bay. Tiburon Boulevard (CA-131), which connects the town (and adjacent Belvedere) to the mainland, is a key transportation asset exposed to coastal hazards like sea level rise.

Asset	
Airports	0
Golden Gate Transit Stops	0
Golden Gate Ferry Terminals	2
Marin Transit Stops	23
SMART Stations	0
Caltrans Maintenance Facilities	0
Park and Ride	1
Transit Hubs	0
State Highway Bridges	0
Road Tunnels	0
Bikeways (Existing and Proposed)	13 miles
HOV Lanes	0 miles
Trails	45 miles
Roadways	112 miles

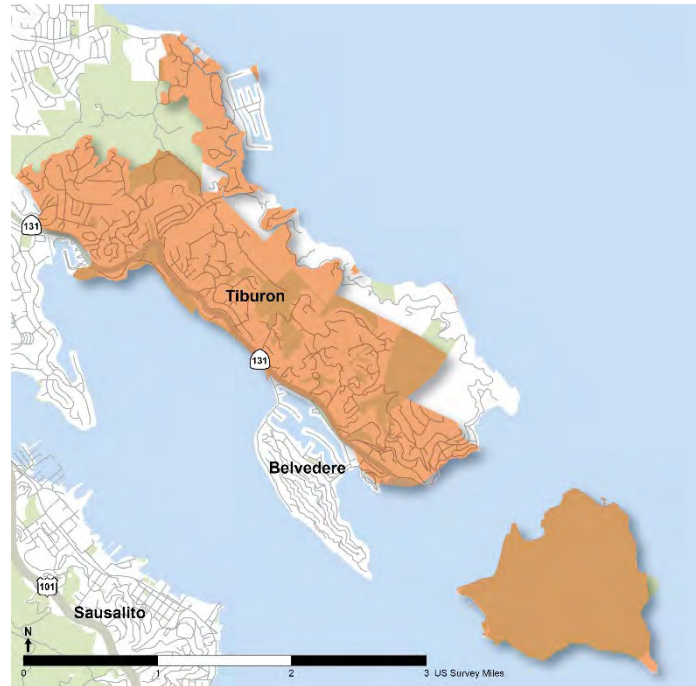


Figure 24 Tiburon City Boundary

Key focus areas, highlighting vulnerable communities or assets:

- Ferry landings in Tiburon have been identified as vulnerable to near-term SLR in the Marin Shoreline Sea Level Rise Vulnerability Assessment (BayWAVE, 2017).
- Paradise Drive connects Tiburon to the County and US-101, and it is part of the Bay Trail. Parts of the road are vulnerable to flood under 66” (5.5ft or 1.7m) SLR, though may experience inundation during storm events under less SLR (Corte Madera Climate Adaptation Assessment).

6.1.12 Unincorporated Communities

Unincorporated communities in the County of Marin include Greenbrae, Kentfield, Marin City, Bolinas, Dillon Beach, Forest Knolls, Inverness, Lagunitas, Marshall, Nicasio, Olema, Point Reyes, San Geronimo, Stinson Beach, and Tomales.<sup>7</sup>

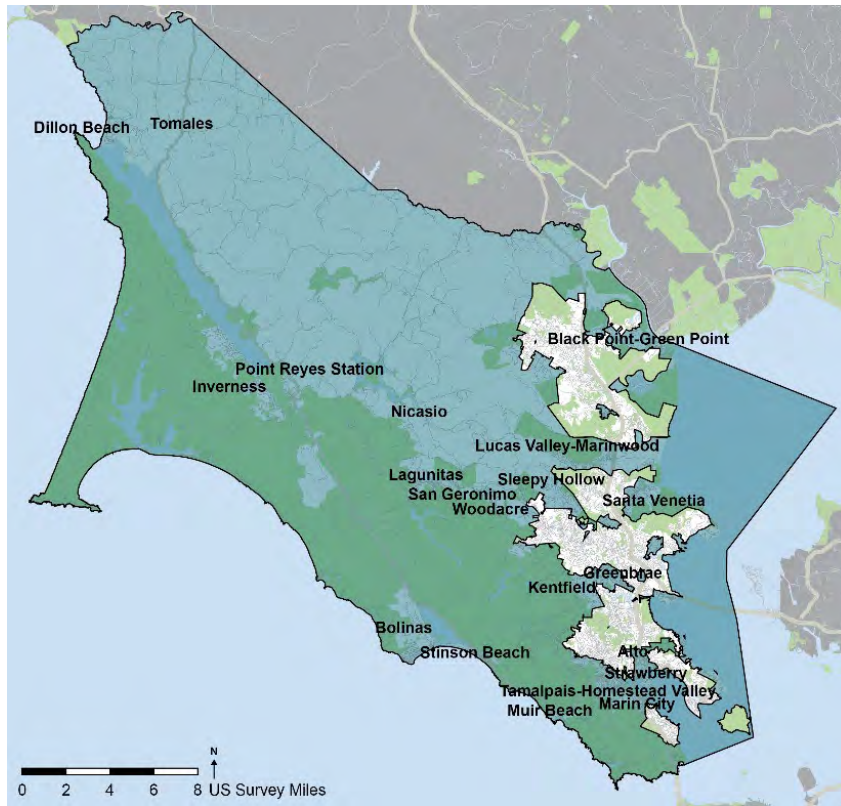


Figure 25 Unincorporated Marin County Boundary

Asset	
Airports	Gross Field
Golden Gate Transit Stops	18
Golden Gate Ferry Terminals	1
Marin Transit Stops	136
SMART Stations	0
Caltrans Maintenance Facilities	- Manzanita Maintenance Station - Point Reyes Maintenance Station - San Rafael Paint Shop
Park and Ride	5
Transit Hubs	6
State Highway Bridges	32
Road Tunnels	4

<sup>7</sup> [Marin Communities - County of Marin \(marincounty.org\)](http://marincounty.org)

Bikeways (Existing and Proposed)	224 miles
HOV Lanes	7 miles
Trails	683 miles
Roadways	1,461 miles

Key focus areas, highlighting vulnerable communities or assets:

- The Manzanita Park & Ride, Shoreline Highway (Almonte) and US-101 (Strawberry) already experience flooding at high tides, which is expected to worsen under SLR (Marin Shoreline SLR Vulnerability Assessment, BayWAVE, 2017) (C-SMART, 2018) (ART Richardson Local Assessment, BCDC, 2020) (TAM Annual Report, 2022).
- SR-37 – See details in ‘City of Novato’ section.
- Shoreline Highway (SR-1) – This critical asset already experiences flooding during present-day storms, and portions of it are vulnerable to inundation under future 10” (0.8ft or 0.25m) SLR conditions. It connects most of the communities in western Marin to the rest of the county and the region. Particularly exposed sections can be found in Bolinas, Stinson Beach, and Point Reyes Station (C-SMART, 2018).
- Stinson Beach – Low-lying parts of Stinson Beach are located in FEMA VE zones, which is a 100-yr flood zone exposed to tsunamis and/or wave action (MCM LHMP). A key corridor, Shoreline Highway (SR-1) is the only access road to the community, and it is vulnerable to inundation during storm events with as little as 10” (0.8ft or 0.25m) SLR (C-SMART, 2018).
- Santa Venetia – flat, low-lying terrain in this community leads to drainage challenges, especially during high tides. The community relies on a system of pumps and levees to protect infrastructure and buildings (MCM LHMP). An ongoing project to replace wooden structure part of the levees will improve flood protection in the area (Santa Venetia Floodwall Project, 2023).
- Kentfield – Lucky Drive floods during present-day king tide events and is also susceptible to riverine flooding from Corte Madera Creek. This short corridor represents an essential connection between Corte Madera, Larkspur, Kentfield, and other Central Marin communities to US-101 (Corte Madera Climate Adaptation Assessment, 2021) (BayWAVE, 2017) (Corte Madera Creek Flood Risk Management Project, 2020).
- Muir Beach – Shoreline Highway (SR-1) is vulnerable to inundation under 80” (6.7ft or 2.0m) SLR, according to C-SMART (2018). The community also relies on the vulnerable US-101 / SR-1 Manzanita Interchange to connect to the county and region, particularly to the south.
- Inverness – Sir Francis Drake Boulevard has present-day risk to flooding during storm events, which are expected to worsen with climate change. Living shoreline solutions are being explored for this community and others along Tomales Bay (Tomales Bay Living Shoreline Feasibility Study, 2022).
- Marin City – This Priority Development Area on Richardson Bay is exposed to sea level rise and flooding along the coast, particularly US-101 which connects the region and Donahue Street which is the only road in and out of the community (ART Richardson Local Assessment, BCDC, 2020). The Marin City population has been identified as socially vulnerable, discussed in Resilient by Design Bay Area Challenge report for Permaculture + Social Equity Team (P+SET) (2018). As identified by the community, local flooding locations, which have been inundated in previous storms or experienced drainage issue from sediment and debris, include Cole Drive west of US-101, at the foot of Olio St. and Waldo Ct., foothill of Burgess Ct., and the intersections of US-101, Donahue St., and Drake Avenue (Marin City Drainage Study, 2018).

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**DATE:** February 12, 2024

**TO:** Transportation Authority of Marin  
Administration, Projects & Planning Executive Committee

**FROM:** Anne Richman, Executive Director *Anne Richman*  
Bill Whitney, Principal Project Delivery Manager

**SUBJECT:** Highway 101 Interchange and Approaching Roadway Studies Update (Discussion),  
Agenda Item No. 7

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## RECOMMENDATION

For discussion only.

## BACKGROUND

The approach of the Interchange Program is to identify operational and safety improvements for all users of an interchange. The interchange studies have been developed as part of a comprehensive effort to evaluate our interchange infrastructure at twelve locations to address deficiencies most in need, and feasible.

The TAM Board previously approved the Program's Implementation and Prioritization Plan. The Plan identifies the following three interchanges to be prioritized for further evaluation and development:

- State Route 131 Tiburon Blvd./East Blithedale
- Manuel T. Freitas Parkway/Civic Center Drive
- Alameda Del Prado/Nave Drive

Detailed interchange study materials are posted on the TAM website: <https://tam101study.com/>.

TAM is currently preparing a Project Initiation Document (PID) for the three interchange locations. PIDs are required to be developed and approved by the California Department of Transportation (Caltrans) before any major or highly complex project can be programmed and constructed on the State Highway System. The most important function of the PID is to establish that a project is a viable candidate for federal, state, or regional funds. Without a PID, most capital projects would be ineligible for funding programming and commitment.

## DISCUSSION

Over the last few months, staff have continued to follow the direction presented in the Implementation and Prioritization Plan. A Technical Advisory Committee (TAC) has been assembled to help guide the refinement of proposed improvements and provide oversight in the development of the PID. It will also help inform our partners of the project scope and gain local support.

TAM, with the support of Caltrans and our local agencies, made presentations to the Mill Valley Bicycle and Pedestrian Advisory Committee (BPAC), the San Rafael BPAC, the Novato Complete Streets and Pathways Oversight Committee, the Golden Gate Transit Bus Passenger Advisory Committee, and TAM's BPAC. All of these groups were pleased with the update and provided useful feedback to the team.

TAM also hosted three public workshops in southern, central and northern Marin to inform the public of the Interchange Studies underway. The team presented the preliminary improvements concepts, next steps, how they may stay informed, and accepted comments and questions. TAM also notified community-based organizations and other interest groups in the vicinity of each interchange.

### PID Development

At the September 11, 2023 Administration, Projects & Planning (AP&P) Executive Committee, TAM staff presented the "Purpose and Need Statement" and updated the Committee on the design improvement concepts. Staff continues to work closely with Caltrans staff to refine the improvement concepts and to confirm they will meet the Project Purpose and Need Statement.

The Purpose and Need Statement is used as a guiding statement to assess elements of a project during development to confirm the project remains true to the basic principles of the project. It establishes the reason why an agency is proposing a project and justifies the expected outcome of expenditures and allows decisions to be defensible.

One of the elements of our studies is to identify features that do not fully comply with current state highway standards. Our engineers have assessed the existing conditions of the interchange features to confirm if they meet current standards, or not. We have identified non-standard features that will require an exception from the state and have worked with Caltrans design staff to modify the design to comply with current standards, if possible, and discussed the ramifications of a non-standard condition.

### Recommended Interchange Alternatives

The following are the alternatives recommended for further development in the PID. The team is still discussing non-standard features with Caltrans but we are reasonably confident there are no fatal flaws at this time that would make the alternative infeasible to develop.

#### **State Route 131 Tiburon Blvd./East Blithedale:**

1. Base Study Alternative – widen bridge to add 3<sup>rd</sup> EB lane & 12' pathway;
2. Maintain Existing Bridge & reconfigure with 3<sup>rd</sup> EB lane; add separate bikeway overcrossing;
3. Replace Existing Bridge with new widened overcrossing (with options)  
This alternative has been added to the Study at the request of Caltrans.

#### **Manuel T. Freitas Parkway/Civic Center Drive:**

1. Base Study Alternative – reconfigure bridge to add 12' pathway;
2. Base Study Alternative – reconfigure bridge to add 12' pathway; add traffic circles at Northgate Drive & Del Presidio Blvd  
Options: Add separated bike/ped overcrossing on north side



**Alameda Del Prado/Nave Drive:**

1. Base Study Alternative – Reconfigure bridge to add 14' pathway with signalized intersections;
2. Base Study Alternative – Reconfigure bridge to add 14' pathway with traffic circles; close NB diagonal off-ramp;

Options: Add grade separated bikeway

These alternatives will be reviewed at the AP&P Executive Committee Meeting.

**FISCAL IMPACTS**

Measure AA provides a limited amount of funding to advance the interchange studies into the next phase(s) of project development. Staff will pursue grant funding opportunities as they become available in the future at the appropriate phase of project development.

**NEXT STEPS**

TAM staff will continue to develop the PIDs and supporting documents and work with Caltrans to obtain approvals. Staff will present the design improvement concepts to the TAC as they are further refined and request the AP&P Executive Committee concur with the final PID document when completed.

The PID Document is scheduled to be completed in the fall of 2024. The next phase of project development is to begin environmental studies and preliminary engineering.

**ATTACHMENTS**

Attachment A – PowerPoint Presentation

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## Preparation of Studies for Improvements to Highway 101 Interchanges and Approaching Roadways in Marin County

# Confirmation of Study Alternatives

Transportation Authority of Marin

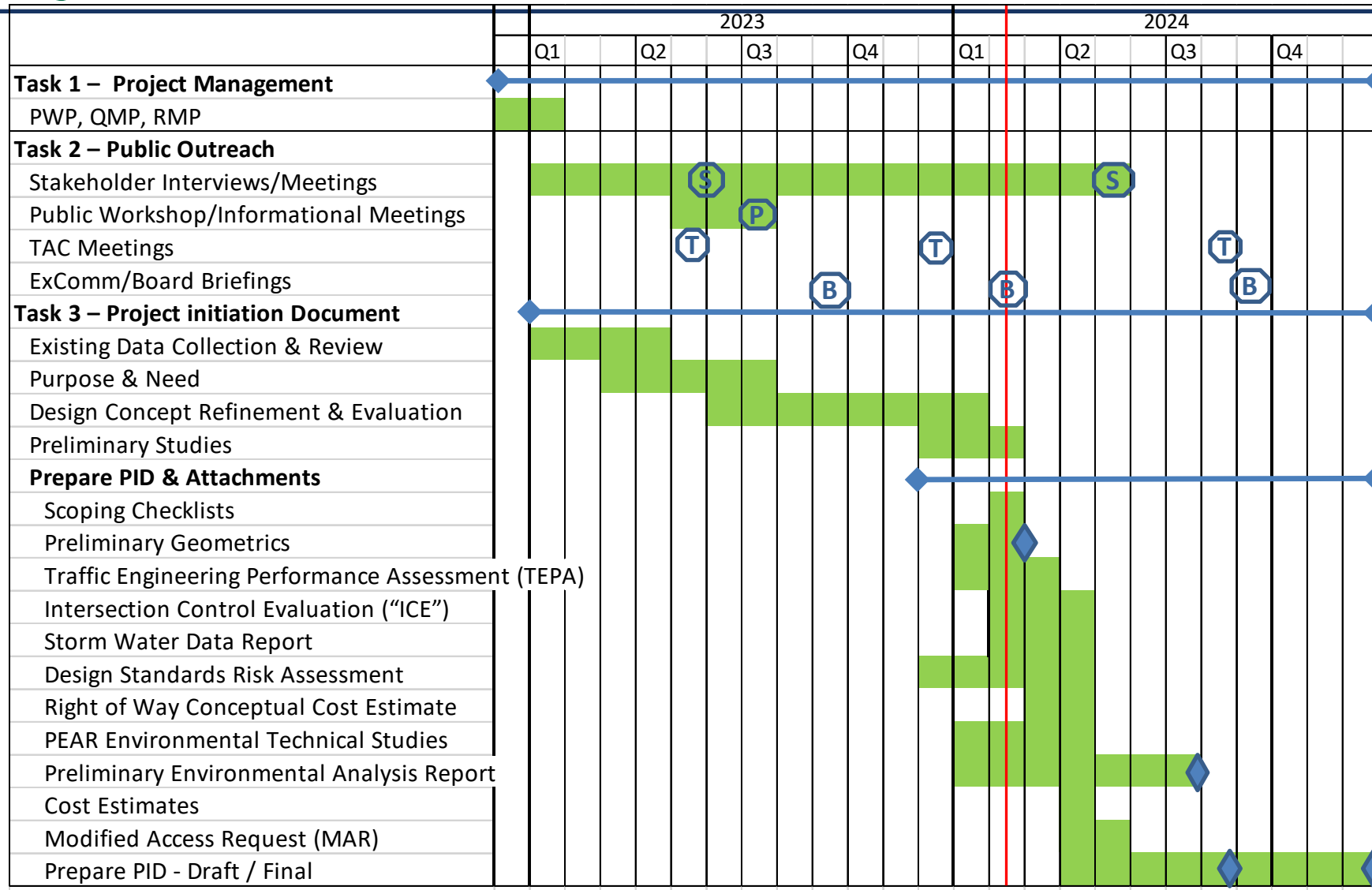
Administration, Projects & Planning Executive Committee

February 12, 2024

# Agenda

- Project Overview & Status
- Confirmation of Preliminary Study Alternatives
  - a. SR 131 Tiburon Blvd./E. Blithedale Ave. – PM 5.69
  - b. Freitas Parkway/Civic Center Dr. – PM 13.71
  - c. Alameda del Prado/Nave Dr. – PM 16.64
- Next Steps

# Project Status - Schedule



- Stakeholder Meetings
- Technical Advisory Committee Meeting
- ExCom/Board Briefing/Approval
- Public Workshop/Meeting
- Major Deliverable

# SR 131 Tiburon Boulevard/E. Blithedale Avenue

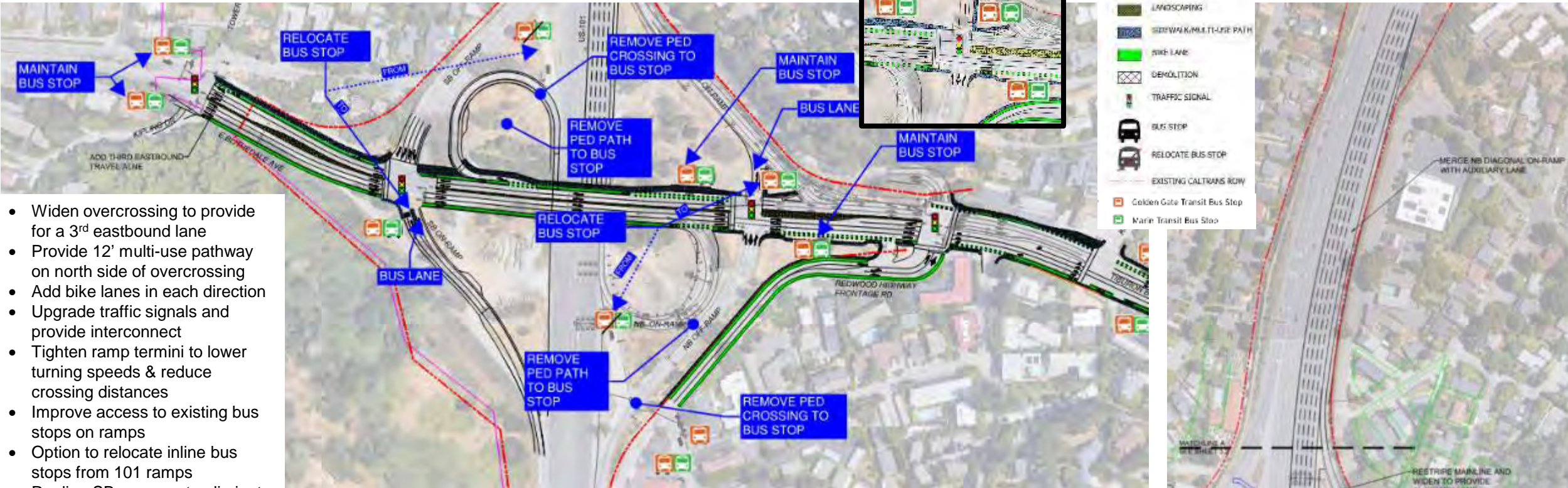


# Preliminary Study Alternatives

## SR 131 Tiburon Boulevard/E. Blithedale Avenue

1. Base Study Alternative – widen bridge to add 3<sup>rd</sup> EB lane & 12' Pathway
2. Maintain Existing Bridge & reconfigure with 3<sup>rd</sup> EB lane; add separate bikeway overcrossing.
3. Replace Existing Bridge with new widened overcrossing (with options)

# Study Alternatives – SR 131 Tiburon Blvd./E. Blithedale Ave.



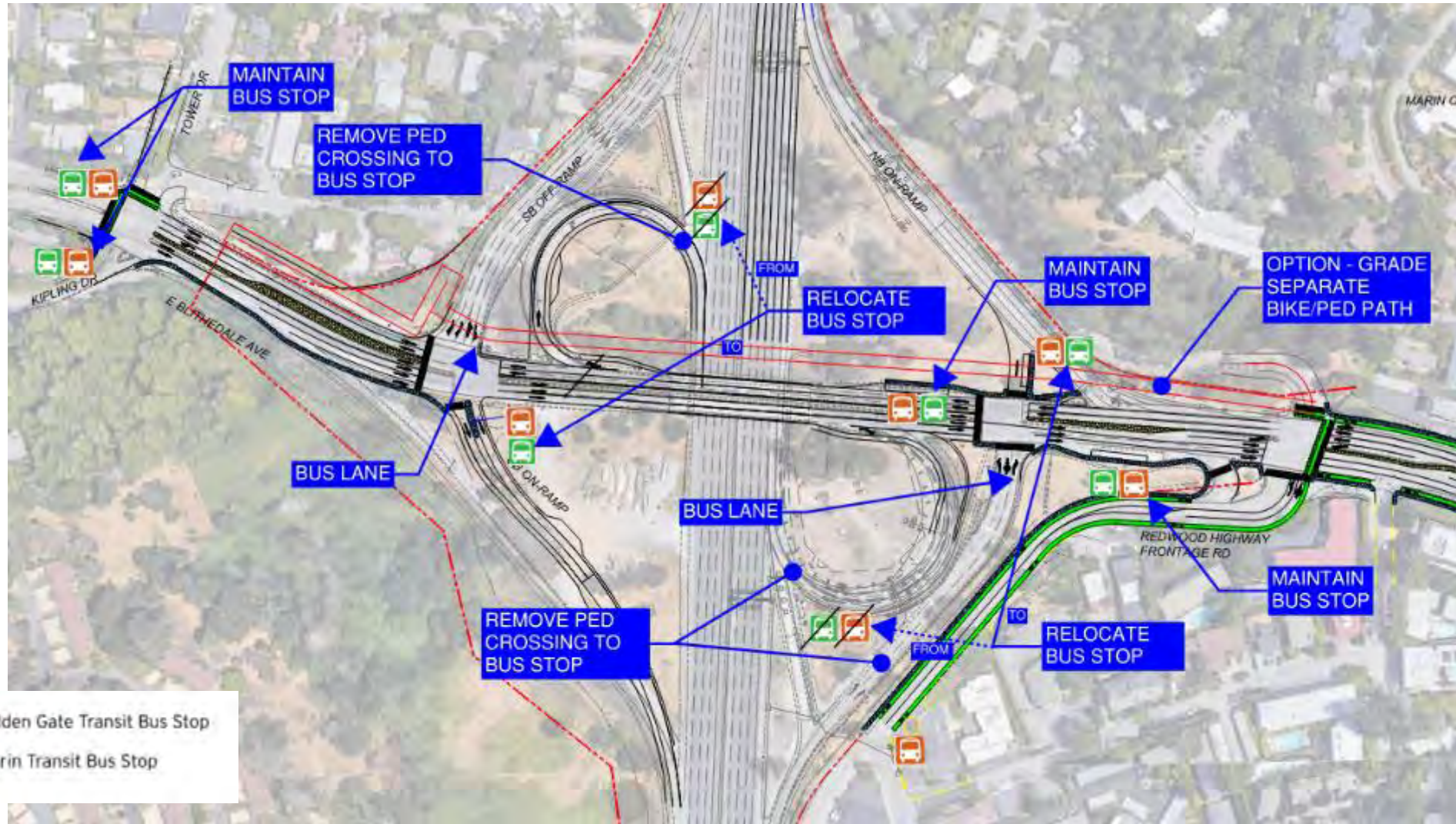
- Widen overcrossing to provide for a 3<sup>rd</sup> eastbound lane
- Provide 12' multi-use pathway on north side of overcrossing
- Add bike lanes in each direction
- Upgrade traffic signals and provide interconnect
- Tighten ramp termini to lower turning speeds & reduce crossing distances
- Improve access to existing bus stops on ramps
- Option to relocate inline bus stops from 101 ramps
- Realign SB on-ramp to eliminate slip ramp (option)

## ALTERNATIVE 1

Widen bridge to add 3<sup>rd</sup> EB lane & 12' Pathway

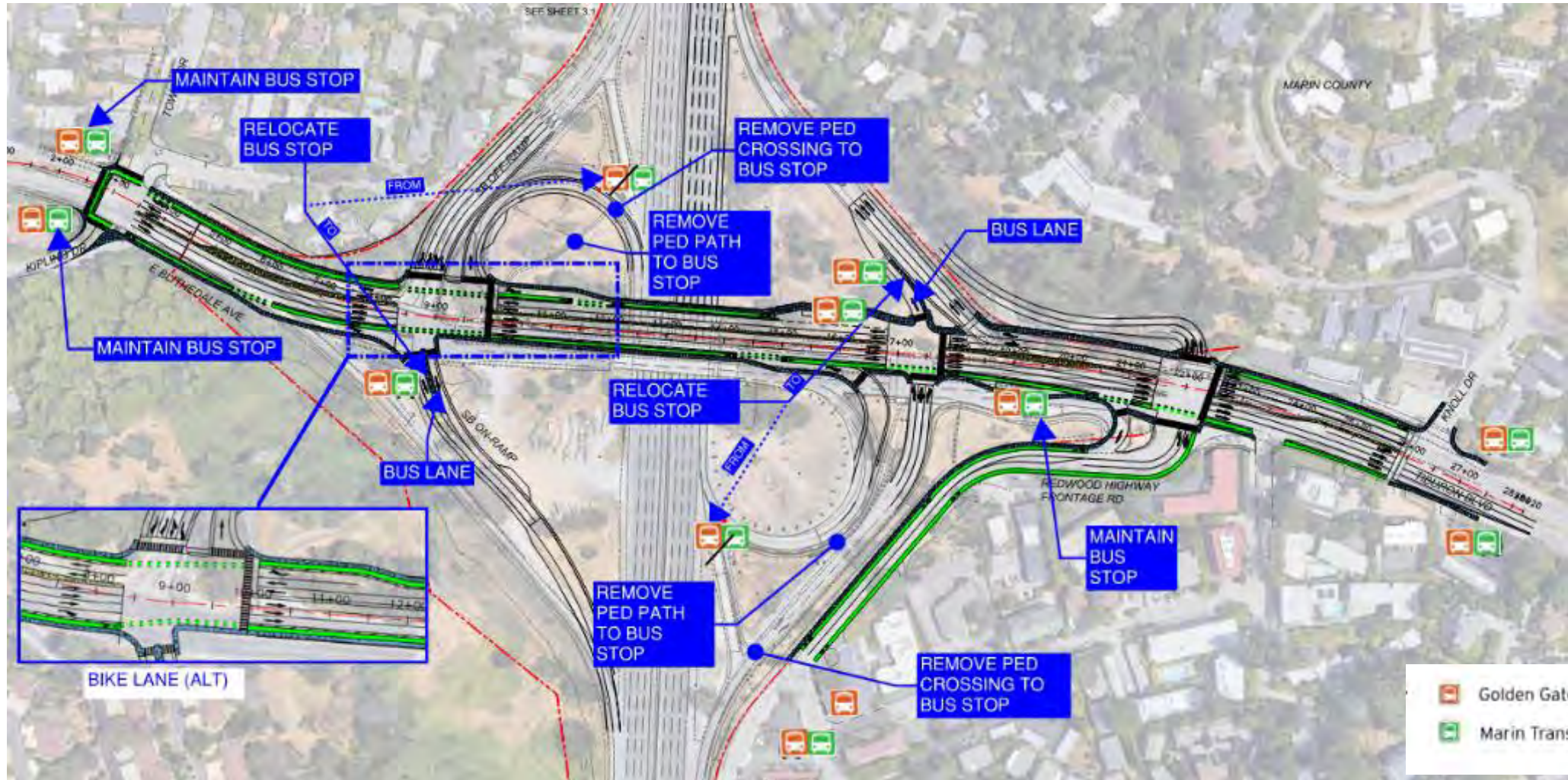


# Study Alternatives – SR 131 Tiburon Blvd./E. Blithedale Ave.



**ALTERNATIVE 2 - Maintain Existing Bridge; add 3rd EB lane; add separate bikeway overcrossing**

# Study Alternatives – SR 131 Tiburon Blvd./E. Blithedale Ave.



## ALTERNATIVE 3 - Replace Bridge; add 3rd EB lane

# Manuel T. Freitas Parkway/Civic Center Drive



# Preliminary Study Alternatives

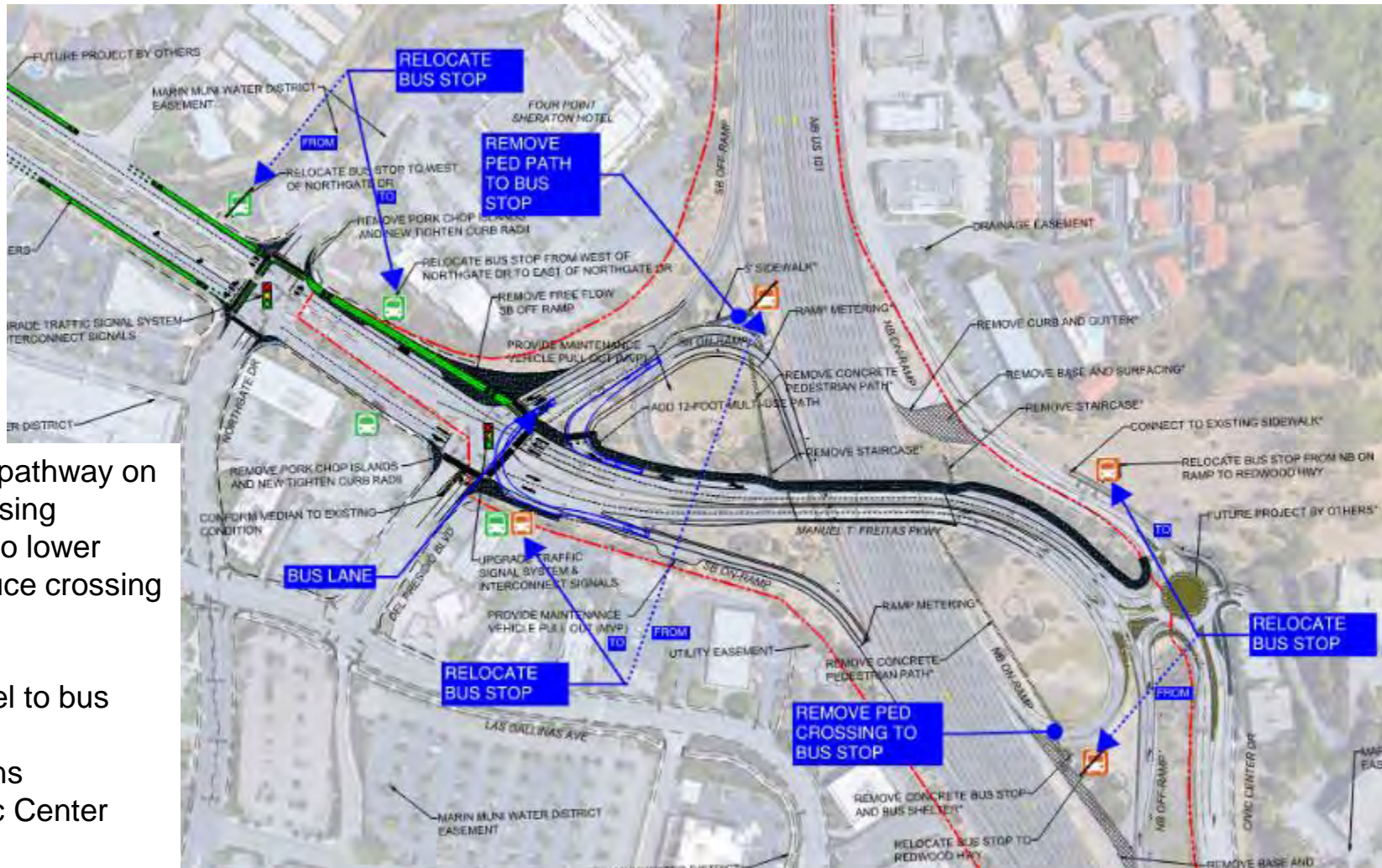
## Manuel T. Freitas Parkway/Civic Center Drive

1. Base Study Alternative (Near-term) – reconfigure bridge to add 12' pathway
2. Base Study Alternative (Long-term) – reconfigure bridge to add 12' pathway; add traffic circles at Northgate Drive & Del Presidio Blvd

Option(s):

- Add separated bike/ped overcrossing on north side

# Study Alternatives – Freitas Parkway/Civic Center Dr.



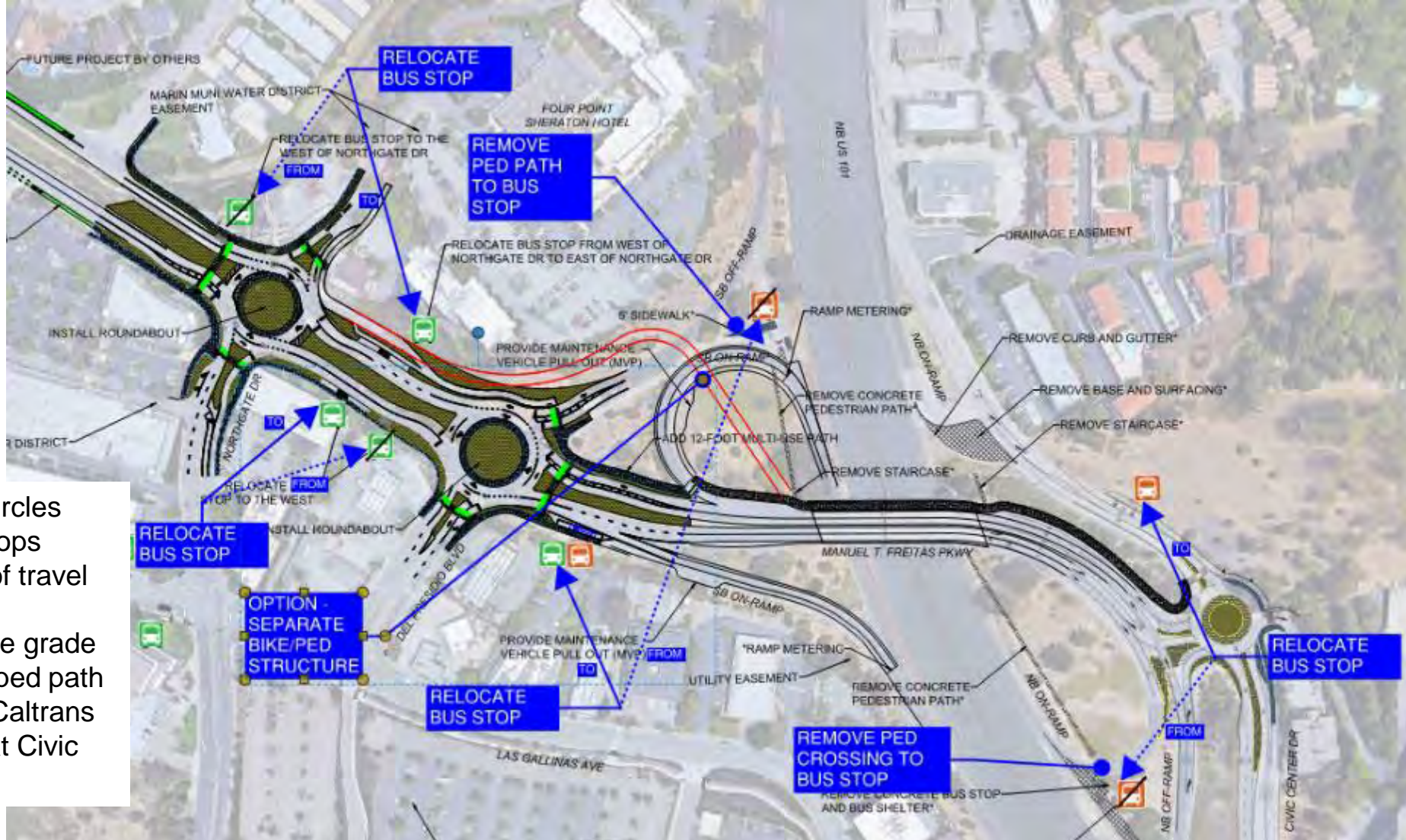
**LEGEND:**

	CONCRETE MEDIAN
	LANDSCAPING
	SIDEWALK/MULTI-USE PAT
	BIKE LANE
	DEMOLITION
	TRAFFIC SIGNAL
	BUS STOP
	RELOCATE BUS STOP
	EXISTING CALTRANS ROW
	Golden Gate Transit Bus Stop
	Marin Transit Bus Stop

- Provide 12' multi-use pathway on north side of overcrossing
- Tighten ramp termini to lower turning speeds & reduce crossing distances
- Relocate bus stops
- Improve paths of travel to bus stops
- Accommodate Caltrans improvements at Civic Center Drive

## ALTERNATIVE 1 - Reconfigure Bridge to add Pathway

# Study Alternatives – Freitas Parkway/Civic Center Dr.



- Provide traffic circles
- Relocate bus stops
- Improve paths of travel to bus stops
- Option to provide grade separated bike/ped path
- Accommodate Caltrans improvements at Civic Center Drive

## ALTERNATIVE 2 - Traffic Circles

# Alameda del Prado/Nave Drive



# Preliminary Study Alternatives

## Alameda del Prado/Nave Drive

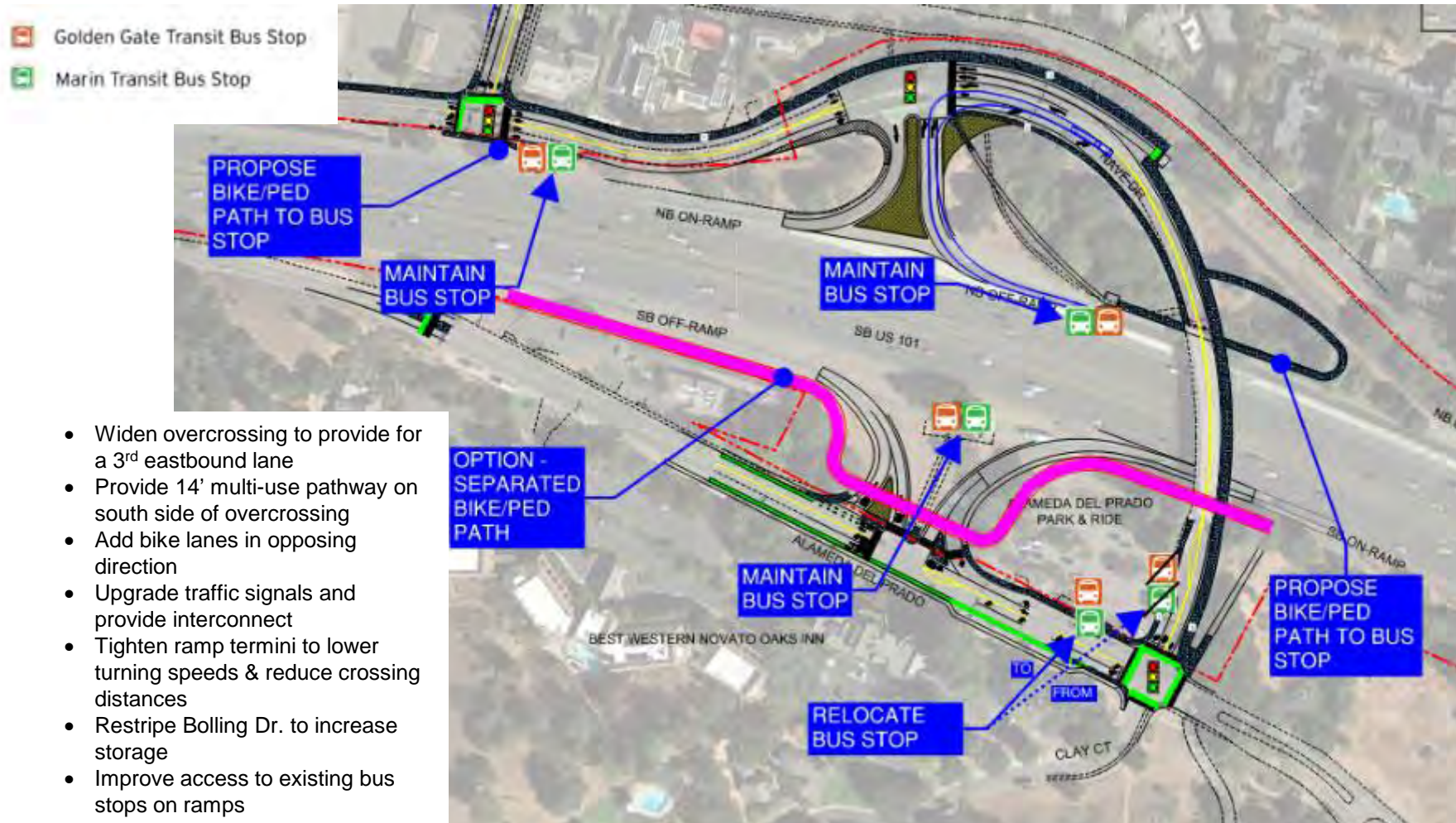
1. Base Study Alternative – Reconfigure bridge to add 14' Pathway with signalized intersections
2. Base Study Alternative – Reconfigure bridge to add 14' Pathway with traffic circles; close NB diagonal off-ramp

Option(s):

- Add grade separated bikeway



# Study Alternatives - Alameda del Prado/Nave Drive



- Widen overcrossing to provide for a 3<sup>rd</sup> eastbound lane
- Provide 14' multi-use pathway on south side of overcrossing
- Add bike lanes in opposing direction
- Upgrade traffic signals and provide interconnect
- Tighten ramp termini to lower turning speeds & reduce crossing distances
- Restripe Bolling Dr. to increase storage
- Improve access to existing bus stops on ramps



## ALTERNATIVE 1 - Reconfigure Bridge to add Pathway, signalized intersections

# Study Alternatives - Alameda del Prado/Nave Drive



## ALTERNATIVE 2 - Reconfigure Bridge to add Pathway, traffic circles

# Project Actions and Next Steps

## Confirm Study Alternatives

- Concur with Scope of Improvements

## Continue with PID Phase Activities

- Perform Focused Studies & Refine Design Improvement Concepts

## Caltrans approval of PID Document

- Work with Caltrans to obtain Design Exceptions Where Needed

## Report Back to the Committee at the Conclusion of the PID Phase

# Questions?

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Thank you!

Bill Whitney

Transportation Authority of Marin

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415-226-0823