



DATE: October 25, 2021

TO: Transportation Authority of Marin Citizens' Oversight Committee

FROM: Dan Cherrier, Principal Project Delivery Manager

SUBJECT: Traffic Study for Richmond-San Rafael Bridge Westbound Vehicle Shoulder Use (Information), Agenda Item No. 7

RECOMMENDATION

This is an informational item. No action is required.

BACKGROUND

One of the recommendations of the Greenbrae Working Group in 2013 was to improve access to the Richmond-San Rafael Bridge (RSRB). This recommendation resulted in several projects, of which some were managed by TAM and others implemented by the Bay Area Toll Authority (BATA). TAM's projects included the completed modifications to eastbound Sir Francis Drake Boulevard (SFD) in the vicinity of the Larkspur Ferry Terminal and on-going improvements to the Bellam off-ramp. A joint project between BATA and TAM resulted in the recently opened two-way bicycle connector on the SFD Overcrossing on I-580.

The largest scale improvement was the work on the RSRB consisting of a part-time third traffic lane on the lower eastbound (EB) deck and a two-way, barrier-separated multi-use path on the upper westbound (WB) deck. The EB part-time traffic lane opened for vehicle use in April of 2018; and the WB Project, the multi-use path, opened for bicycles and pedestrians in November of 2019. Both projects were put in place for a four-year pilot period and are being evaluated during that time.

The EB Project resulted in immediate elimination of the afternoon traffic congestion that could back up as far as US-101. The multi-use path has been used by recreational users, especially on weekends. Just months after the path opened, the COVID-19 pandemic started, which affected travel considerably and may have reduced some of the expected weekday mode shift since the roadway was no longer congested during the morning commute.

Morning congestion has continued to exist WB approaching the bridge on the Richmond side. TAM, BATA and the Contra Costa Transportation Authority (CCTA) have been investigating the feasibility of a similar part-time travel lane project WB, as was implemented EB, to reduce congestion. BATA, in conjunction with Caltrans, was tasked to study if the bridge could structurally accommodate the extra loading, while TAM was asked to look at potential traffic impacts. The TAM Board authorized the increase in budget utilizing the team already on board for the US-101 to I-580 Direct Connector Project to complete the Study.

DISCUSSION/ANALYSIS

Traffic Study

The study assessed the potential impacts of a future third traffic lane on the upper deck of the bridge during weekday morning peak hours. The moveable barrier currently in place on the upper deck to create the multi-use pathway would be moved every weekday to create this part-time travel lane. The limits of the Study were from the junction of I-580/I-80 in Albany to US-101 in Marin. The study assumed that major elements of the BATA Richmond-San Rafael Forward Project (RSR Forward) would be in place prior to the study year of 2025. Some of those elements include converting the toll plaza to open road tolling and converting the far-left lane of WB I-580 to a two-person carpool lane from the Regatta interchange to near the toll plaza. The traffic study was completed by Kimley-Horn & Associates and its traffic consultant Fehr & Peers.

The Study explored travel times from the intersection of I-80/I-580 to US-101, either northbound (NB) or southbound (SB). For traffic going to NB US-101, the route of travel was simply using I-580. For traffic headed towards SB US-101, two routes of travel were studied, one using WB SFD and the other utilizing a future WB I-580 to SB US-101 direct connector. The Study covers 5:00 am to 11:00 am on weekdays only.

In summary, these are the major findings from the Study:

- The addition of the third travel lane will cost approximately \$70–90 million, largely due to the need for significant capital improvements on the Marin side to make a third WB travel lane feasible. Primary components are signage on the bridge; widening of a portion of the WB trestle section, the Main Street Undercrossing, and the I-580 shoulder; and relocation of the Francisco Boulevard East (FBE) on-ramp to a new location west of SFD. Five years of operating costs were also included. The costs of the RSR Forward project were not included in this estimate.
- For the 79% of the vehicles that exit the bridge WB and head towards NB US-101 or San Rafael, there will be an average travel time savings of two minutes, with an eleven-minute savings during the peak hour.
- For the 21% of the vehicles that exit the bridge and head towards SB US-101 or points along SFD west of US-101, the average and peak hour travel time will increase by three minutes. The increase is due to capacity constraints at the SFD off-ramp and along SFD.
- A new WB 580 to SB US-101 direct connector eliminates congestion on the bridge with the third part-time travel lane.
- WB connectivity between FBE and SFD would need to be eliminated. This could be a significant concern for the community.
- The new WB FBE on-ramp would be a more standard design and result in operational improvements compared to the existing hook ramp with a very short acceleration section.
- There is concern that the part-time third lane may induce WB travel demand and eliminate some of the benefits associated with the RSR Forward Project to drive mode shift.
- Concerns have also been raised that the increased backup at SFD will be moving the congestion from east to west.

FISCAL CONSIDERATION

The cost estimated for improvements needed for a third travel lane WB, including operating costs for five years, is approximately \$70–90 million. A WB I-580 to SB US-101 connector near the Bellam area would be an additional \$220 million. No funding is identified for either of these projects.

NEXT STEPS

Portions of this presentation were made to the TAM Board at its September 23 meeting. A request was made by commissioners to look at studying the effects of a part-time lane limited to transit and HOV. In addition, staff was tasked to evaluate if any options exist for a short-term pilot without the expensive improvements necessary to continue the lane to SFD.

A study by the University of California (UC) Berkeley of the current multi-use path pilot project will be complete in mid-2024 and a decision will be made to either eliminate the barrier or continue with operation of the multi-use path.

Staff will also continue to monitor the development of the possible Marin Municipal Water District (MMWD) water pipeline, currently planned to be placed below the upper deck of the RSRB.

ATTACHMENTS

Staff PowerPoint Presentation

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Richmond San Rafael Bridge West Bound Third Lane Traffic Study Preliminary Findings

Transportation Authority of Marin
Citizens' Oversight Committee

October 25, 2021



Project Background

• History

- EB Third lane on lower deck opened in April 2018
- Multi-Use path on upper deck (WB) opened in November 2019
- Increased congestion in the WB direction in the last 5 years

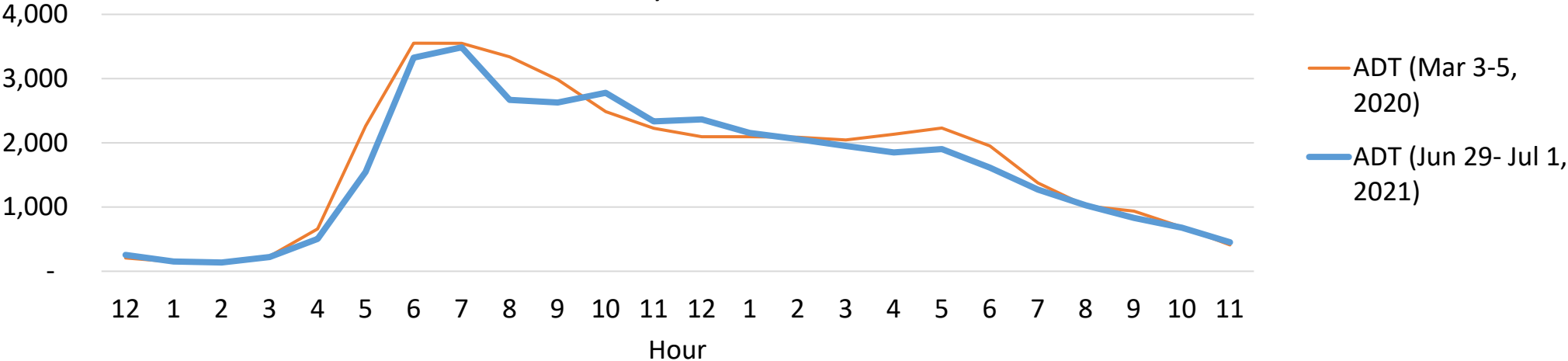
} 4-Year Pilots

• Studies & Plans

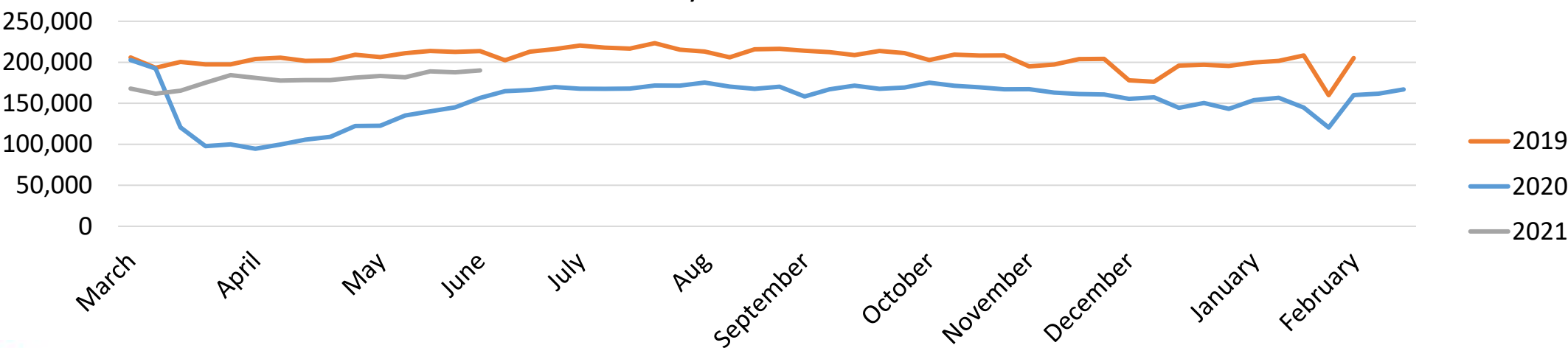
- BATA/Caltrans completing bridge structural analysis
- TAM completing third lane traffic study (subject item)
- UC Berkeley will complete evaluation of the pilot projects
- BATA is advancing the planning & design of RSR Forward program

WB I-580 Bridge Vehicle Travel 2019 - 2021

RSR Hourly Volume at Toll Plaza



RSR Weekly Volume at Toll Plaza



Traffic Study

- Show benefits/drawbacks of a third WB traffic lane between 5:00AM and 11:00 AM on weekdays
 - Lane would be created by moving the barrier on the bridge daily
- Identify improvements in Marin County, if needed
- Previously collected traffic data was used to generate the results
 - Richmond side data: 2016
 - San Rafael side data: 2018-2019
 - Combined data set converted using Year 2019 INRIX data.

Richmond San Rafael Bridge Forward

Major elements of MTC/BATA Project are:

- Replace the existing toll structure with Overhead Toll Gantries (Open Road Tolling).
- Reinstall a previous WB I-580 HOV lane from Regatta Avenue Interchange to near the Toll Plaza.
- Improvements at Richmond Parkway on ramps
- Enhanced TDM, Transit, Bike Infrastructure
- Benefits Include:
 - Improve operational efficiency by upgrading the existing toll infrastructure.
 - Improve safety by eliminating the need to pass through the existing toll plaza.
 - Improve peak period person throughput across the RSRB.
 - Promote mode shift by providing travel time savings for carpooling and transit users.

Traffic Study Scenarios Evaluated

Existing Conditions (2019)

Baseline (2025)

- Assume Richmond Forward project is implemented
- Shoulder stays as a multi-use path
- No other improvements in Marin County

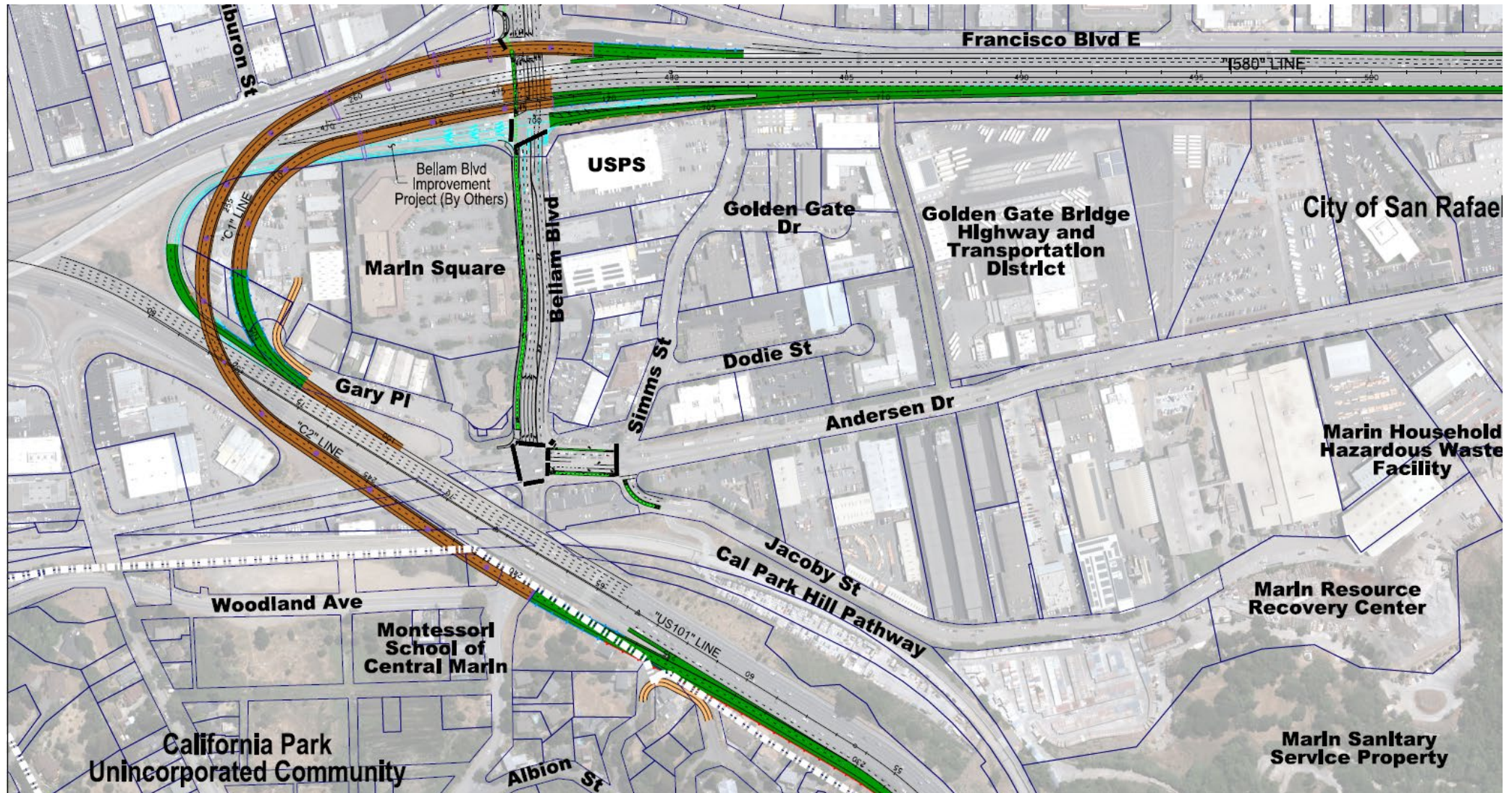
Build Alternative 1 (2025)

- Assume Richmond Forward project is implemented
- Third Lane on the upper deck ends at existing Sir Francis Drake Blvd Off-ramp
- Francisco Blvd E. to WB I-580 on-ramp moved to west of existing SFD structure
- No Access from Francisco Blvd E. to Sir Francis Drake Blvd

Build Alternative 2 (2025)

- New Connector from WB I-580 to SB US 101 is added
- Same as Alternative 1 except Third Lane ends at New Connector (instead of SFD)

Conceptual WB 580 to SB US 101 Connector



Cost of Project (escalated to 2025)

Build Alternative 1

- Improvements on RSR Bridge (signage): up to \$20 M
- Widening of portion of RSR bridge: \$30 M
- Barrier Operating Costs (\$1M per year for 5 Year Pilot): \$5 M
- Relocate Francisco Blvd. on-ramp and widen I-580: \$35 M
- **Total: Approximately \$70-\$90 M**

Build Alternative 2

- Improvements and widening on RSR Bridge: \$50 M
- Barrier Operating Costs (\$1 M per year for 5 Year Pilot): \$5 M
- Relocate Francisco Blvd. on-ramp: \$35 M
- Direct Connector near Bellam: \$220 M
- **Total: Approximately \$310 M**

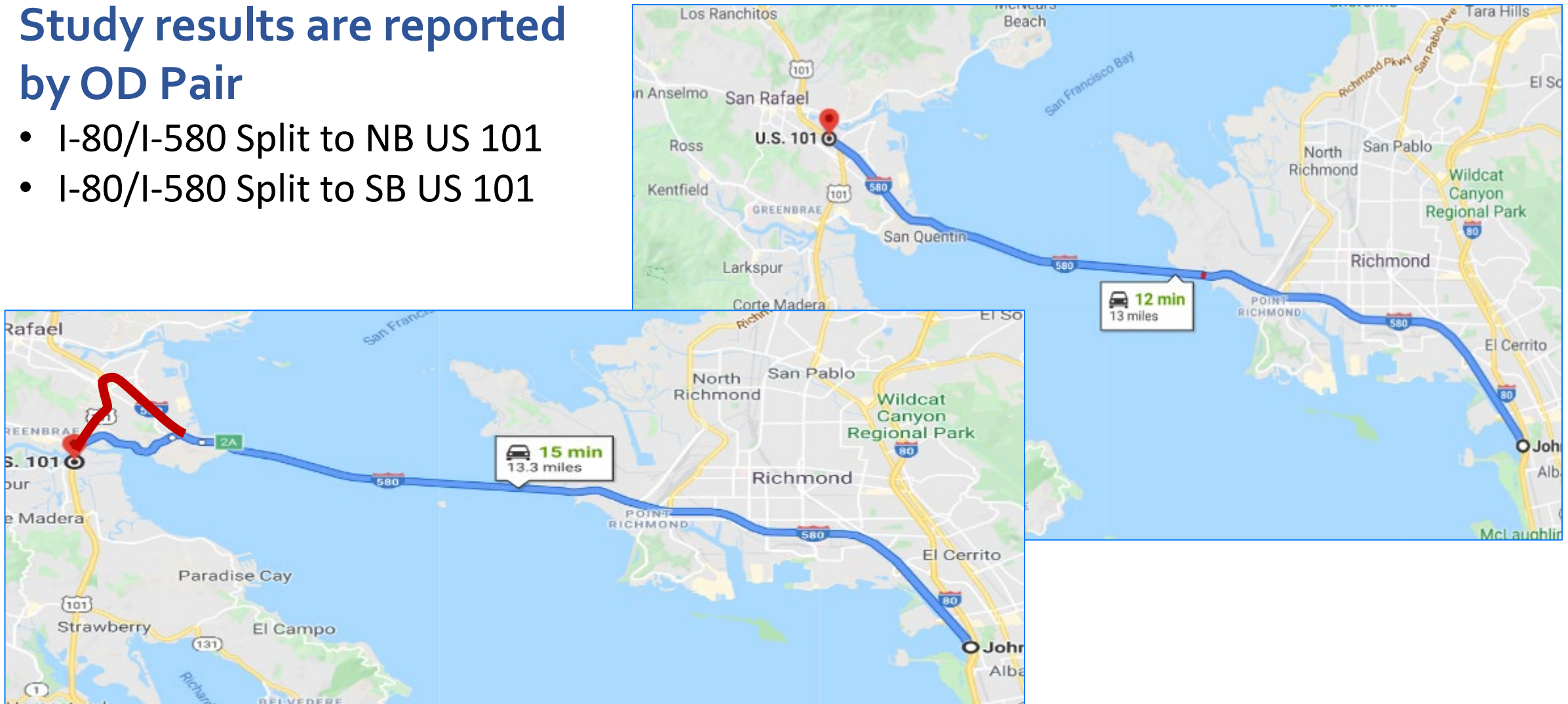
Capital Projects to Support Third Lane (Marin Side)



Origin-Destination Pairs

Study results are reported by OD Pair

- I-80/I-580 Split to NB US 101
- I-80/I-580 Split to SB US 101

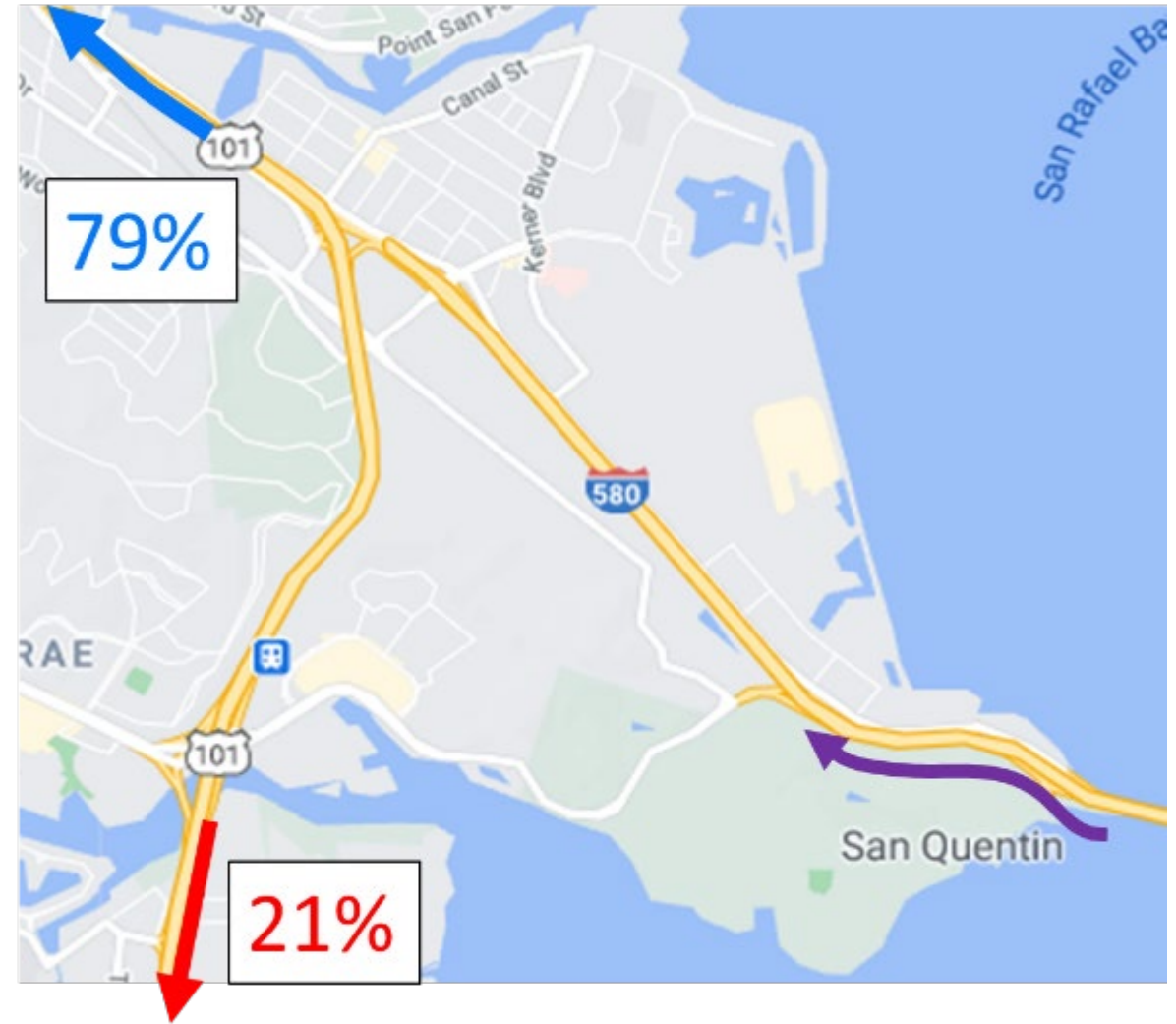


WB I-580 to US 101 Traffic Split

2018 Origin/Destination Data Shows:

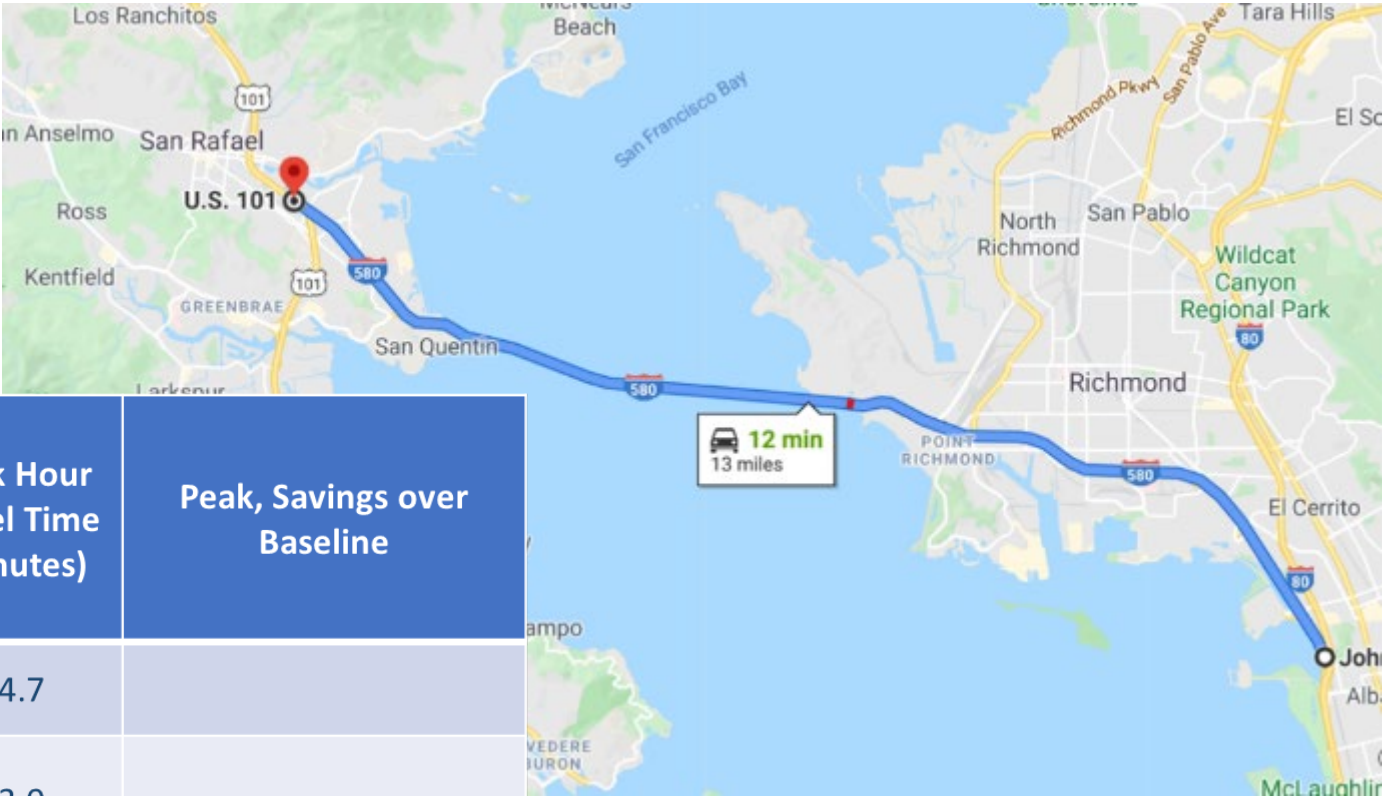
Of the traffic that comes across the bridge and continues to US 101

- **79%** of AM traffic continues north onto NB US 101
- **21%** of AM traffic continues south onto SB US 101
- *These numbers do not include traffic that exits to local roads*



WB THIRD LANE STUDY

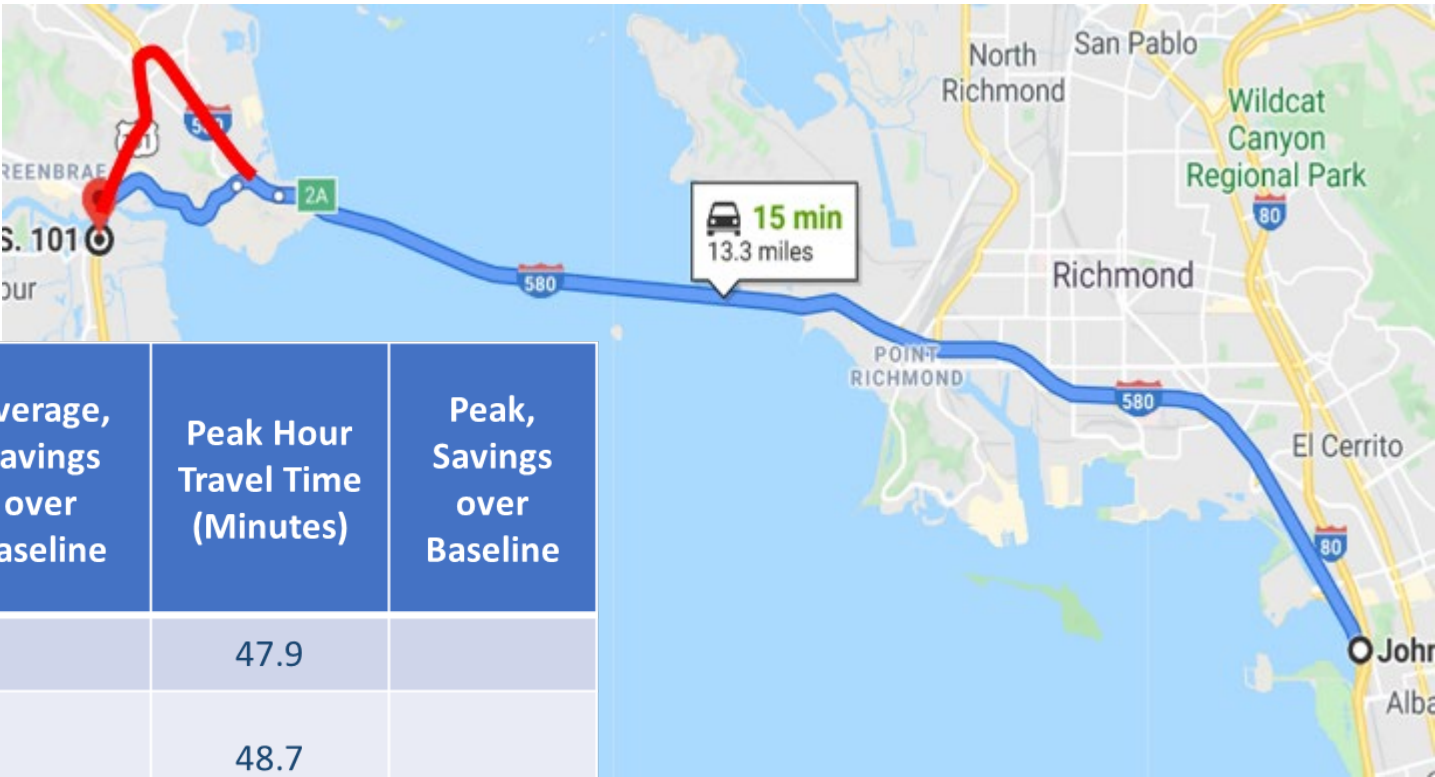
WB I-580 Travel Time:
From I-80/I-580 Split to NB US 101
(Downtown San Rafael)



Scenario	Cost Est. (millions)	Average Travel Time Albany to 101 (Minutes)	Average, Savings over Baseline	Peak Hour Travel Time (Minutes)	Peak, Savings over Baseline
Existing (2019)	N/A	23.7		34.7	
Baseline (incl. RSR Forward)	BATA- funded	24.3		43.0	
Alt 1: Part time lane to 101	\$70-90	22.7	7%	32.0	27%
Alt 2: Part time lane to 101	~\$310	19.2	21%	31.5	27%

WB THIRD LANE STUDY

WB I-580 Travel Time:
From I-80/I-580 Split to SB US 101



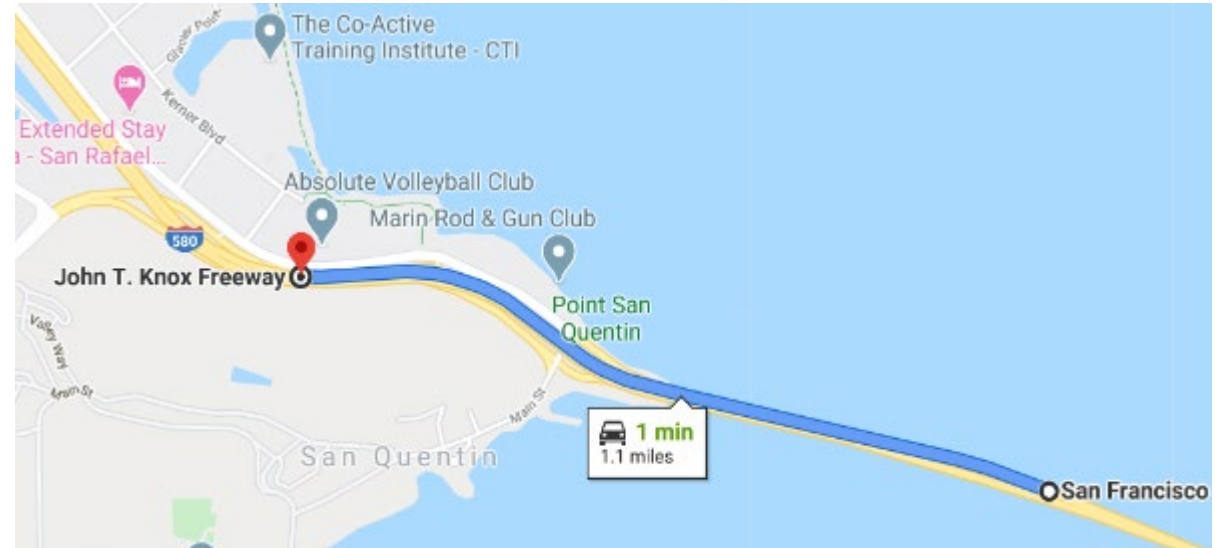
Scenario	Cost Est. (millions)	Average Travel Time Albany to 101 (Minutes)	Average, Savings over Baseline	Peak Hour Travel Time (Minutes)	Peak, Savings over Baseline
Existing (2019)	N/A	30.4		47.9	
Baseline (incl. RSR Forward)	BATA-funded	32.6		48.7	
Alt 1: Part time lane to SFD	\$70-90	35.5	<9%>	52.0	<6%>
Alt 2: Part time lane to DC	~\$310	20.6	37%	32.7	31%

WB I-580 Maximum Queue Length at Sir Francis Drake

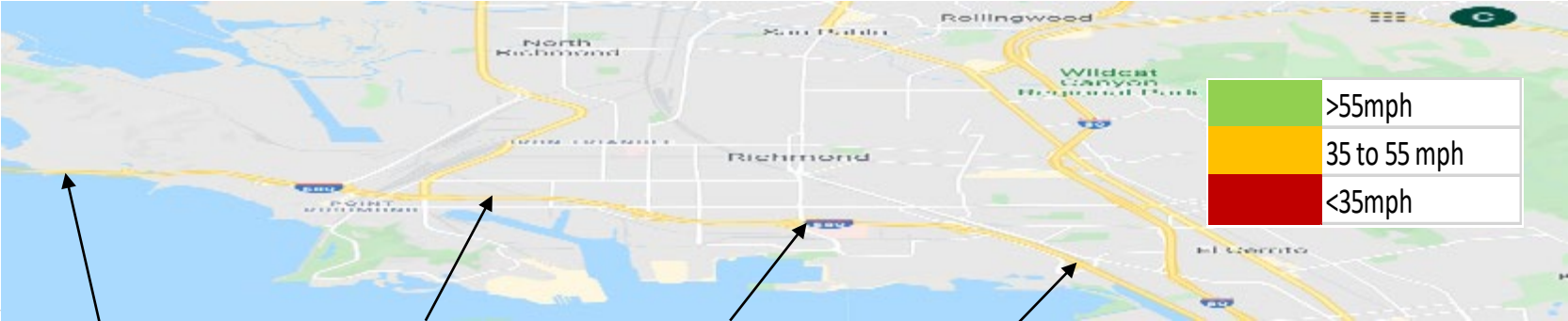
Existing: 0.8 Miles (7:45AM)

No Build 2025: 1.1 Miles (8:30AM) ➡

Build Alternative 1: 4.9 Miles (9:15AM) ↓

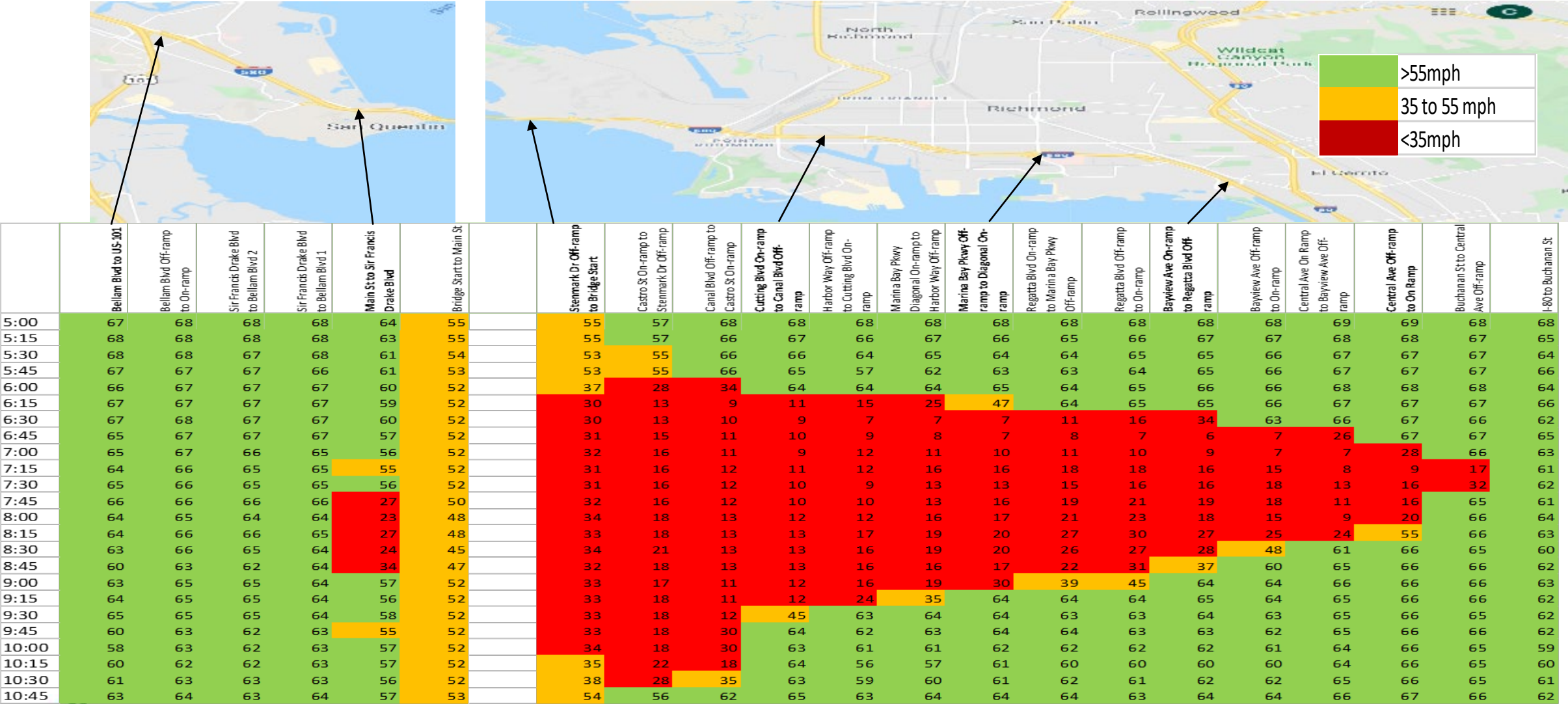


WB I-580 Speed Profile – 2019 Conditions

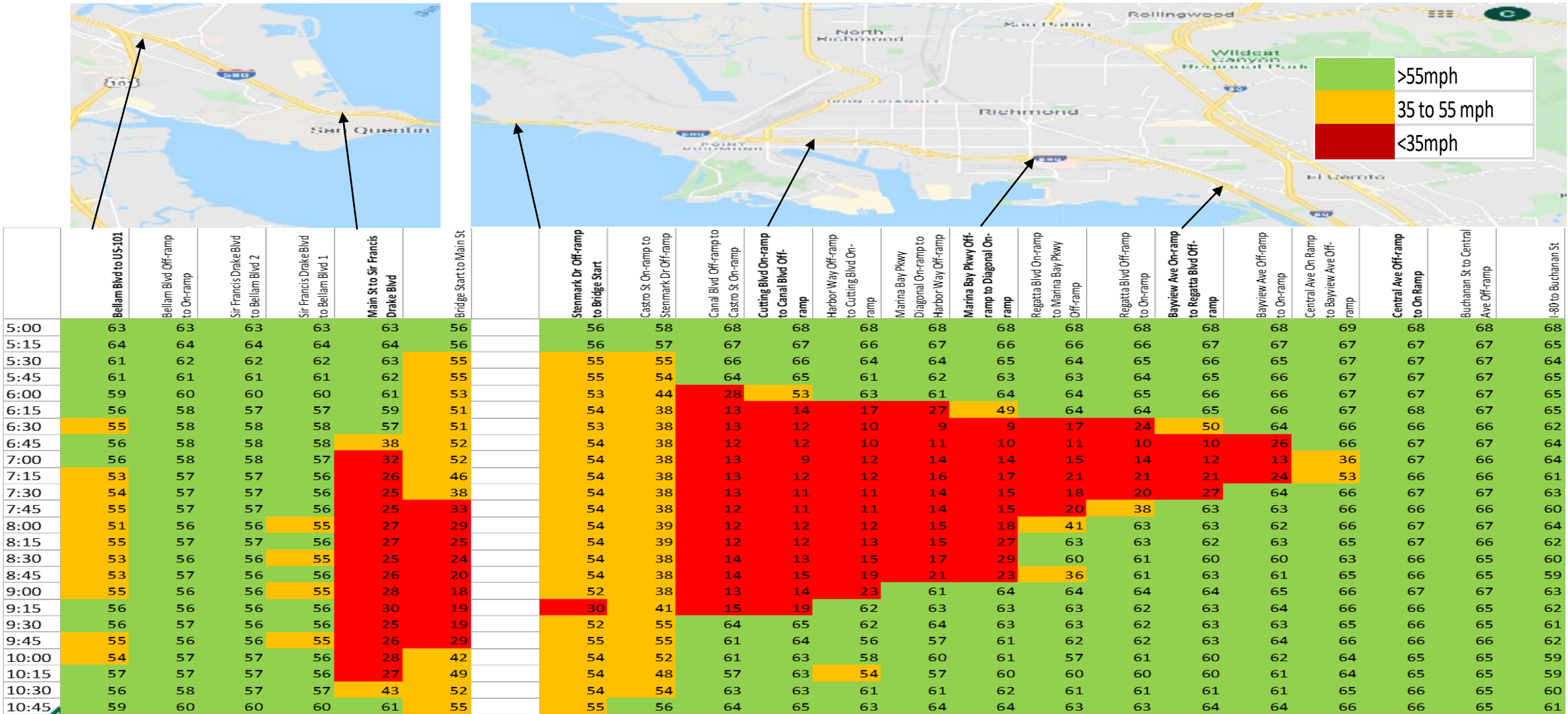


	Belam Blvd to US-10	Belam Blvd Off-ramp to On-ramp	Sir Francis Drake Blvd to Belam Blvd 2	Sir Francis Drake Blvd to Belam Blvd 1	Main St to Sir Francis Drake Blvd	Bridge Start to Main St	Stenmark Dr Off-ramp to Bridge Start	Castro St On-ramp to Stenmark Dr Off-ramp	Canal Blvd Off-ramp to Castro St On-ramp	Cutting Blvd On-ramp to Canal Blvd Off-ramp	Harbor Way Off-ramp to Cutting Blvd On-ramp	Marina Bay Pkwy Diagonal On-ramp to Harbor Way Off-ramp	Marina Bay Pkwy Off-ramp to Diagonal On-ramp	Regatta Blvd On-ramp to Marina Bay Pkwy Off-ramp	Regatta Blvd Off-ramp to On-ramp	Bayview Ave On-ramp to Regatta Blvd Off-ramp	Bayview Ave Off-ramp to On-ramp	Central Ave On-ramp to Bayview Ave Off-ramp	Central Ave Off-ramp to On-ramp	Buchanan St to Central Ave Off-ramp	I-80 to Buchanan St
5:00	68	68	68	68	63	55	44	59	68	69	68	69	69	69	69	69	69	69	69	68	67
5:15	68	68	68	68	64	55	43	58	68	68	68	68	68	67	68	68	68	68	68	67	65
5:30	68	68	68	67	61	53	43	57	67	68	67	68	68	67	67	67	68	68	67	67	65
5:45	67	67	67	67	61	53	42	57	68	67	66	67	67	67	67	67	68	68	68	67	66
6:00	67	67	67	67	61	52	24	35	44	67	66	67	67	67	67	68	68	68	68	67	65
6:15	66	67	66	67	60	52	16	12	11	24	66	67	67	67	67	67	68	68	68	67	66
6:30	66	67	66	66	59	52	15	11	9	8	10	24	60	66	66	67	67	67	67	66	63
6:45	66	67	66	66	58	51	16	12	8	8	7	7	12	66	67	67	67	67	67	66	64
7:00	65	66	65	65	57	52	15	12	9	9	12	8	9	66	67	67	67	67	67	67	65
7:15	64	66	65	66	57	52	15	12	10	8	8	9	10	66	67	66	66	66	67	66	61
7:30	64	65	65	65	55	52	15	11	9	8	7	9	11	67	67	67	67	67	67	66	62
7:45	64	65	65	64	30	51	16	12	9	8	7	9	11	66	67	66	66	66	67	66	61
8:00	61	65	65	65	39	51	16	12	9	8	8	9	11	61	67	67	67	67	67	67	65
8:15	65	65	65	66	56	52	16	12	9	9	10	12	36	65	65	66	66	66	66	66	63
8:30	65	66	66	66	60	52	15	11	8	9	10	19	65	66	66	66	66	66	66	66	59
8:45	65	66	65	66	59	52	16	11	9	8	9	9	39	66	66	66	66	66	66	66	62
9:00	64	65	65	65	59	52	16	11	9	9	10	13	40	67	66	67	67	67	67	66	63
9:15	65	65	64	64	58	52	15	12	8	9	14	55	67	67	67	67	66	66	66	65	63
9:30	62	64	63	64	56	52	19	13	8	14	65	67	67	66	66	67	67	66	66	65	62
9:45	59	63	64	64	57	52	17	14	24	67	65	66	66	66	66	67	67	67	67	66	62
10:00	60	62	61	63	55	52	20	25	65	66	65	66	66	66	65	66	66	66	66	65	60
10:15	62	64	64	64	58	52	28	55	65	66	63	66	66	65	65	66	66	66	66	65	61
10:30	62	63	63	62	56	53	35	56	65	66	66	66	66	66	65	66	66	66	65	64	60
10:45	65	65	65	65	59	53	43	57	66	66	66	66	66	66	66	66	67	66	67	66	63

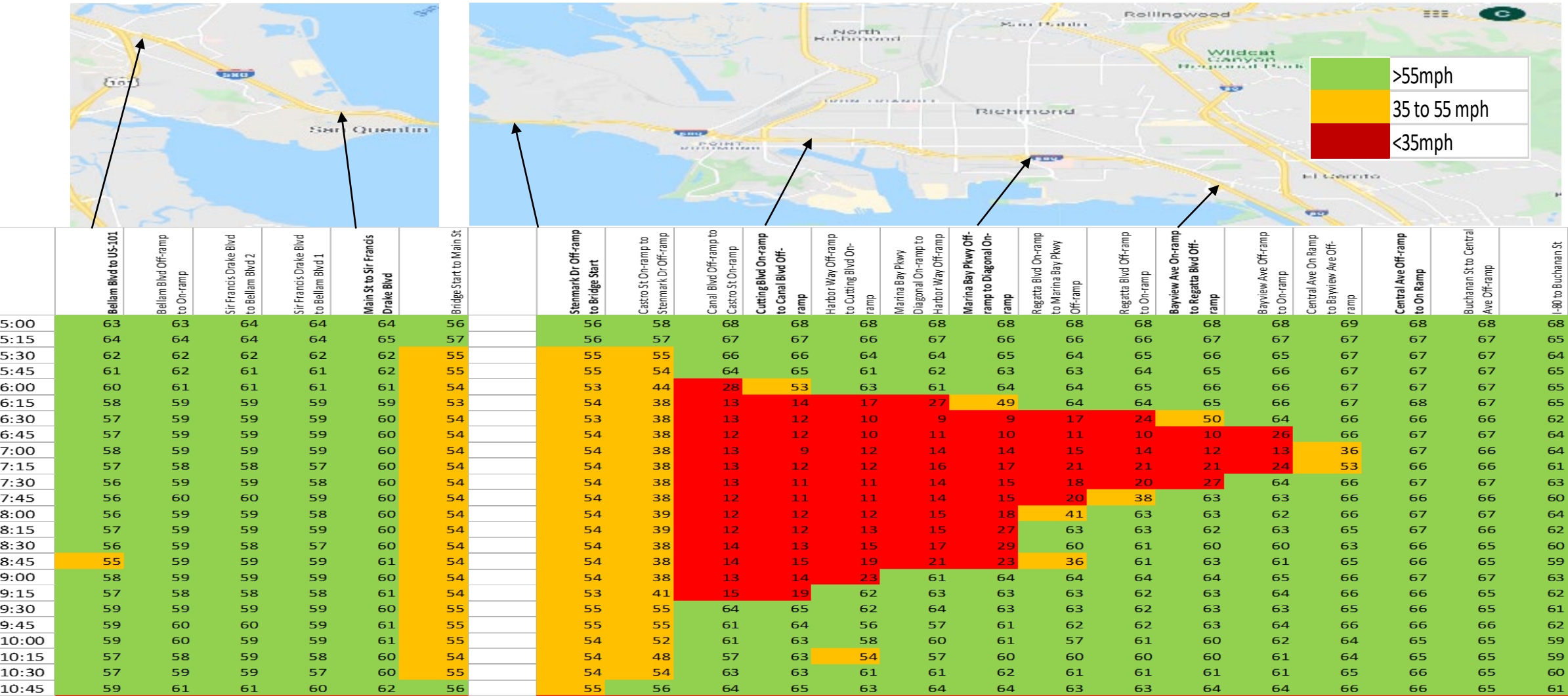
WB I-580 Speed Profile – 2025 No Build - GP Lanes



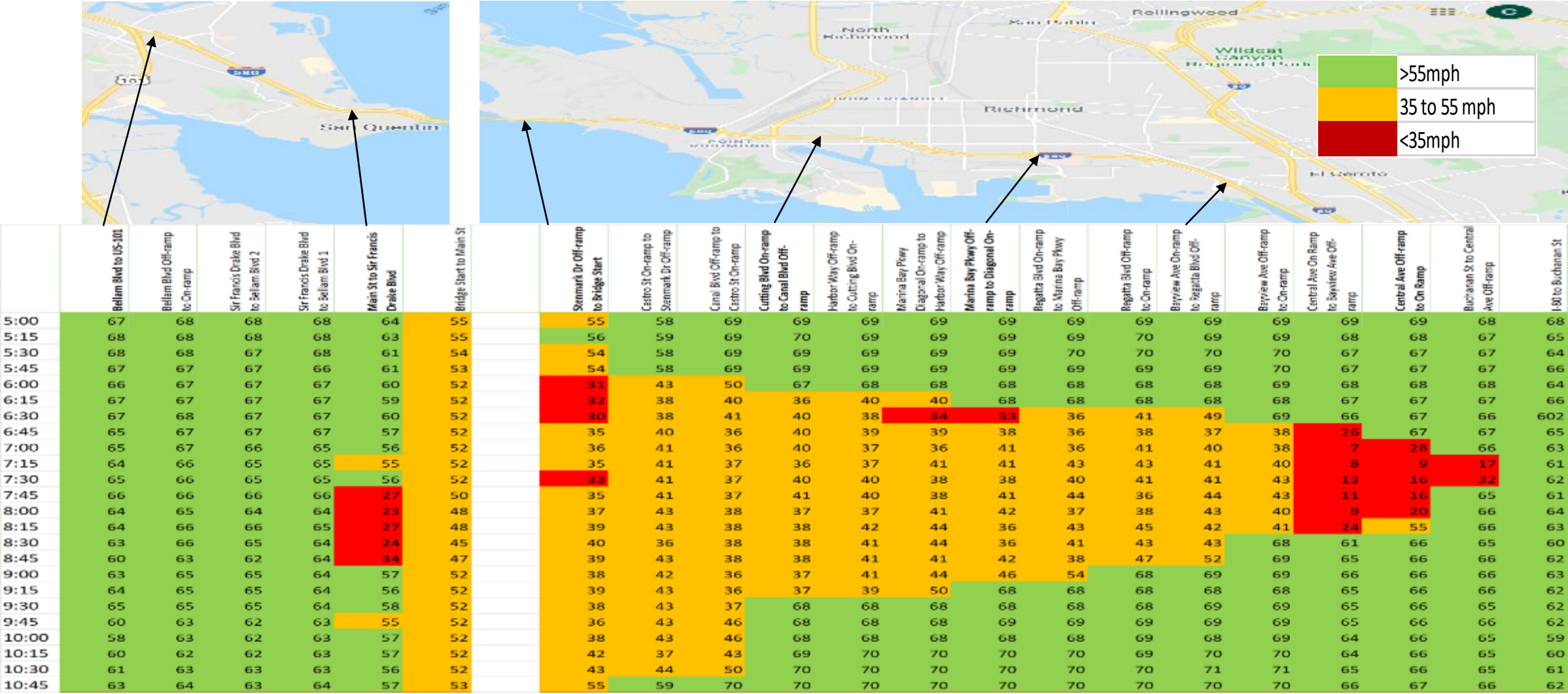
WB I-580 Speed Profile – 2025 Build Alt 1 - GP Lanes



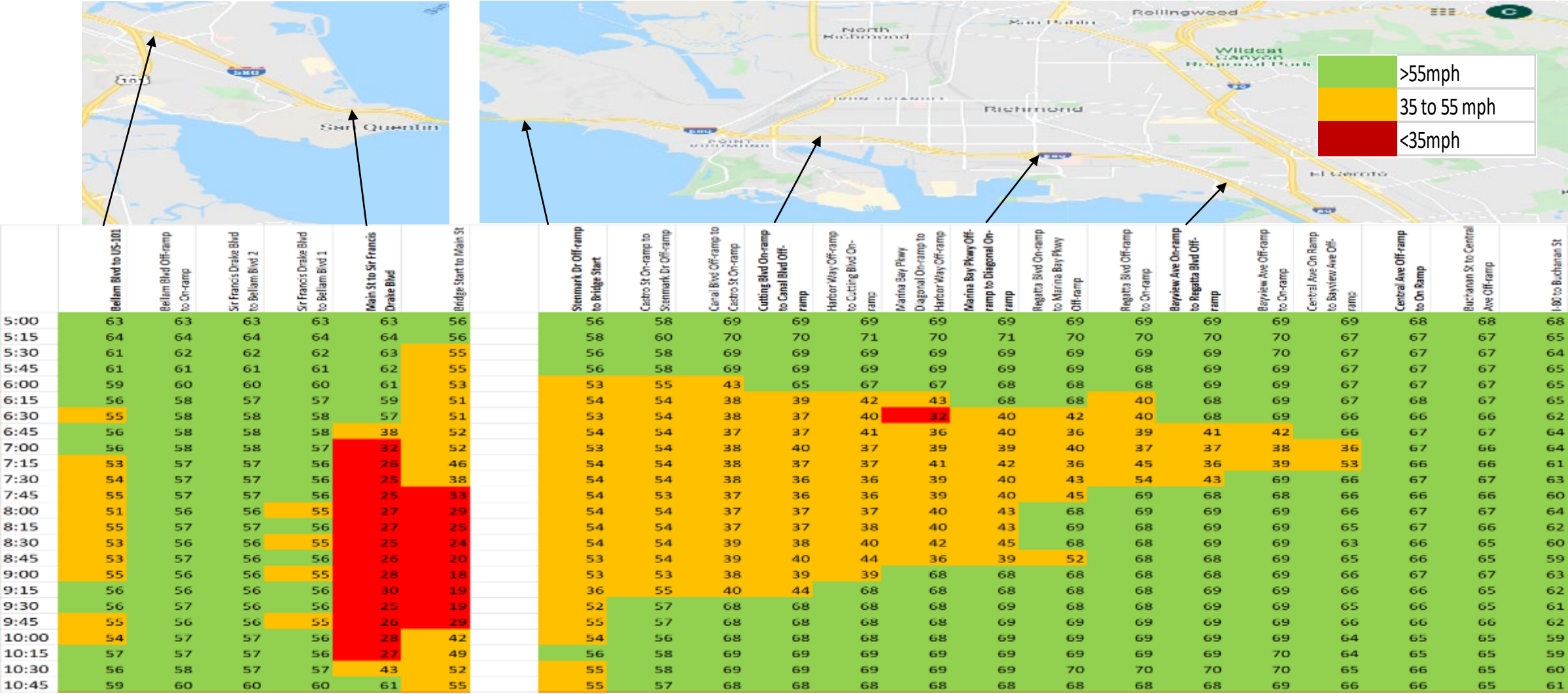
WB I-580 Speed Profile - 2025 Build Alt 2 – GP Lanes



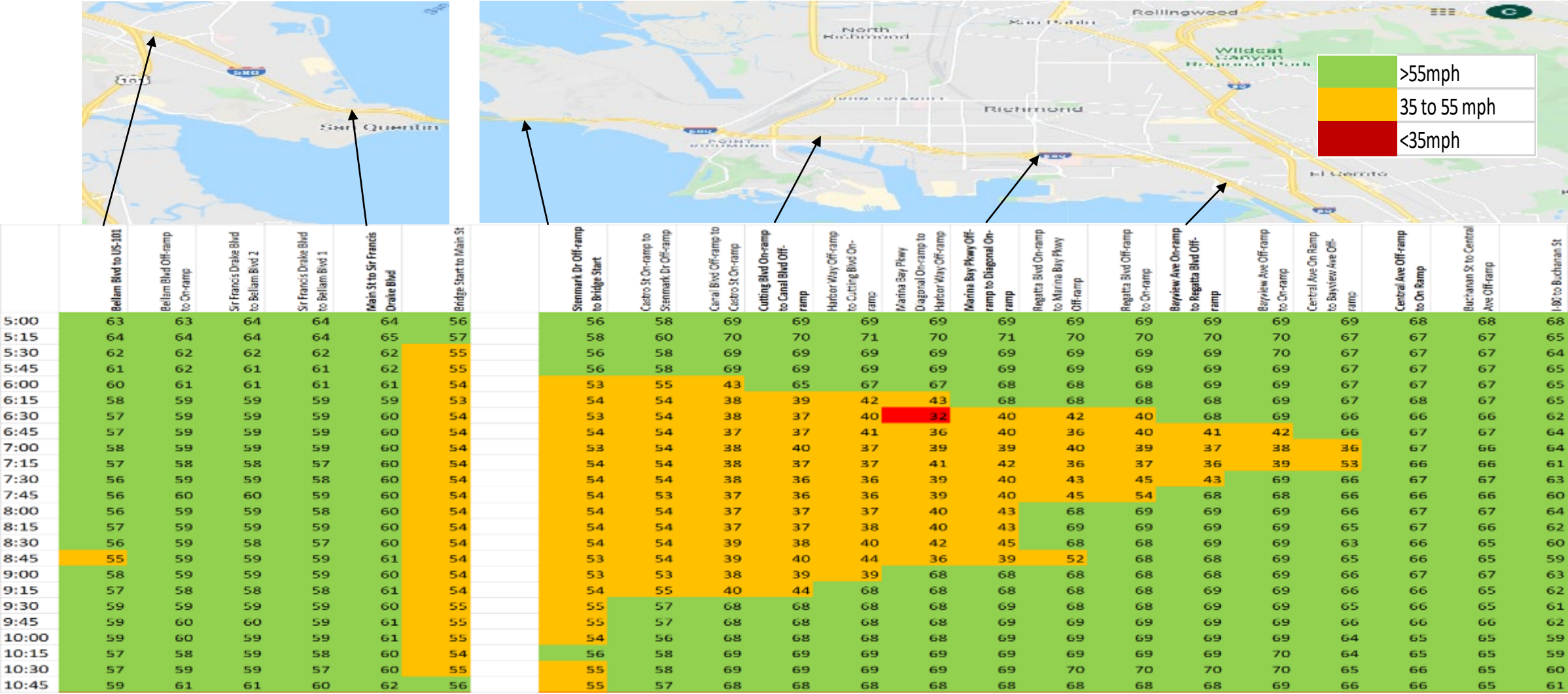
WB I-580 Speed Profile – 2025 No Build - HOV



WB I-580 Speed Profile – 2025 Build Alt 1 - HOV



WB I-580 Speed Profile - 2025 Build Alt 2 - HOV



Summary

- Peak period use lane on the upper deck would require significant new construction on the Marin County side.
- Direct access from Francisco Boulevard East/Morphew Street to Sir Francis Drake Boulevard would not be able to be maintained with the project.
- Traffic headed to northbound US 101 would have a peak hour time savings of 11 minutes with the project (Alt 1) in 2025.
- However, traffic headed to southbound US 101 would have an increased peak hour delay of 3 minutes with the project (Alt 1) in 2025.
 - Travel time savings only possible with construction of WB-SB Direct Connector.

Summary (continued)

- The Project may shift the congestion and bottlenecks from the toll plaza area to Sir Francis Drake Blvd.
- Concerns that the PPU Lane will result in Induced Demand for vehicles WB on the Bridge, counter to RSR Forward Mode Shift goals
- MMWD Pipeline project could affect options available for the future.

Questions?

Thank You!