Appendix E

Updated Transportation Summary Report

Transportation Summary Report

August 2022

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Prepared for:

GOLDEN GATE BRIDGE
HIGHWAY & TRANSPORTATION DISTRICT

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Executive Summary

ES.1 Overview

The Golden Gate Bridge, Highway, and Transportation District (GGBHTD) is currently undertaking a project to identify a new location for the San Rafael Transit Center (SRTC). Sonoma-Marin Area Rail Transit (SMART) was recently extended to Larkspur, bisecting the existing transit center. This has impacted bus operations and passenger movements, creating the need for a new transit center. Through a community-driven process, several alternatives were developed and screened to identify potential new locations for the transit center. In 2018, a Notice of Preparation (NOP) was issued to begin an environmental analysis process per the requirements of the California Environmental Quality Act (CEQA). The NOP identified five project alternatives. Since the preparation of the NOP, the alternatives have been refined through subsequent design development and the number of build alternatives screened down to three.

The project team has conducted a detailed transportation evaluation of the three build alternatives under consideration, plus a no-build alternative. This report documents the evaluation methodology and the results of the analysis. The project team also prepared a detailed safety analysis of pedestrian, bicycle, and vehicular safety around the No-Build and Build alternatives. The safety analysis is included in Appendix D. The safety analysis identifies pedestrian and bicycle treatments that would be built with each of the alternatives to address safety needs. It also provides a safety assessment for each of the alternatives that focuses on pedestrian-vehicle conflicts and circulation around the SRTC site.

SRTC, also known as the C. Paul Bettini Transit Center, is owned by GGBHTD. GGBHTD operates Golden Gate Transit (GGT) regional and inter-county bus transit services. The current SRTC is located in Downtown San Rafael at the intersection of 3rd Street and Hetherton Street (see Figure ES-1).

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Relocation Analysis, Environmental Clearance, and Preliminary Design

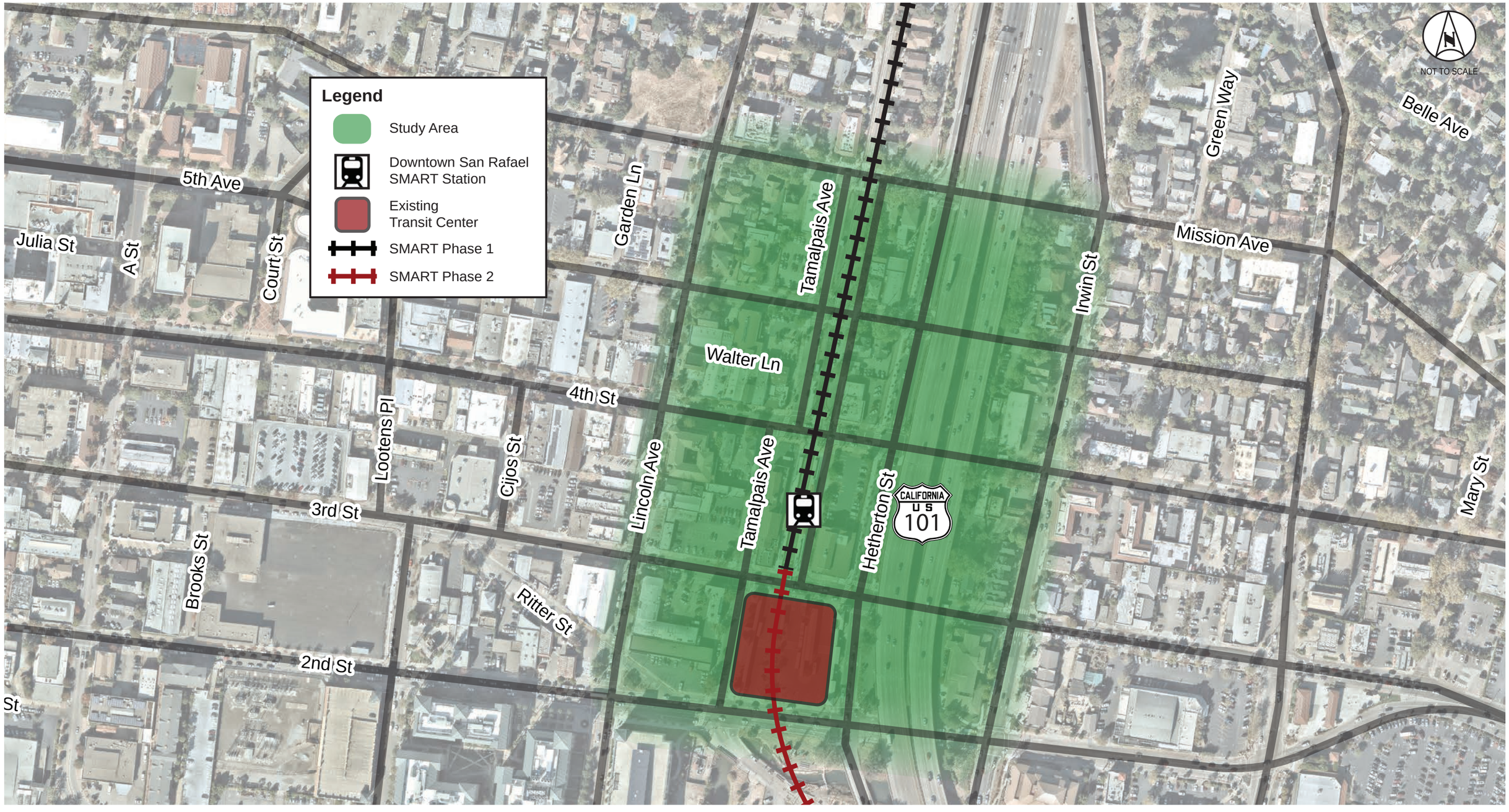

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Figure ES-1: Project Location

ES.2 Alternatives

ES.2.1 No-Build Alternative/Existing Transit Center Site

In the No-Build Alternative (shown in Figure ES-2), the transit center would remain at its current location, on the block bound by 2nd Street, Tamalpais Avenue, 3rd Street, and Hetherton Street. The "interim" transit center configuration constructed as part of the SMART extension would remain. Customer service and vendor facilities would remain at their current location on Platform D. Pick-up/drop-off curb space would remain on the west side of Platform D along Tamalpais Avenue. Bus access/egress would continue to occur via driveways along 2nd and 3rd Streets. Buses accessing southbound U.S. Highway 101 (US 101) would continue to berth curbside on the east side of Platform A.

ES.2.2 4th Street Gateway Alternative

The 4th Street Gateway Alternative is shown in Figure ES-3. This alternative utilizes the two blocks bound by the SMART tracks, 3rd Street, Hetherton Street, and Fifth Avenue.

This alternative would include three curbside bays on the west side of Hetherton Street, between 4th Street and Fifth Avenue. To accommodate these curbside bays, southbound right-turns from Hetherton Street to 4th Street would be precluded. Other bus bays would be accessed via driveways on 3rd and 4th Streets and a driveway on Hetherton Street.

Along Hetherton Avenue, space would be provided for public plazas, bike parking, and building space for customer service and transit-supportive land uses. The segment of the existing Puerto Suello bike path located on the east side of the proposed site between 4th Street and Fifth Avenue would be realigned around the transit center site. The existing Victorian homes south of Fifth Avenue would either be removed or relocated.

The existing SMART pick-up/drop-off area on East Tamalpais would be removed. Pick-up/drop-off space for microtransit, taxis, shuttles, and passenger vehicles would be provided on the east side of West Tamalpais Avenue between 3rd Street and Fifth Avenue. Maintenance vehicle parking for five GGT vehicles would be provided on-site at the transit center on the block north of 4th Street, with one additional maintenance vehicle parking space provided on the east side of Tamalpais Avenue between 4th Street and Fifth Avenue.

ES.2.3 Under the Freeway Alternative

The Under the Freeway Alternative is shown in Figure ES-4. This concept utilizes the block bound by 4th Street, Hetherton Street, Fifth Avenue, and Irwin Street, and the northern portion of the block bound by Hetherton Street, 3rd Street, 4th Street, and Irwin Street, generally located beneath US 101. Bus bays would be accessed via driveways on 4th Street, Irwin Street, and Hetherton Street.

Space would be provided for public plazas, customer service, and/or transit-supportive land uses in the area outside of the US 101 envelope. This alternative would require three bridges/viaducts over Erwin Creek to connect Hetherton Street to the bus bays. Two bridges would be located on the block north of 4th Street and one would be located on the block south of 4th Street.

The under-freeway portions of this alternative are currently occupied by Caltrans-owned and maintained park & ride lots; this alternative would result in their removal from this location and relocation to a yet-to-be-determined site. Private property would also need to be acquired. Pick-

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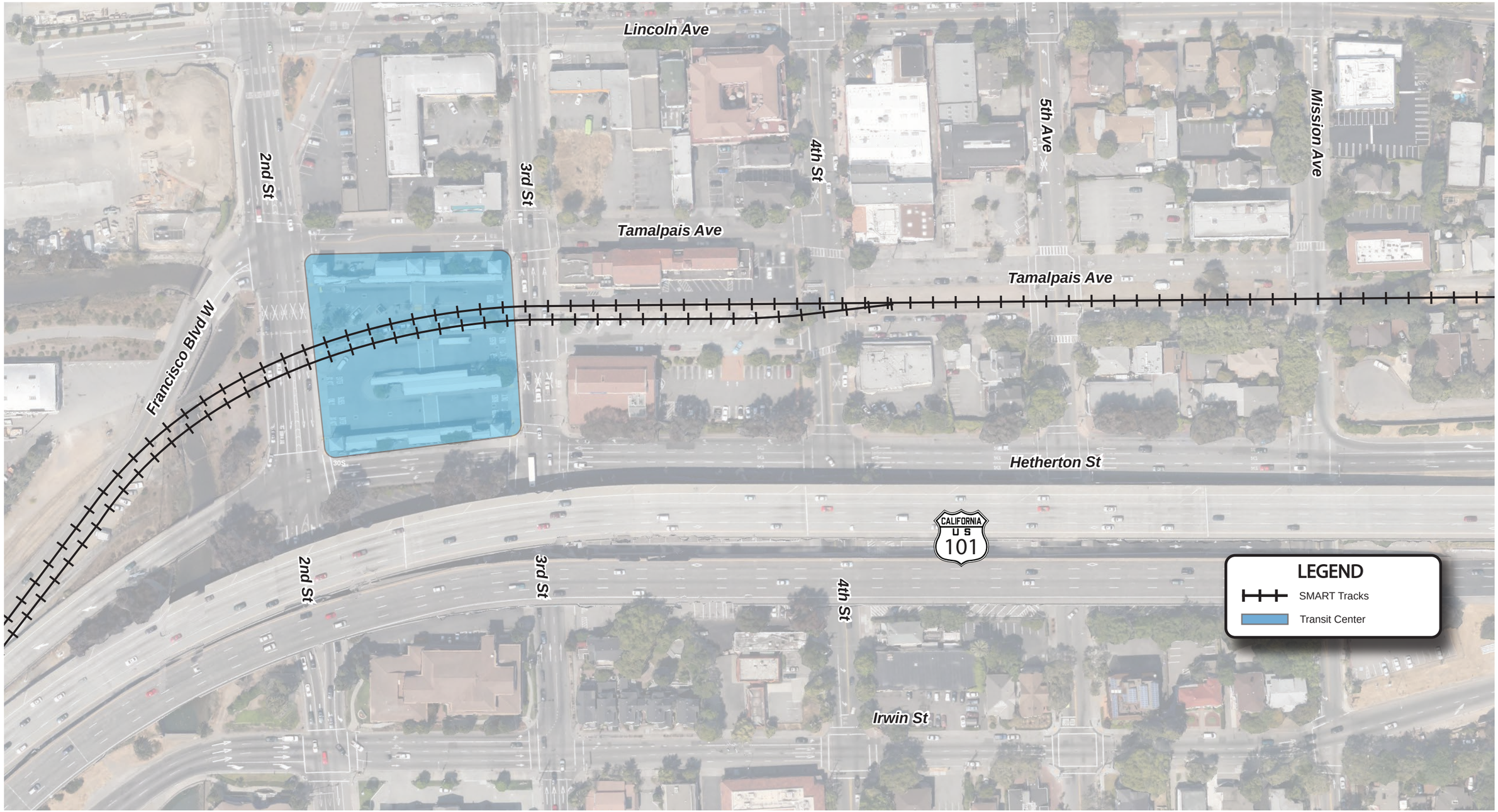

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Figure ES-2: No Build Alternative

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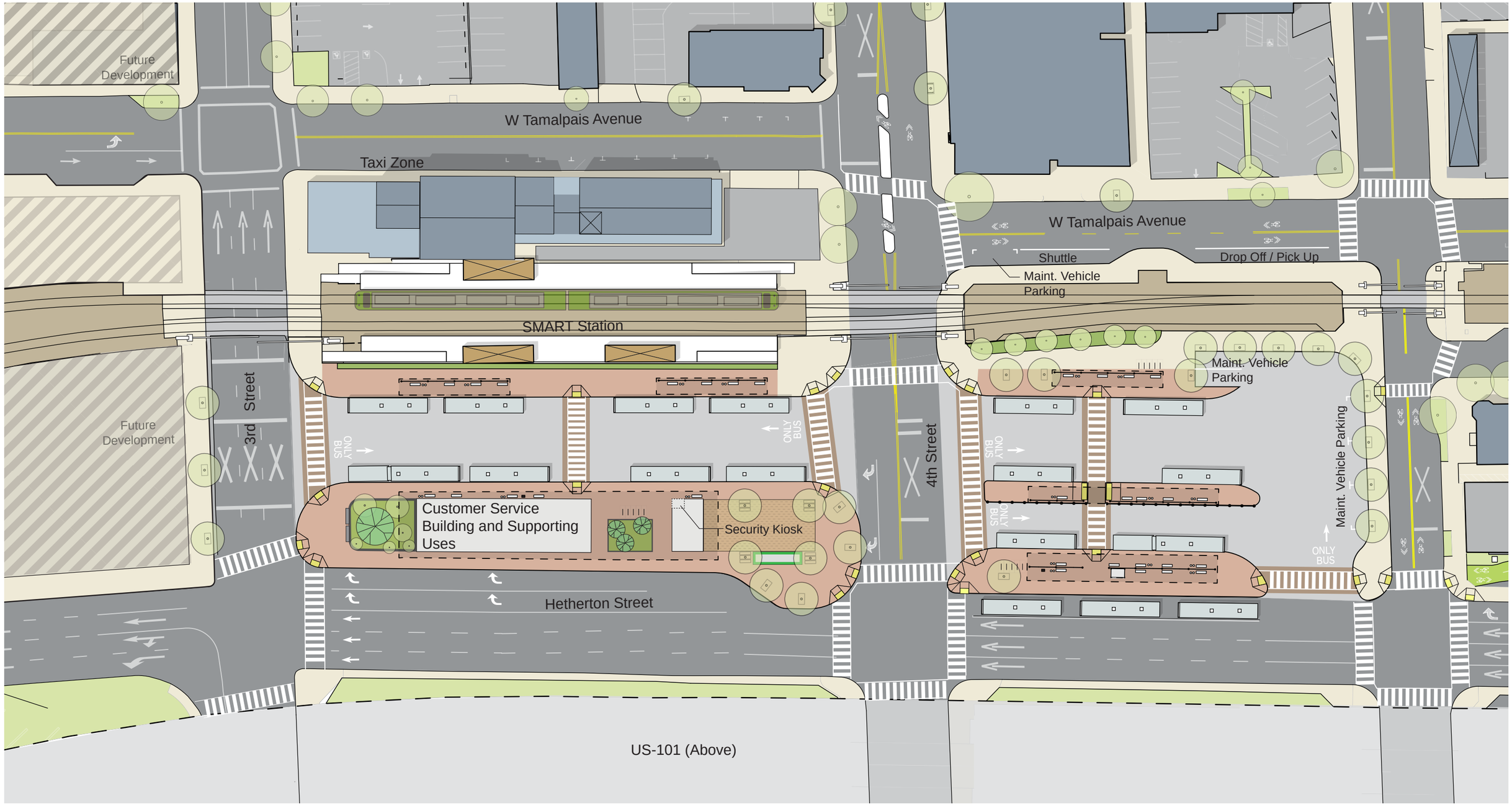

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Figure ES-3: 4th Street Gateway Alternative

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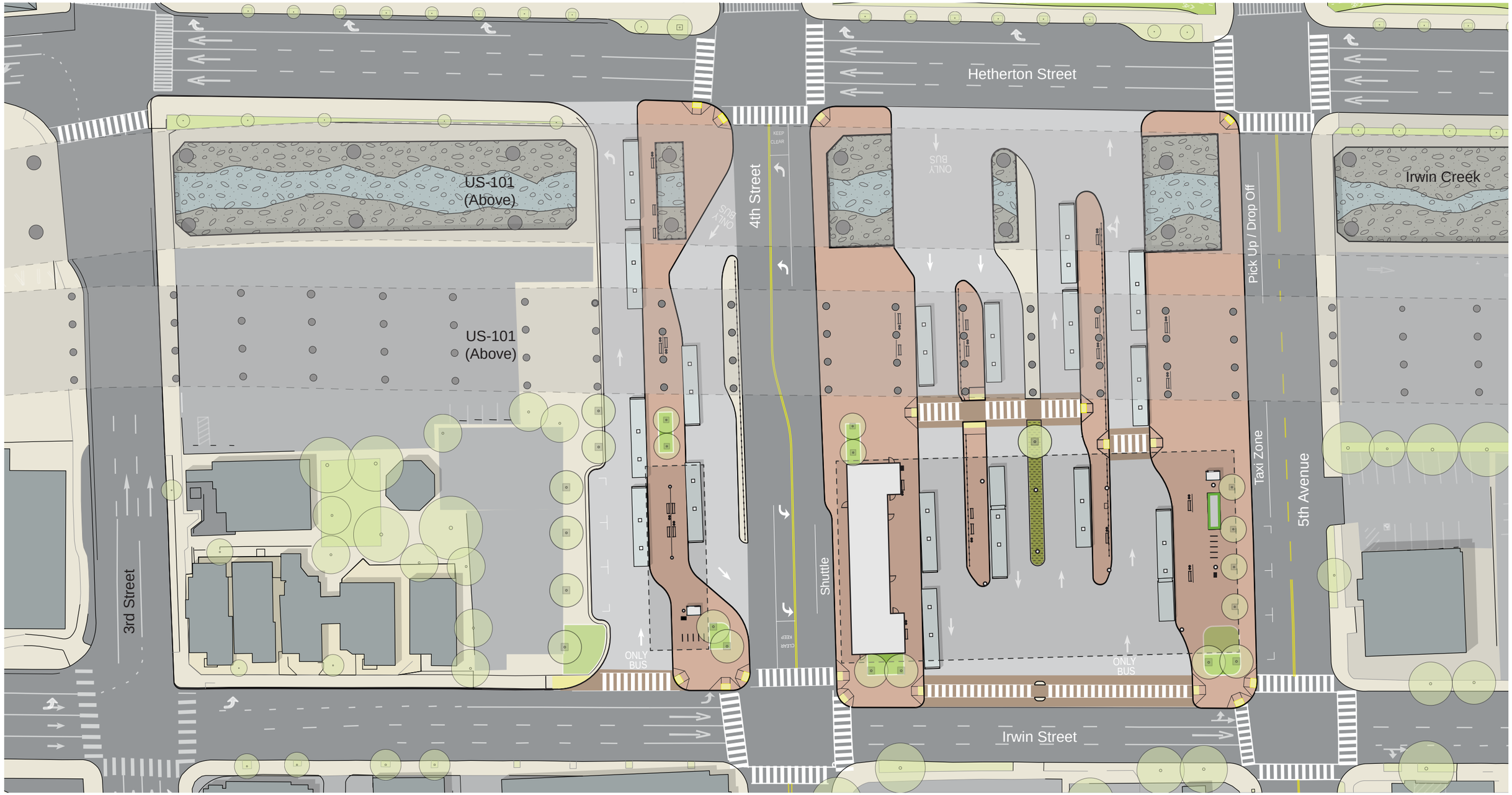

Figure ES-4: Under the Freeway Alternative

up/drop-off space would be provided on the south side of Fifth Avenue between Irwin Street and Hetherton Street. Space for shuttles and microtransit would be provided along the north side of 4th Street, adjacent to the northern portion of the transit center. Maintenance vehicle parking for three Golden Gate Transit vehicles would be provided on the south side of Fifth Avenue between Irwin Street and Hetherton Street, and parking for an additional three vehicles would be located on the far southern edge of the site south of 4th Street.

ES.2.4 Whistlestop Block Alternatives

Two alternatives were developed that place the transit center in the same area, centered on the existing Whistlestop building along West Tamalpais Avenue. These two alternatives were considered separately in the Draft Environmental Impact Report; however, they share the same transportation network, with the only difference in access and circulation consisting of a re-alignment of West Tamalpais Avenue. Since the transportation network is nearly identical between the two alternatives, they were modeled together as the Whistlestop Block Alternatives for the purposes of this report.

The Adapt Whistlestop Alternative is shown in Figure ES-5. This alternative co-locates the transit center on the same block as the existing SMART station, by utilizing area from west of West Tamalpais Avenue to 3rd Street, Hetherton Street, and 4th Street. West Tamalpais Avenue between 3rd Street and 4th Street would be limited to buses only, and curbside bays would be provided on both sides of the street. A portion of the curb space on West Tamalpais Avenue would be dedicated to microtransit and shuttles. To the east of the SMART tracks, bus bays would be accessed via driveways on 3rd and 4th Streets. The existing taxi and pick-up/drop-off area on East Tamalpais would be relocated to a newly constructed access road between 3rd Street and 4th Street. The Whistlestop building would remain in place and be modified, renovated, and reconfigured to serve as GGT customer service and operations building space. Some of the space within the building could be allocated for non-GGT uses. Maintenance vehicle parking for six GGT vehicles would be provided on the new access road between 3rd Street and 4th Street, adjacent to the pick-up/drop-off area. Eight parking stalls would be provided on the east side of West Tamalpais Avenue between 2nd Street and 3rd Street. A portion of the planned North South Greenway would be installed as part of the project between 2nd Street and 4th Street along West Tamalpais in the form of a raised Class IV two-way cycle track.

The Move Whistlestop Alternative is shown in Figure ES-6. In this alternative, a portion of the Whistlestop building would be relocated to or rebuilt on the west side of West Tamalpais Avenue between 3rd and 4th Streets. As part of this relocation, West Tamalpais Avenue between 2nd and 4th Streets would be shifted east so that it is directly adjacent to the SMART tracks and more closely aligned with West Tamalpais Avenue north of 4th Street. The relocated or reconstructed building would include GGT customer service and operations building space, as well as supporting retail uses. Space on the southwest corner of the intersection of West Tamalpais Avenue and 4th Street would be provided for public plazas, customer service, bike parking, and/or transit-supportive land uses. The taxi and pick-up/drop-off area and six maintenance vehicle parking stalls would be provided on the new access road west of West Tamalpais Avenue. A total of 16 parking stalls would be provided on West Tamalpais Avenue between 2nd Street and 3rd Street.

In both Whistlestop Alternatives, a new driveway would be installed on 4th Street between Tamalpais Avenue and Lincoln Avenue to replace the removed driveway on West Tamalpais Avenue that provides

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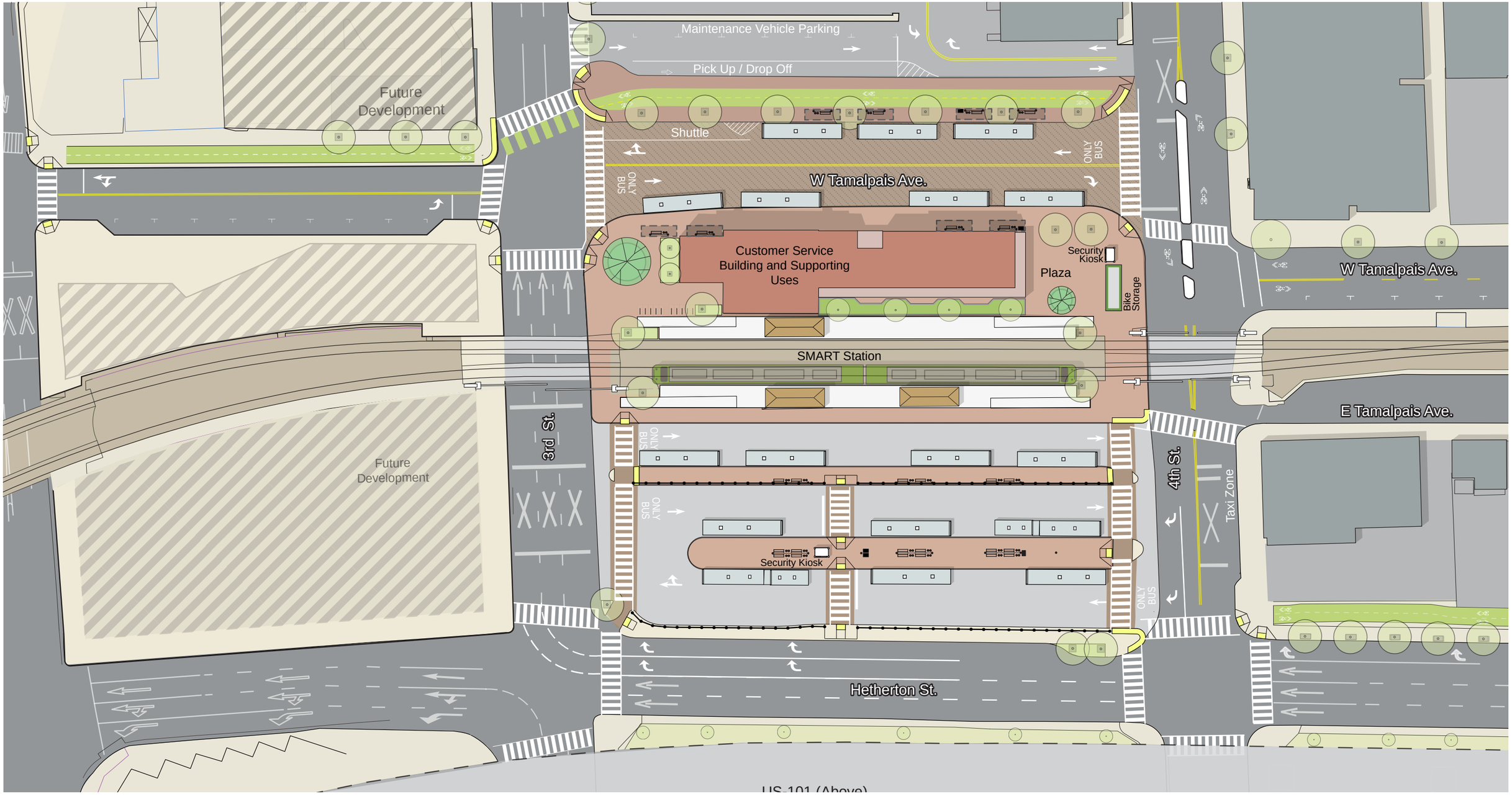

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Figure ES-5: Whistlestop Block Alternative

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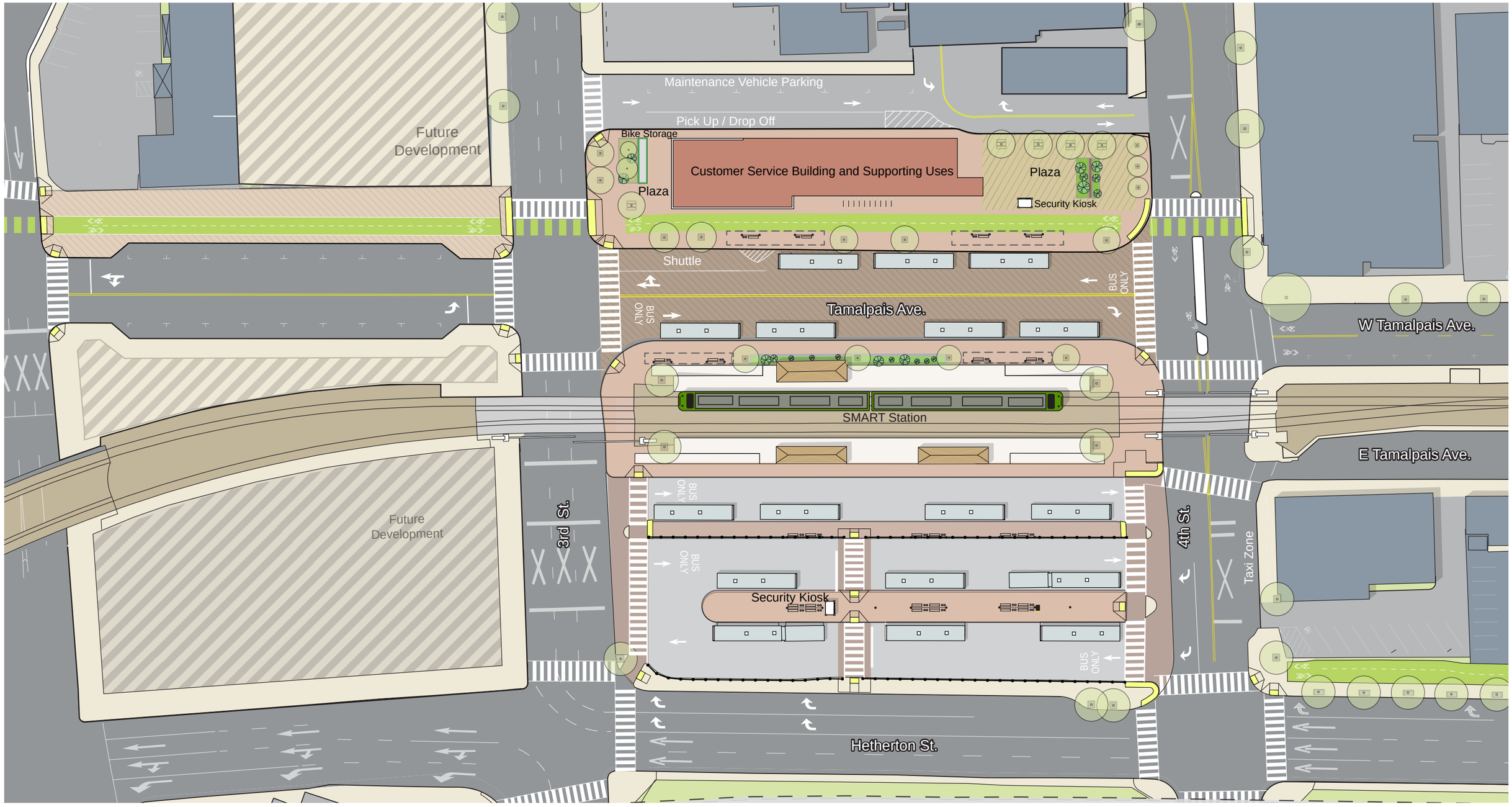

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Figure ES-6: Whistlestop Block Alternative - Move Whistlestop

access to the condominium complex at Lincoln and 4th Street. This new driveway would also be utilized for egress from the new pick-up/drop-off and maintenance parking access road. An existing curb cut on 3rd Street would be utilized to access the remnant of the existing parcel at the northwest corner of Tamalpais Avenue and 3rd Street, west of the pick-up/drop-off area.

ES.3 Analysis Methodology

The transportation analysis in this report encompasses a study of transit circulation, vehicular traffic, and non-motorized transportation including pedestrians and bicyclists, and parking. All three transit center alternatives, plus the No-Build Alternative, were analyzed under Existing (Year 2020) and Year 2040 conditions.

Roadway geometrics, vehicle/bicycle/pedestrian counts, travel-time data, and signal-timing data were collected and used as inputs to conduct the transit and traffic analyses. The inputs were applied to VISSIM 9 software package to develop microsimulation models of the no-build and each of the three build alternatives under Existing (Year 2020) and Year 2040 conditions. The modeling produced estimates of changes to circulation time for buses under each alternative, as well as changes in vehicle delay and travel time for vehicular traffic. In addition to microsimulation modeling, data on parking, pedestrian volumes, ridership, and transfer activity were utilized to analyze the effects on non-motorized transportation modes and parking.

ES.4 Transit Analysis

Bus circulation was quantified based on the total circulation time of individual bus routes traveling through the microsimulation model for each peak hour; the estimated circulation time for each route was determined by taking the average circulation time of 10 runs of the model.

The total circulation time for all routes, in seconds, is presented in Table ES-1 for Existing (Year 2020) models and Table ES-2 for Year 2040 models. The percent change for delay compared to the baseline (No-Build) analysis is also presented.

Table ES-1: Total Circulation Time in Network – Existing (Year 2020) Conditions

Total Circulation Time by Routes		% Change
No-Build A.M. Peak Hour	27,492 sec	
No-Build P.M. Peak Hour	25,739 sec	
4th Street Gateway A.M. Peak Hour	25,550 sec	-7%
4th Street Gateway P.M. Peak Hour	24,133 sec	-6%
Under the Freeway A.M. Peak Hour	21,863 sec	-20%
Under the Freeway P.M. Peak Hour	22,487 sec	-13%
Whistlestop Block A.M. Peak Hour	23,664 sec	-14%
Whistlestop Block P.M. Peak Hour	21,583 sec	-16%

As shown in the table, in Year 2020 conditions, all build alternatives would result in a reduction in total circulation time relative to the No-Build Alternative. The Under the Freeway Alternative and the Whistlestop Block Alternatives result in a greater than 10 percent reduction in transit travel time in both peak hours.

Table ES-2: Total Circulation Time in Network – Year 2040 Conditions

Total Circulation Time by Routes (s)		% Change
No-Build A.M. Peak Hour	34,808 sec	
No-Build P.M. Peak Hour	26,856 sec	
4th Street Gateway A.M. Peak Hour	38,547 sec	+11%
4th Street Gateway P.M. Peak Hour	24,416 sec	-9%
Under the Freeway A.M. Peak Hour	29,300 sec	-16%
Under the Freeway P.M. Peak Hour	27,740 sec	+3%
Whistlestop Block A.M. Peak Hour	27,386 sec	-21%
Whistlestop Block P.M. Peak Hour	23,056 sec	-14%

As shown in the table, in Year 2040 conditions, the Whistlestop Block Alternatives provides a greater than 10 percent reduction in transit travel time in both the a.m. and p.m. peak hours relative to the No-Build Alternative. The Under Freeway Alternative provides a reduction in one peak hour, but results in an increase in circulation time in the other peak hour. The increase is the result of routing additional buses through heavily constrained intersections on 4th Street.

ES.5 Traffic Analysis

The microsimulation models developed for each transit center alternative were used to analyze existing (Year 2020) and Year 2040 traffic operations and levels of service. The overall network results for existing conditions are shown in Table ES-3.

Table ES-3: Network Evaluation – Existing Conditions

Scenario		Avg Delay/Vehicle	Avg # Stops/Vehicle	Net Change in Delay/Vehicle	Net Change in Delay/Vehicle (%)
Baseline (No-Build)	A.M. Peak Hour	175 sec	4		
	P.M. Peak Hour	123 sec	6		
4th Street Gateway	A.M. Peak Hour	200 sec	4	+25	+15%
	P.M. Peak Hour	144 sec	6	+21	+12%
Under the Freeway	A.M. Peak Hour	170 sec	4	-5	-3%
	P.M. Peak Hour	115 sec	5	-8	-5%
Whistlestop Block	A.M. Peak Hour	175 sec	4	0	--
	P.M. Peak Hour	121 sec	5	-2	-1%

As shown in the table, in the a.m. peak hour, the Under the Freeway Alternative has a small reduction in vehicle delay, the Whistlestop Block Alternatives have no change, and the 4th Street Gateway Alternative would result in an increase in delay per vehicle. In the p.m. peak hour, the Under the Freeway Alternative achieves a delay reduction, the Whistlestop Block Alternatives have minimal change, and the 4th Street Gateway Alternative would result in an increase in delay per vehicle.

The overall network results for Year 2040 conditions are shown in Table ES-4.

Table ES-4: Network Evaluation – Year 2040 Conditions

Scenario		Avg Delay/Vehicle	Avg # Stops/Vehicle	Net Change in Delay/Vehicle	Net Change in Delay/ Vehicle (%)
Baseline (No-Build)	A.M. Peak Hour	276 sec	6		
	P.M. Peak Hour	156 sec	8		
4th Street Gateway	A.M. Peak Hour	313 sec	7	+37	+13%
	P.M. Peak Hour	155 sec	7	-1	-1%
Under the Freeway	A.M. Peak Hour	314 sec	6	+38	+14%
	P.M. Peak Hour	153 sec	6	-3	-2%
Whistlestop Block	A.M. Peak Hour	248 sec	6	-28	-10%
	P.M. Peak Hour	151 sec	8	-5	-3%

The change in delay for all alternatives in both peak hours is equal to or less than 10 percent, except for the 4th Street Gateway Alternative and Under the Freeway Alternative in the a.m. peak hour, where the delay per vehicle increase is 13 percent and 14 percent respectively. Both peak hours see a decrease in delay per vehicle with the Whistlestop Block Alternatives.

ES.6 Non-Motorized Transportation

The transit center alternatives were analyzed to evaluate their connectivity to downtown and local destinations, as well as their ability to connect passengers between different transit services. The 4th Street Gateway Alternative is nearest to Downtown San Rafael, which is the greatest trip attractor for passengers at the transit center. The Under the Freeway Alternative is located the farthest away from downtown with the additional barrier of Hetherton Street.

The Whistlestop Block Alternatives consolidate all bus bays within one block along with SMART and closes a public street, meaning that pedestrians do not have to cross any street open to auto traffic to transfer between buses or between a bus and SMART. The 4th Street Gateway Alternative requires the greatest amount of 4th Street crossings for bus-to-bus transfers. The Under the Freeway Alternative requires the most challenging transfer to SMART, as it requires crossing busy Hetherton Street for that transfer movement.

For bicycle connections, the Whistlestop Block Alternatives would best promote the City's planned bicycle network by constructing two blocks of the planned North South Greenway Class IV bikeway on Tamalpais Avenue as a high-quality, raised two-way Class IV facility. The 4th Street Gateway Alternative would require removal or realignment of one block of the Puerto Suello bike path but would provide effective connections to the Mahon Creek Path and the Puerto Suello bike path. The Under the Freeway

Alternative would not closely integrate with the City's planned network nor would it affect any planned facilities.

ES.7 Safety

The safety analysis of the blocks immediately surrounding the Project alternatives identified that the intersections around the transit center and SMART station recently have had collision rates higher than statewide averages. This emphasizes the need to consider pedestrian and bicycle safety and access improvements as a key element of the SRTC Project.

All of the Project alternatives provide several safety advantages relative to the No-Build Alternative. This includes a reduction in pedestrian-vehicle conflicts for most users and the implementation of pedestrian safety treatments, such as high-visibility crosswalks, leading pedestrian intervals (LPIs), and enhanced lighting.

Of the build alternatives, the Whistlestop Block Alternatives provide the greatest benefit to pedestrian and bicycle safety by achieving the greatest reduction in pedestrian-vehicle conflicts, placing the transit center closest to the primary destination of downtown San Rafael, locating all transit services within the same block to limit conflicts for transferring passengers, incorporating effective pedestrian safety features, and providing a high-quality bicycle facility to close a critical gap in the City's bicycle network.

ES.8 Parking

Each of the alternatives involve some amount of parking removal. The Whistlestop Block Alternatives would remove on-street parking on Tamalpais Avenue between 2nd Street and 4th Street but would replace most of them with new on-street parking stalls between 2nd Street and 3rd Street. The 4th Street Gateway Alternative would convert existing on-street spaces to curb space used for transit center-related pick-up/drop-off or maintenance vehicle parking. The Under the Freeway Alternative also requires use of some on-street spaces and results in the removal of 72 spaces in existing Caltrans park & ride lots under US 101; Caltrans would require that these spaces be relocated to an undetermined location elsewhere. The overall changes in public parking are shown in Table ES-5.

Table ES-5: Net Change in Public Parking

Alternative	Removed		Added		Net Change	
	On-Street	Off-Street	On-Street	Off-Street	On-Street	Off-Street
4th Street Gateway	26	0	0	0	-26	0
Under the Freeway	16	72	0	0[1]	-16	-72[1]
Adapt Whistlestop	25	0	8	0	-17	0
Move Whistlestop	25	0	16	0	-9	0

[1] *The impacted 72 spaces at the Caltrans park & ride lots will be required to be replaced at a similar location within the existing park & ride driveshed; however, no replacement parking area has yet been identified.*

1.0 Introduction

The Golden Gate Bridge, Highway, and Transportation District (GGBHTD) is currently undertaking a project to identify a new location for the San Rafael Transit Center (SRTC). Sonoma-Marin Area Rail Transit (SMART) was recently extended to Larkspur, bisecting the existing transit center. This has impacted bus operations and passenger movements, creating the need for a new transit center. Through a community-driven process, several alternatives were developed and screened to identify potential new locations for the transit center. In 2018, a Notice of Preparation (NOP) was issued to begin an environmental analysis process per the requirements of the California Environmental Quality Act (CEQA). The NOP identified five project build alternatives. Since the preparation of the NOP, the alternatives have been refined through subsequent design development and the number of build alternatives screened down to three.

The project team has conducted a detailed transportation evaluation of the three build alternatives under consideration, plus a No-Build Alternative. This report documents the evaluation methodology and the results of the analysis.

1.1 Project Description

The SRTC, also known as the C. Paul Bettini Transit Center, is owned by GGBHTD. GGBHTD operates Golden Gate Transit (GGT) regional and inter-county bus transit services. The transit center is located in Downtown San Rafael at the intersection of 3rd Street and Hetherton Street (see Figure 1-1). With more than 500 bus trips daily and 17 operating bus bays, the transit center is the largest transit hub in Marin County, providing access to the regional transportation network for area residents and a key transfer point for residents, employees, visitors, and students in San Rafael and the greater North Bay region. The transit center primarily serves bus routes operated by GGT and Marin Transit, but it is also served by airporter, Greyhound, and paratransit services. On weekdays, nearly 9,000 people board/alight buses at the transit center to make their necessary transportation connections. Downtown San Rafael is an important destination, with nearly half of the passengers travelling to or from downtown, and the remaining riders making transfers to other destinations. The bus bays currently are fully occupied at times during the peak-period pulse, leaving little room for growth in bus service.

The new transit center (Project) will include similar facilities to the existing transit center, with additional amenities planned to upgrade technology, provide connections to emerging transportation modes, and enhanced public spaces. Similar to the existing transit center, 17 bays will be provided along with pick-up/drop-off curb space for private autos, taxis, transportation network companies (TNCs), and microtransit. To support transit center operations, the facility will include parking for maintenance/operations vehicles, relief facilities for drivers and other staff, and public restrooms. Other passenger amenities will include facilities, space for customer service and complementary retail, signage/wayfinding, bike parking, security kiosk(s), and urban design elements.

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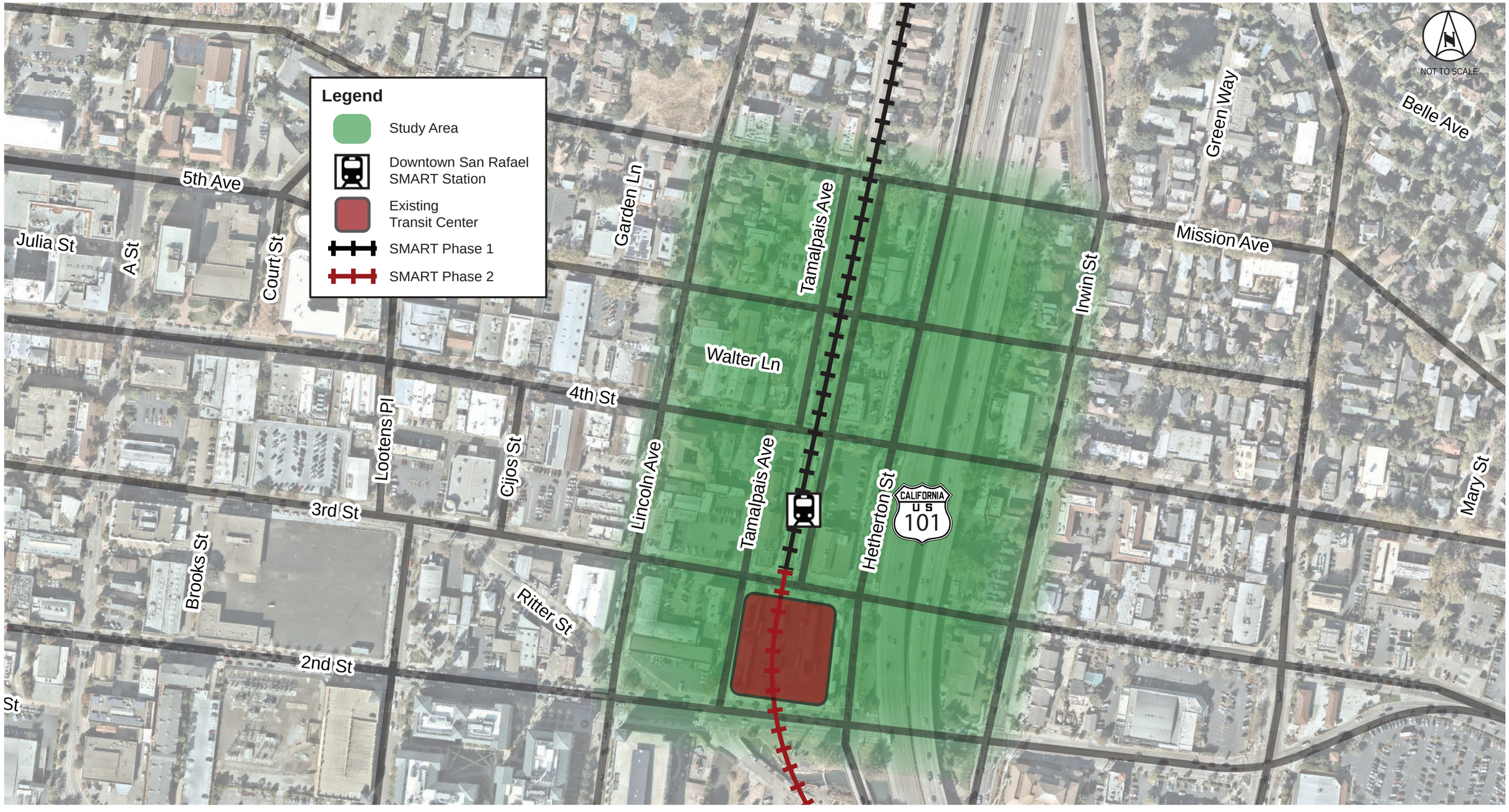

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Figure 1-1: Project Location

1.2 Alternatives

No-Build Alternative/Existing Transit Center Site

In the No-Build Alternative, the transit center would remain at its current location, on the block bound by 2nd Street, Tamalpais Avenue, 3rd Street, and Hetherton Street. The "interim" transit center configuration constructed as part of the SMART extension would remain. Customer service and vendor facilities would remain at their current location on Platform D. Pick-up/drop-off curb space would remain on the west side of Platform D along Tamalpais Avenue. Bus access/egress would continue to occur via driveways along 2nd and 3rd Streets. Buses accessing southbound U.S. Highway 101 (US 101) would continue to berth curbside on the east side of Platform A.

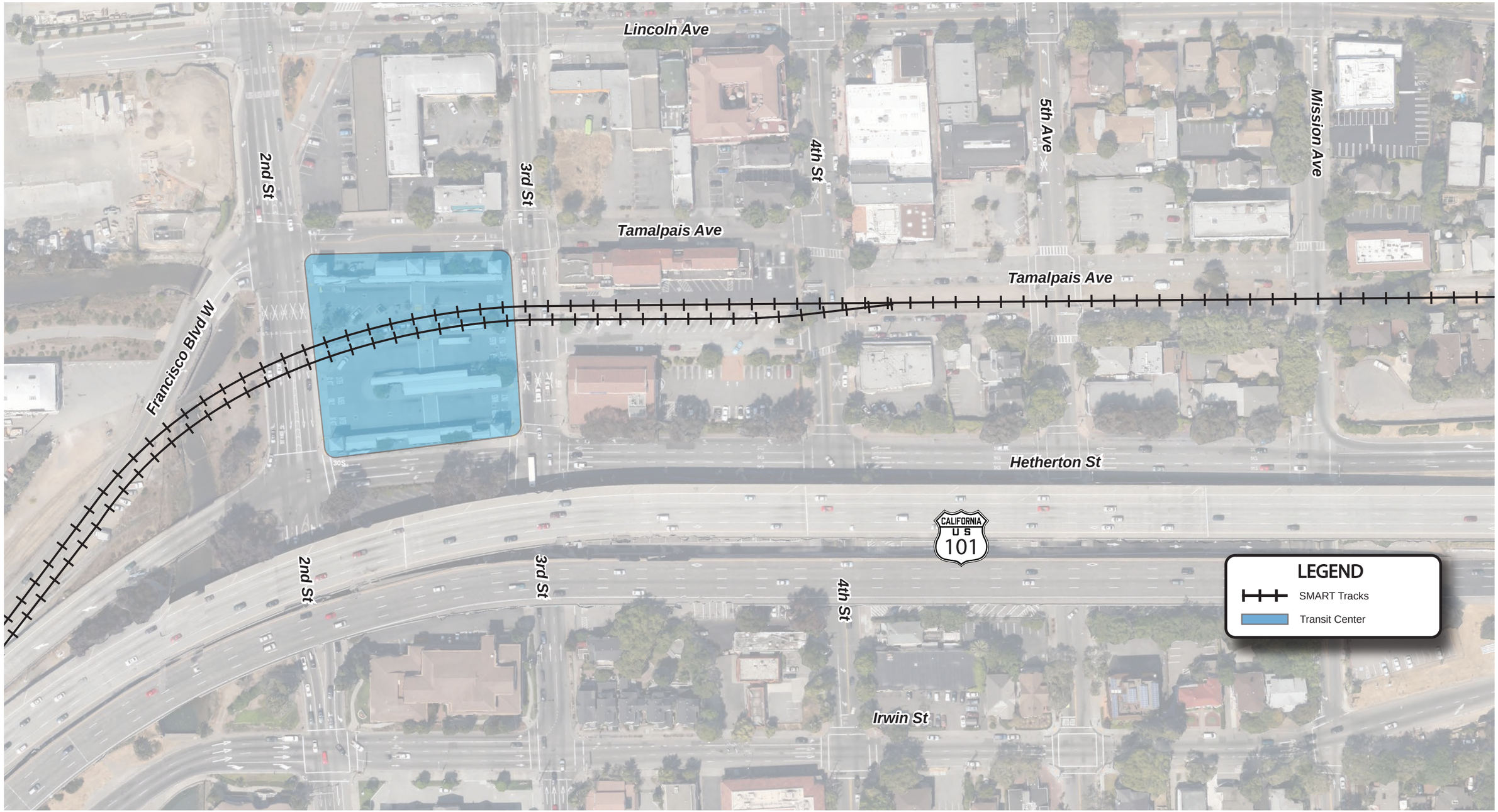

Figure 1-2: No Build Alternative

4th Street Gateway Alternative

The 4th Street Gateway Alternative is shown in Figure 1-3. This alternative utilizes the two blocks bound by the SMART tracks, 3rd Street, Hetherton Street, and Fifth Avenue.

This alternative would include three curbside bays on the west side of Hetherton Street between 4th Street and Fifth Avenue. To accommodate these curbside bays, southbound right-turns from Hetherton Street to 4th Street would be precluded. Other bus bays would be accessed via driveways on 3rd and 4th Streets and a driveway on Hetherton Street.

Along Hetherton Avenue, space would be provided for public plazas, bike parking, and building space for customer service and transit-supportive land uses. The segment of the existing Puerto Suello bike path located on the east side of the proposed site between 4th Street and Fifth Avenue would be realigned around the transit center site. The existing Victorian homes south of Fifth Avenue would either be removed or relocated.

The existing taxi pick-up/drop-off area on East Tamalpais would be removed. A new pick-up/drop-off space for microtransit, taxis, shuttles, and passenger vehicles would be provided on the east side of West Tamalpais Avenue between 3rd Street and Fifth Avenue. Maintenance vehicle parking for five GGT vehicles would be provided on-site at the transit center on the block north of 4th Street, with one additional maintenance vehicle parking space provided on the east side of Tamalpais Avenue between 4th Street and Fifth Avenue.

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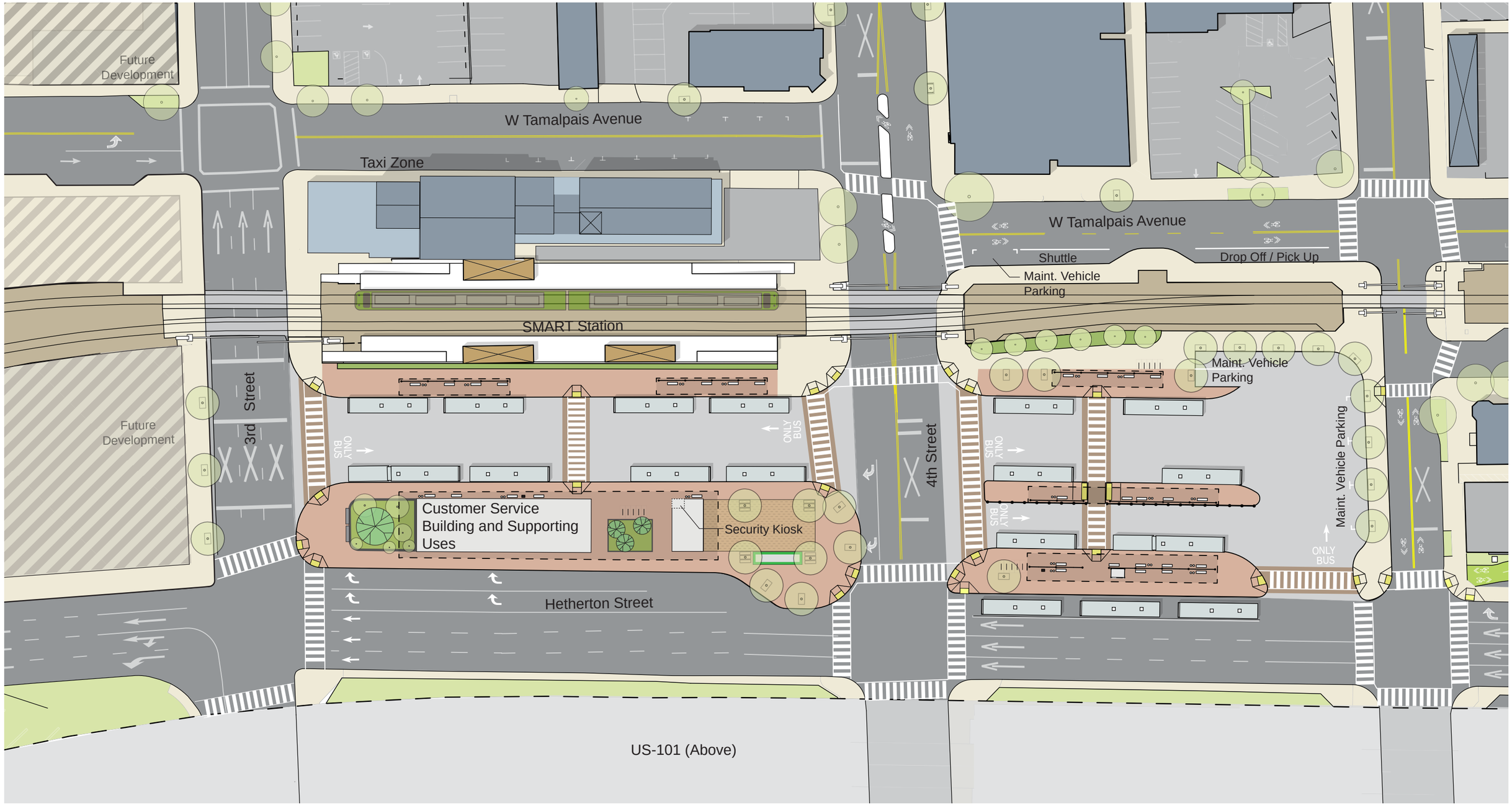

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Figure 1-3: 4th Street Gateway Alternative

Under the Freeway Alternative

The Under the Freeway Alternative is shown in Figure 1-4. This concept utilizes the block bound by 4th Street, Hetherton Street, Fifth Avenue, and Irwin Street, and the northern portion of the block bound by Hetherton Street, 3rd Street, 4th Street, and Irwin Street, generally located beneath US 101. Bus bays would be accessed via driveways on 4th Street, Irwin Street, and Hetherton Street.

Space would be provided for public plazas, customer service, and/or transit-supportive land uses in the area outside of the US 101 envelope. This alternative would require three bridges/viaducts over Erwin Creek to connect Hetherton Street to the bus bays. Two bridges would be located on the block north of 4th Street and one would be located on the block south of 4th Street.

The under-freeway portions of this alternative are currently occupied by Caltrans-owned and maintained park & ride lots; this alternative would result in their removal from this location and relocation to a yet-to-be-determined site. Private property would also need to be acquired. Pick-up/drop-off space would be provided on the south side of Fifth Avenue between Irwin Street and Hetherton Street. Space for shuttles and microtransit would be provided along the north side of 4th Street, adjacent to the northern portion of the transit center. Maintenance vehicle parking for three Golden Gate Transit vehicles would be provided on the south side of Fifth Avenue between Irwin Street and Hetherton Street, and parking for an additional three vehicles would be located on the far southern edge of the site south of 4th Street.

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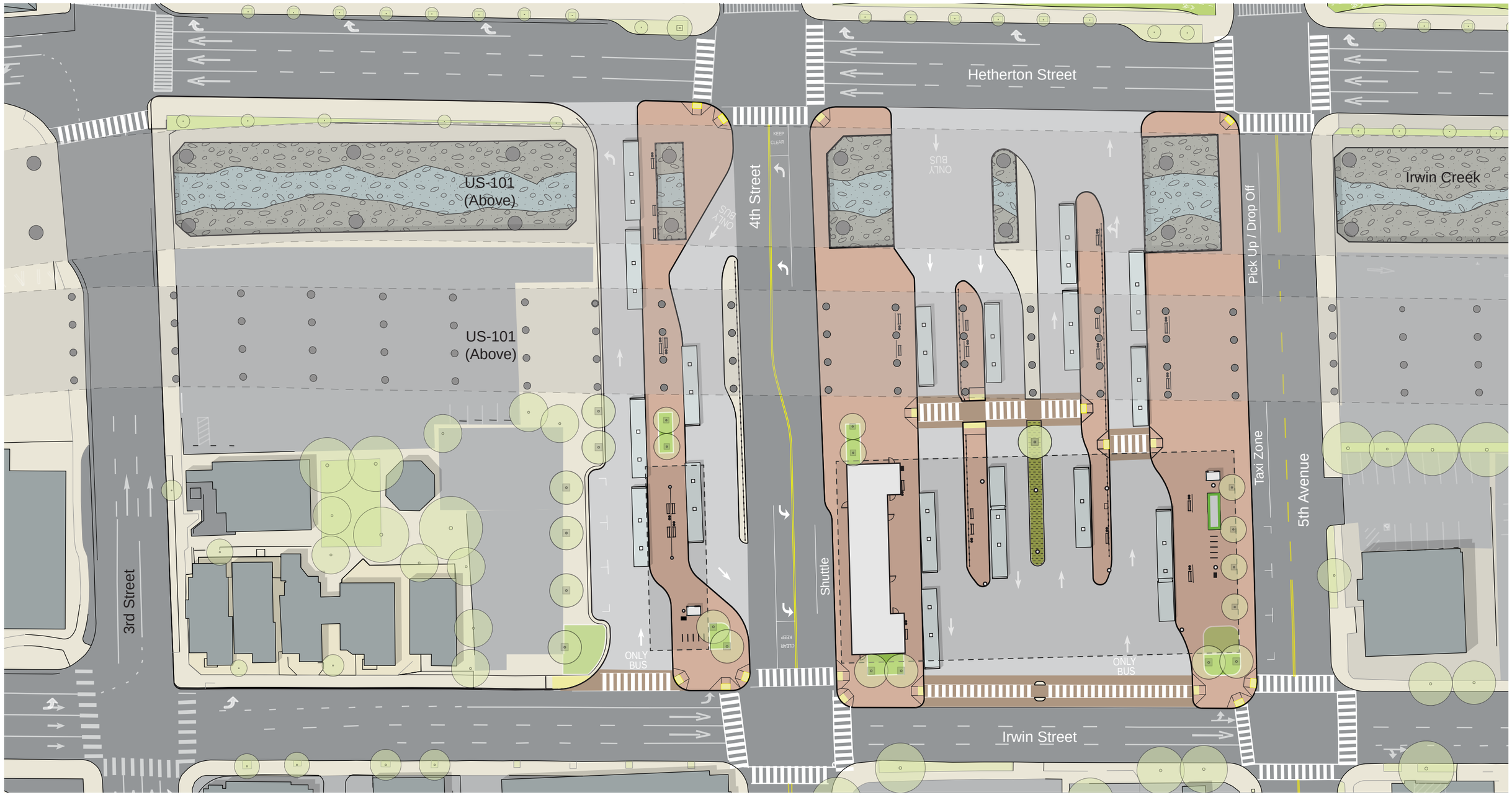

Figure 1-4: Under the Freeway Alternative

Whistlestop Block Alternatives

Two alternatives were developed that place the transit center in the same area, centered on the existing Whistlestop building along West Tamalpais Avenue. These two alternatives are considered separately in the Draft Environmental Impact Report; however, they share the same transportation network, with the only difference in access and circulation consisting of a re-alignment of West Tamalpais Avenue. Since the transportation network is nearly identical between the two alternatives, they were modeled together as the Whistlestop Block Alternatives for the purposes of this report.

The Adapt Whistlestop Alternative is shown in Figure 1-5. This alternative co-locates the transit center on the same block as the existing SMART station, by utilizing area from west of West Tamalpais Avenue to 3rd Street, Hetherton Street, and 4th Street. West Tamalpais Avenue between 3rd Street and 4th Street would be limited to buses only, and curbside bays would be provided on both sides of the street. A portion of the curb space on West Tamalpais Avenue would be dedicated to microtransit and shuttles. To the east of the SMART tracks, bus bays would be accessed via driveways on 3rd and 4th Streets. The existing taxi and pick-up/drop-off area on East Tamalpais Avenue would be relocated to a newly constructed access road between 3rd Street and 4th Street a. The Whistlestop building would remain in place and be modified, renovated, and reconfigured to serve as GGT customer service and operations building space. Some of the space within the building could be allocated for non-GGT uses. Maintenance vehicle parking for six GGT vehicles would be provided on the new access road between 3rd Street and 4th Street, adjacent to the pick-up/drop-off area. Eight parking stalls would be provided on the east side of West Tamalpais Avenue between 2nd Street and 3rd Street. A portion of the planned North South Greenway would be installed as part of the project between 2nd Street and 4th Street along West Tamalpais in the form of a raised Class IV two-way cycle track.

The Move Whistlestop Alternative is shown in Figure 1-6. In this alternative, a portion of the Whistlestop building would be relocated to or rebuilt on the west side of West Tamalpais Avenue between 3rd and 4th Streets. As part of this relocation, West Tamalpais Avenue between 2nd and 4th Streets would be shifted east so that it is directly adjacent to the SMART tracks and more closely aligned with West Tamalpais Avenue north of 4th Street. The relocated or reconstructed building would include GGT customer service and operations building space, as well as supporting retail uses. Space on the southwest corner of the intersection of West Tamalpais Avenue and 4th Street would be provided for public plazas, customer service, bike parking, and/or transit-supportive land uses. The taxi and pick-up/drop-off area and six maintenance vehicle parking stalls would be provided on the new access road west of West Tamalpais Avenue. A total of 16 parking stalls would be provided on West Tamalpais Avenue between 2nd Street and 3rd Street. A portion of the planned North South Greenway would be installed as part of the project between 2nd Street and 4th Street along West Tamalpais in the form of a raised Class IV two-way cycle track.

In both Whistlestop Alternatives, a new driveway would be installed on 4th Street between Tamalpais Avenue and Lincoln Avenue to replace the removed driveway on West Tamalpais Avenue that provides access to the condominium complex at Lincoln and 4th Street. This new driveway would also be utilized for egress from the new pick-up/drop-off and maintenance parking access road. An existing curb cut on 3rd Street would be utilized to access the remnant of the existing parcel at the northwest corner of Tamalpais Avenue and 3rd Street, west of the pick-up/drop-off area.

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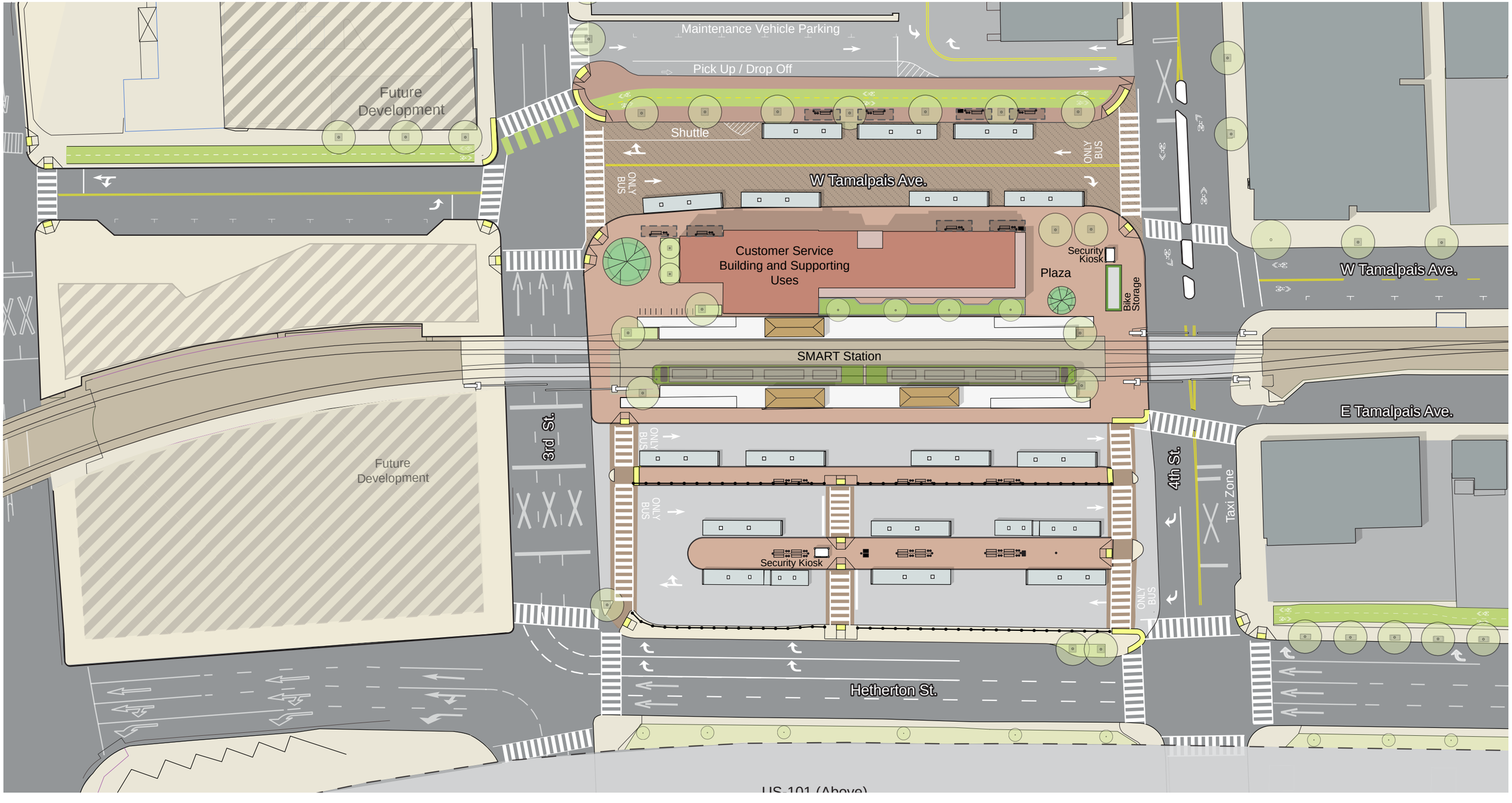

Figure 1-5: Whistlestop Block Alternative

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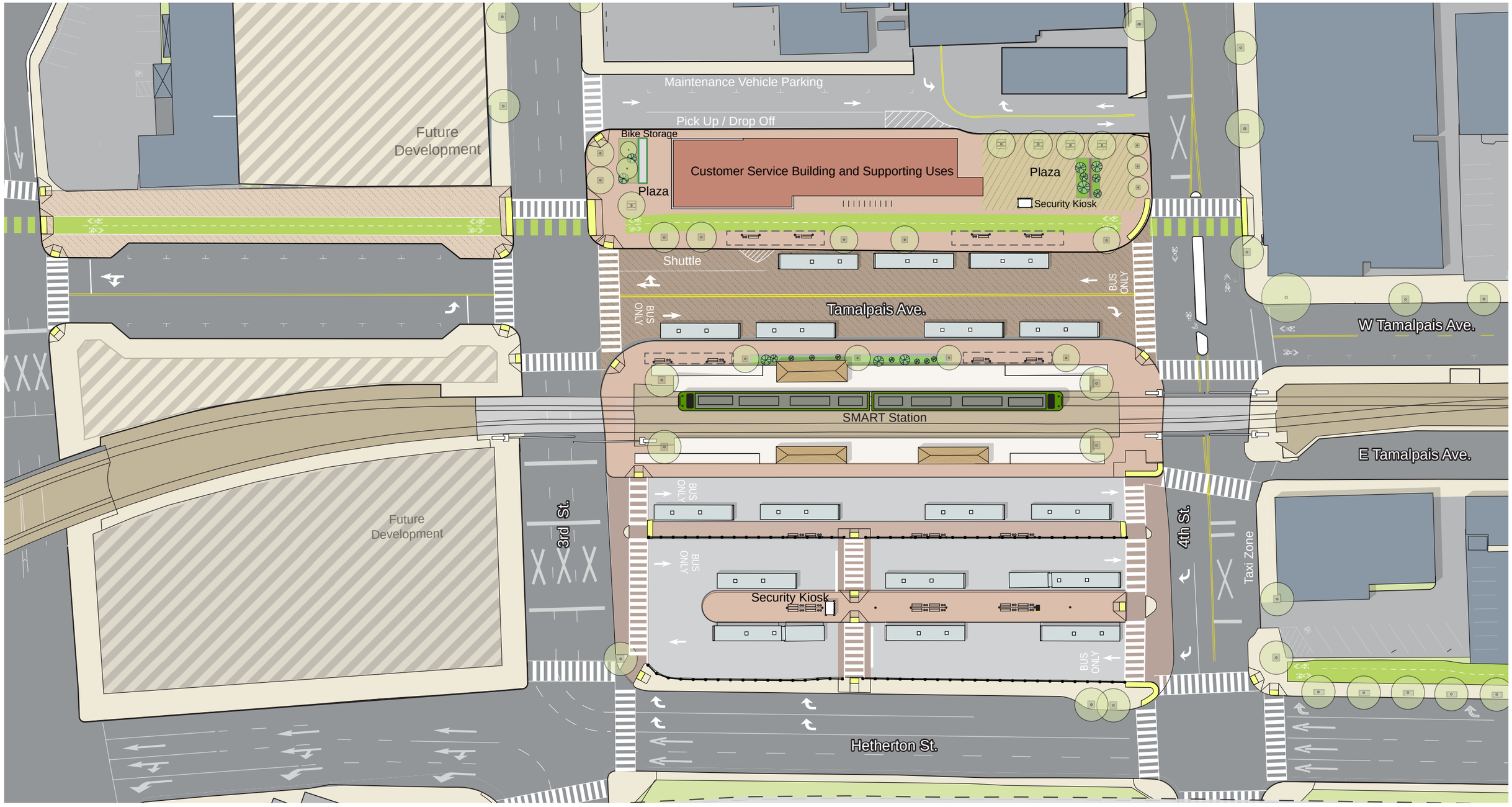

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Figure 1-6: Whistlestop Block Alternative - Move Whistlestop

2.0 Analysis Methodology and Data Collection

2.1 Analysis Scenarios

Intersection operations analyses were performed for existing no-build and build conditions (Year 2020), and future (Year 2040) no-build and build conditions. The analyses were conducted to study the impact of relocating the transit center to different locations proposed under the three build alternatives. The following analysis scenarios were performed:

- **Existing Conditions (No-Build Alternative)** – Assumes the existing roadway network, traffic volumes, and transit service, as of January 2020 (the time of the existing data collection period).
- **Existing Conditions (Build Alternatives)** – Assumes the changes to the roadway network and transit routing associated with each build alternative, based on existing traffic volumes.
- **Year 2040 Conditions (No-Build Alternative) –** Assumes growth in traffic (auto, bicycle, and pedestrian) volumes to projected Year 2040 conditions. Includes already built and planned changes to the roadway network. Assumes existing transit service, modified as needed based on roadway network changes.
- **Year 2040 Conditions (Build Alternatives) –** Assumes the changes to the roadway network and transit routing associated with each build alternative and planned roadway network modifications, based on projected Year 2040 traffic volumes.

2.2 Existing Conditions Data Collection

The transportation analysis of existing conditions is based on data collected by the project team and information provided by GGT, Marin Transit, the City of San Rafael, Transportation Authority of Marin (TAM), and SMART.

The project team collected a.m. and p.m. peak hour turning movement volumes, including bicycle and pedestrian volumes, at 42 study intersections in January 2020. These represent conditions prior to the impact of the COVID-19 pandemic. Peak period travel times along 2nd Street, 3rd Street, 4th Street, Irwin Street, and Hetherton Street were also collected in the same month to assist in calibrating the analysis. Queue lengths for the US 101 off-ramps at Mission Avenue and 2nd Street were also collected during peak periods.

All transit information documented and analyzed in this report reflects pre-COVID-19 conditions. GGT, Marin Transit, and SMART provided information on existing transit routes and schedules for pre-COVID-19 conditions.

The Metropolitan Transportation Commission (MTC) provided Clipper transfer data, which was supplemented by farebox data provided by GGT and Marin Transit to determine transfer activity at the transit center.

GGT and Marin Transit provided on-board survey data, which was used to determine activity patterns at the transit center and modes of access and egress.

The City of San Rafael provided existing signal timings and information on planned changes to the bicycle, pedestrian, and roadway network to be accounted for in Year 2040 conditions.

The data provided was supplemented by numerous field visits conducted by the project team.

2.3 Recent Changes to Study Area Geometrics

The Existing Conditions model was built and calibrated to conditions present at the time of data collection in early 2020. Since that time period, the City has implemented several improvements to the transportation network within the study area. These include:

- Conversion of Francisco Boulevard West to one-way southbound operations between 2nd Street and Rice Drive
- Removal of the exclusive southbound left-turn lane on Tamalpais Avenue at 2nd Street
- Removal of the south leg crosswalk and addition of an east leg crosswalk at the intersection of 3rd Street and Hetherton Street and the implementation of leading pedestrian intervals (LPIs)
- Updated signal timing at various intersections in downtown
- Intersection geometry modifications at the US-101/Irwin Street and 2nd Street intersection
- Intersection geometry modifications at the Grand Avenue and 2nd Street intersection

Based on comments received on the Draft EIR, the models for the Whistlestop Block Alternatives (Preferred Alternative) were updated to reflect improvements implemented since January 2020, as of August 2022. All Year 2040 build alternatives models include the implemented improvements.

2.4 Year 2040 Conditions Assumptions

The City of San Rafael provided daily and peak hour model volume plots from the TAM activity-based countywide travel-demand model for Baseline (2019) and Future (Year 2040) conditions; the Future forecasts incorporated the preferred land-use plan from the recently completed 2040 San Rafael General Plan Update. The model plots provided by the City were used to develop traffic volumes for Year 2040 conditions. The model assumes continued growth of transit in the region.

The Year 2040 baseline includes the construction of long-term roadway network improvements planned by the City of San Rafael and are unrelated to the proposed Project.

- Conversion of B Street, C Street, and D Street from one-way to two-way operations
- Conversion of Francisco Boulevard West to one-way southbound operations between 2nd Street and Rice Drive
- Conversion of the following segments of West Tamalpais Avenue:
  - 2nd Street to 3rd Street – convert to one-way operation southbound and removal of the exclusive southbound left-turn lane to 2nd Street
  - 3rd Street to 4th Street – convert to one-way operation northbound
  - 4th Street to Fifth Avenue – close to vehicle traffic
  - Fifth Avenue to Mission Avenue – convert to one-way operation northbound
- The northbound approach to 2nd Street and Grand Avenue would be converted to two through lanes and a 100-foot right-turn pocket
- Addition of a second northbound right-turn lane at 2nd Street and Irwin Street; removal of the existing crosswalks on the north and east legs of the same intersection and construction of new crosswalks on the south and west legs
- Completion of the SMART Multi-Use Path to 2nd Street

It is noted that some of the build alternatives include modifications to these planned network improvements.

2.5 VISSIM Modeling Platform

Technical analysis of the alternatives was performed using the VISSIM micro-simulation platform, which allows for modeling of individual movements as they travel through the roadway network. This micro-simulation model allows the operations of the entire study area network to be considered in an integrated fashion, allowing for the detailed evaluation of upstream and downstream effects of a set of solutions. A critical component of the analysis was understanding how treatments at the individual intersections interact and affect upstream and downstream locations. The VISSIM platform allows for analysis of the integration of auto, transit, bicycle, and pedestrian modes in a dynamic environment, making it sensitive to the effects of changes in circulation patterns such as those anticipated as a result of the Project.

VISSIM is a sophisticated and detailed analysis tool that provides the ability to model complex multimodal traffic interactions, including merge, weave, pedestrian, and bicycle movements. Existing auto, transit, bicycle, and pedestrian activity data was utilized in the micro-simulation model. Roadway geometrics, vehicle/bicycle/pedestrian counts, travel-time data, and signal-timing data were collected and used as inputs to conduct the operation analysis. The VISSIM analysis calculated metrics such as intersection delay, queuing, corridor travel time, vehicle delay, vehicle travel time, and transit travel time. Videos created from the VISSIM model allowed for visual demonstration of conditions with the baseline scenario and each build alternative.

Intersection operations are described using a level of service (LOS) grade, as defined by the *Highway Capacity Manual, 6th Edition* (HCM). The LOS grades range from A to F, with A representing little to no delay and F representing failing conditions with excessive delay. Intersection delay was obtained from the VISSIM model in the form of seconds of delay. This was converted to a level of service using HCM thresholds for delay. It is noted that the VISSIM model does not rely on HCM methodologies and thus the LOS grade provided should be used as a comparative tool only and may not match the findings of an HCM-based analysis.

The VISSIM models created were based on the 1-hour peak period for both the 7:45 to 8:45 a.m. and 4:30 to 5:30 p.m. peak traffic conditions. A 15-minute “seeding” period was added to the beginning of each model run to properly saturate the network. Ten simulation runs were conducted for each model. The results presented in this report are the average of the 10 runs, except where noted.

The models were calibrated to existing conditions (January 2020) in accordance with *FHWA Traffic Analysis Toolbox Volume 3* which is used by Caltrans as guidance for VISSIM model calibration. The models were calibrated to observed traffic volumes and corridor travel time data on 2nd Street, 3rd Street, 4th Street, Hetherton Street, and Irwin Street. To ensure proper calibration, the model’s behavior and characteristics were adjusted for both the morning and afternoon peak so that each of the measured corridors were within 30 percent of the field-conducted travel times.

2.6 Traffic Conditions

As all build alternatives primarily represent a shifting of bus activity from one location to another; the Project does not change the amount of bus service to be provided nor are new vehicle trips assumed to

be generated. Each of the three build alternatives include some limited changes to the local roadway network, which affect traffic circulation. Additionally, the shifting of the transit center results in a different circulation pattern for buses on local streets.

To determine the impacts associated with the roadway configuration changes, shift in traffic volumes, and shift in bus circulation, intersections were analyzed for Existing and Year 2040 traffic operations.

Delay and LOS analyses are provided for both the a.m. and p.m. peak hours. Intersection analysis locations encompass the anticipated area of traffic effects associated with the build alternatives. In total, 42 distinct intersection locations were analyzed during both peak hours for all analysis scenarios. The locations of the study intersections are shown in Figure 2-1.

Count data collected by the project team was used to develop model volumes for existing conditions. Year 2040 volumes for the baseline VISSIM models were developed by applying annual growth rates derived from TAM countywide activity-based travel-demand model runs produced based on 2040 San Rafael General Plan Update land uses. Separate annual growth rates were derived separately for four quadrants of the study area; 4th Street delineated between the northern and southern quadrants of the model and US 101 delineated between the eastern and western quadrants. The annual growth rates were applied to volumes within each quadrant of the model.

For roadway network changes assumed under the Year 2040 baseline and all of the build alternatives, it was assumed that any vehicular movements which would be affected by network changes would be redistributed through an alternate route through the network. For example, in the instance that a right-turn lane was proposed to be removed, a new route for the right-turn volumes at that location was determined, and volumes for all conditions in which the right-turn lane is removed were adjusted to reflect these redistributed volumes.

The VISSIM models were used to develop movement-level and intersection-level average vehicular delay. These metrics were developed by running multiple instances of the microsimulation model and producing averages for vehicle delay at each intersection.

Based on intersection-level delay, each intersection was assigned a LOS designation from A to F using the following criteria, which are based on thresholds from the HCM. The HCM includes methodology for estimating average vehicle delay based on inputs related to signal timing, volume, and lane geometry for each individual intersection; for this analysis, the microsimulation models were used in lieu of HCM methodology. The LOS designations assigned to each intersection are thus based only on the following thresholds listed in the HCM:

- LOS A – Negligible delays. No approach phase is fully utilized, and no vehicle waits longer than one red indication. Average control delay is less than 10 seconds per vehicle for both signalized and unsignalized intersections.
- LOS B – Minimal delays. An occasional approach phase is fully used. Drivers begin to feel restricted. Average control delay is 10 to 20 seconds per vehicle for signalized intersections and 10 to 15 seconds per vehicle for unsignalized intersections.

- LOS C – Acceptable delays. Major approach phase may become fully used. Most drivers feel somewhat restricted. Average control delay is 20 to 35 seconds per vehicle for signalized intersections and 15 to 25 seconds per vehicle for unsignalized intersections.
- LOS D – Tolerable Delays. Drivers may wait through no more than one red indication. Queues may develop but dissipate rapidly without excessive delays. Average control delay is 35 to 55 seconds per vehicle for signalized intersections and 25 to 35 seconds per vehicle for unsignalized intersections.
- LOS E – Major Delays. Volumes approaching capacity. Vehicles may wait through several signal cycles and long vehicle queues form in advance of the signal. Average control delay is 55 to 80 seconds per vehicle for signalized intersections and 35 to 50 seconds per vehicle for unsignalized intersections.
- LOS F – Excessive delays. Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections. Average control delay is greater than 80 seconds per vehicle for signalized intersections and greater than 50 seconds per vehicle for unsignalized intersections.

It is noted that LOS is no longer a component in identifying transportation impacts as part of CEQA analysis. This information is provided for information purposes only to identify changes in localized congestion as a result of the project alternatives.

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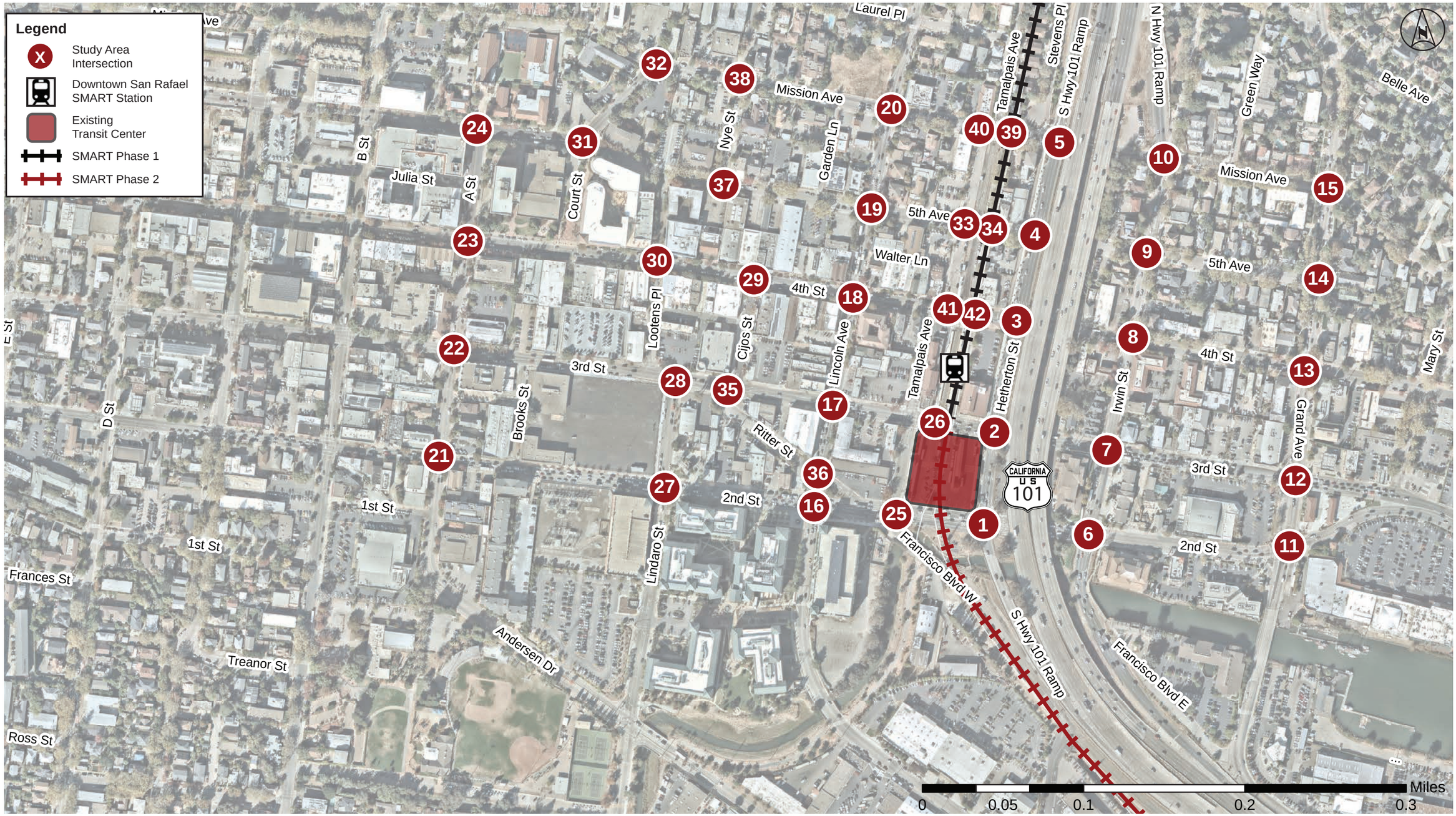

Figure 2-1: Study Intersections

Under CEQA, significance thresholds for transportation impacts are determined based on changes in vehicle miles traveled (VMT) resulting from the Project. As a transit-supportive project, this Project by nature does not generate any new trips and thus does not increase VMT as a result of new trips.

Localized traffic effects resulting from the minor roadway network changes, and changes to bus circulation patterns, were analyzed and are discussed in this report, but they are assumed to result in negligible VMT effects. As a result, this report largely serves to document an understanding of the Project's localized effects on traffic and circulation. The project does not increase VMT and thus does not result in any significant traffic impacts.

2.7 Transit

The Project includes implementation of a new transit center that will benefit riders by providing enhanced amenities, including waiting areas, customer service, lighting, and public spaces. Each transit center is designed with straight bus bay curbs which provide flexibility for future changes in transit fleet composition, such as larger articulated buses or smaller microtransit vehicles. The Project is also intended to improve bus operations by improving operational flexibility, thereby improving functional capacity. By relocating the transit center, bus route alignments will need to change to serve the new location. Modified bus route alignments were developed for each project alternative and included in the respective VISSIM models.

Transit service for existing conditions reflects service deployed prior to impacts from the COVID-19 pandemic. Transit service for Year 2040 baseline conditions reflects the same level of transit service, with modifications to bus route alignments to reflect planned roadway network changes unrelated to the Project. While it is likely that transit services will change between Year 2020 and Year 2040, the nature of those changes is not known and cannot be reasonably foreseen. Therefore, the Year 2040 scenario reflects current transit service levels on top of future traffic volumes and roadway network.

The transit analysis documented in this report primarily focuses on a quantitative analysis of the effects of each alternative on bus circulation time and reliability. These were determined through the modeling of alternatives in VISSIM. Bus circulation was quantified based on the total circulation time of individual bus routes traveling through the microsimulation model for each peak hour; the estimated circulation time for each route was determined by taking the average circulation time of 10 runs of the model.

2.8 Bicycle and Pedestrian Activity

The effects of the Project on bicycle and pedestrian activity were evaluated though a combination of qualitative and quantitative means. Existing bicycle and pedestrian volumes were collected for existing conditions; Year 2040 pedestrian volumes were projected based on the same quadrant-based annual growth rates derived from the TAM travel-demand model that were applied to vehicle volumes.

Pedestrian activity in the vicinity of transit center was re-routed for each of the build alternatives based on existing pedestrian patterns and modified pedestrian routes with each respective potential new transit center location. Pedestrian trips were assumed to continue to the same destinations as they do today and were re-routed accordingly. For example, existing pedestrian patterns indicate the strongest demand for pedestrian movements from the transit center to/from Downtown San Rafael to the north of 3rd Street. With each of the build alternatives, this existing demand for crossing 3rd Street was shifted north of 3rd Street and pedestrian volumes adjusted accordingly.

The alternatives were evaluated against several criteria relating to pedestrian and bicycle activity, including:

- Connectivity to downtown
- Connectivity to local destinations
- Pedestrian conflicts on site periphery and pedestrian paths of travel
- Pedestrian connectivity within the transit center
- Pedestrian connectivity between SMART and buses

2.9 Parking

The build alternatives' effects on public parking are limited to the following:

- Loss of on-street public parking as a result of the transit center site utilizing space that is currently used for public on-street parking, or the addition of new on-street parking
- Loss of off-street public parking as a result of the transit center site utilizing space that is currently used for public parking

The analysis in this report identifies the quantity of parking spaces affected.

3.0 Transit Conditions

3.1 Existing Transit Service

At the time of the existing conditions analysis period, the transit center was serviced by GGT, Marin Transit, SMART, Sonoma County Transit, Sonoma County Airport Express, and Greyhound. The transit center has 17 bus bays on-site with amenities including bus shelters with benches and trash receptacles, wayfinding, driver facilities, customer service kiosks, retail space, and real-time arrival and departure displays. Although most bus bays are located off-street, there are on-street bus bays located on Hetherton Street. Pick-up/drop-off space is located on Tamalpais Avenue. Prior to the extension of SMART to Larkspur, the transit center included space for taxis off-street. Taxis were relocated to East Tamalpais Avenue with the SMART Larkspur extension project.

The analysis described in this report is based on existing transit conditions before the COVID-19 pandemic. Existing bus routing at the transit center is shown in Figure 3-1 and reflects conditions prior to March 2020. Since the pandemic, some services, such as the airport shuttles and Sonoma County Transit, have temporarily halted service to the transit center.

Golden Gate Transit

GGT primarily serves Marin and Sonoma counties, and also provides commute service to San Francisco and Contra Costa County. GGT provides service to SRTC through the following routes: Route 27, Route 30, Route 40/40X, Route 70, and Route 101. Figure 3-2 shows the GGT service map for Marin County.

Marin Transit

Marin Transit primarily serves Marin County and provides service to SRTC through the following routes: Route 17, Route 22, Route 23/23X, Route 29, Route 35, Route 36, Route 49, Route 68, Route 71/71X, Route 122, Route 125, Route 145, Route 228, Route 233, Route 245, Route 257. Figure 3-3 shows the Marin Transit service map. They also offer a microtransit service, Marin Transit Connect, which is an on-demand service that operates in a select service area of about 2.5 miles from SMART stations in Marin County. There are additional areas of coverage, all of which can be accessed through the Uber app.

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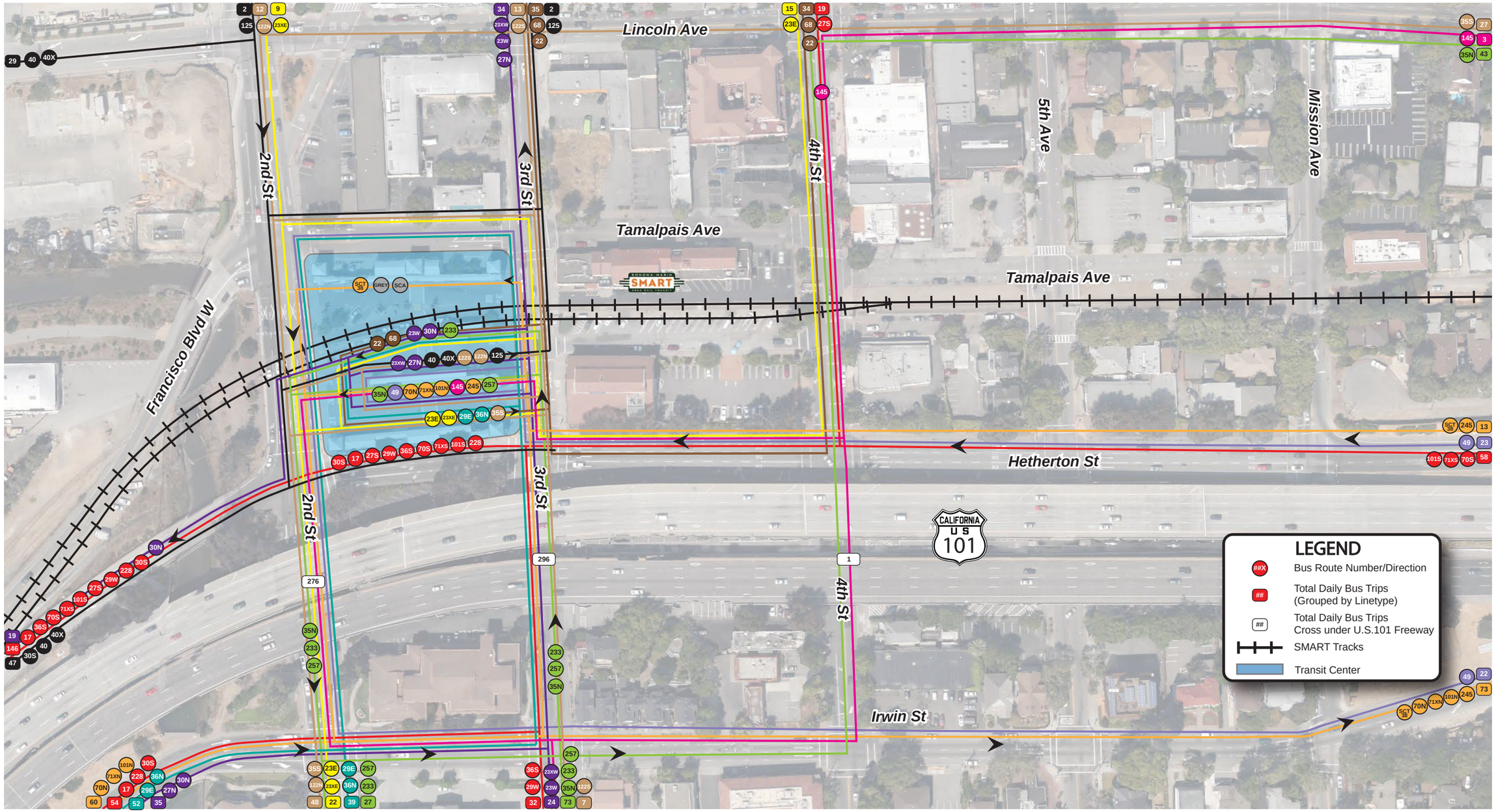

Figure 3-1: Existing SRTC Bus Routing

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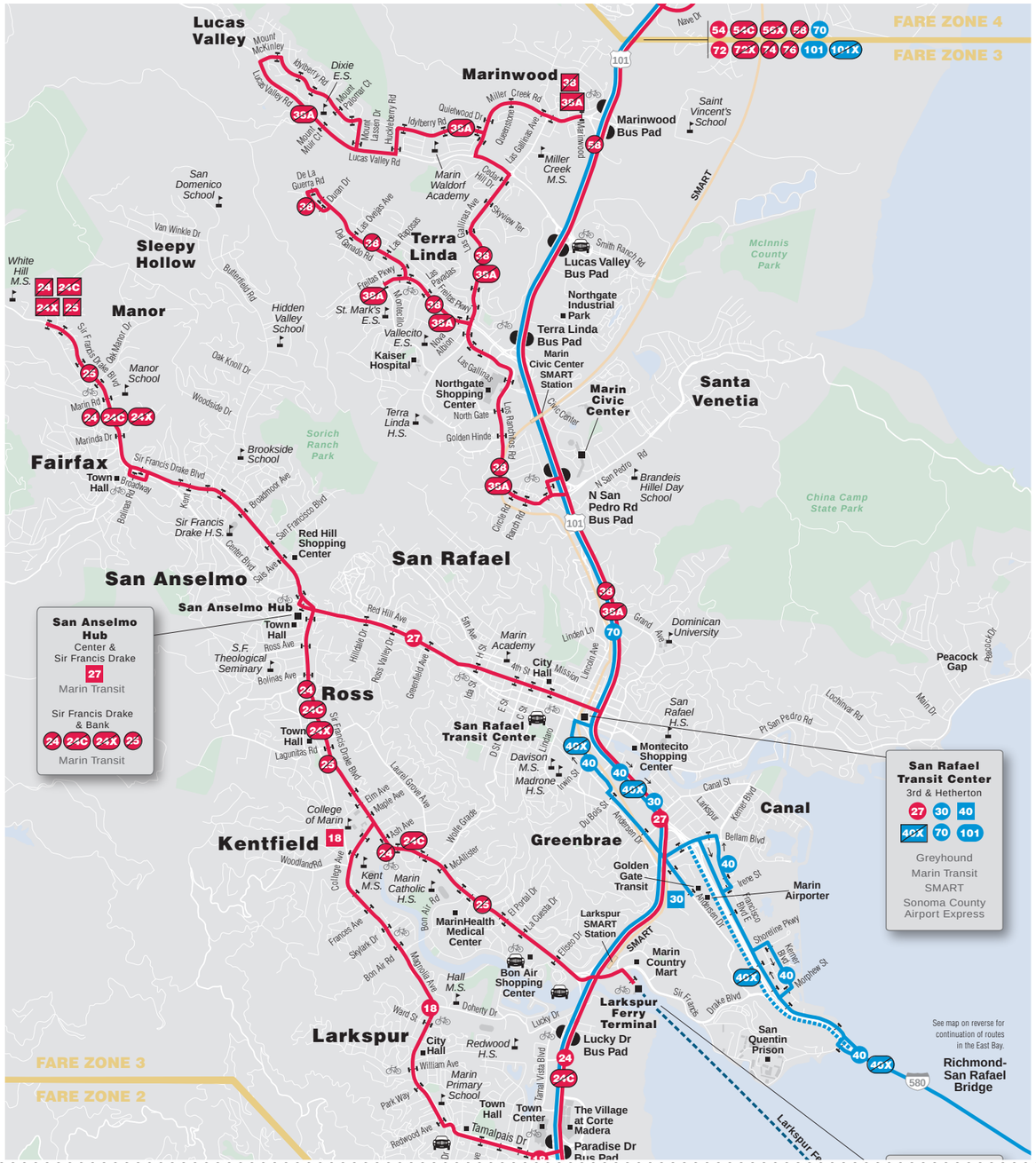
- Route Temporarily Suspended (54C)
  Updated schedules at goldengate.org
- Commute Routes (54)
- Regional Routes (70)
- Limited Service
- Bus Route Number (70, 54)
- Bus Route Terminus (70, 54)
- Ferry Routes
- Other Ferry Routes
- Bus Stop
- Bus Pad
- Park & Ride
- Bike Rack
- Fare Zone Boundary

rev 200913

Novato
Redwood & Grant
Transfer Point

511 Call 511 toll free for trip-planning assistance



Source: Golden Gate Transit

Figure 3-2: Golden Gate Transit System

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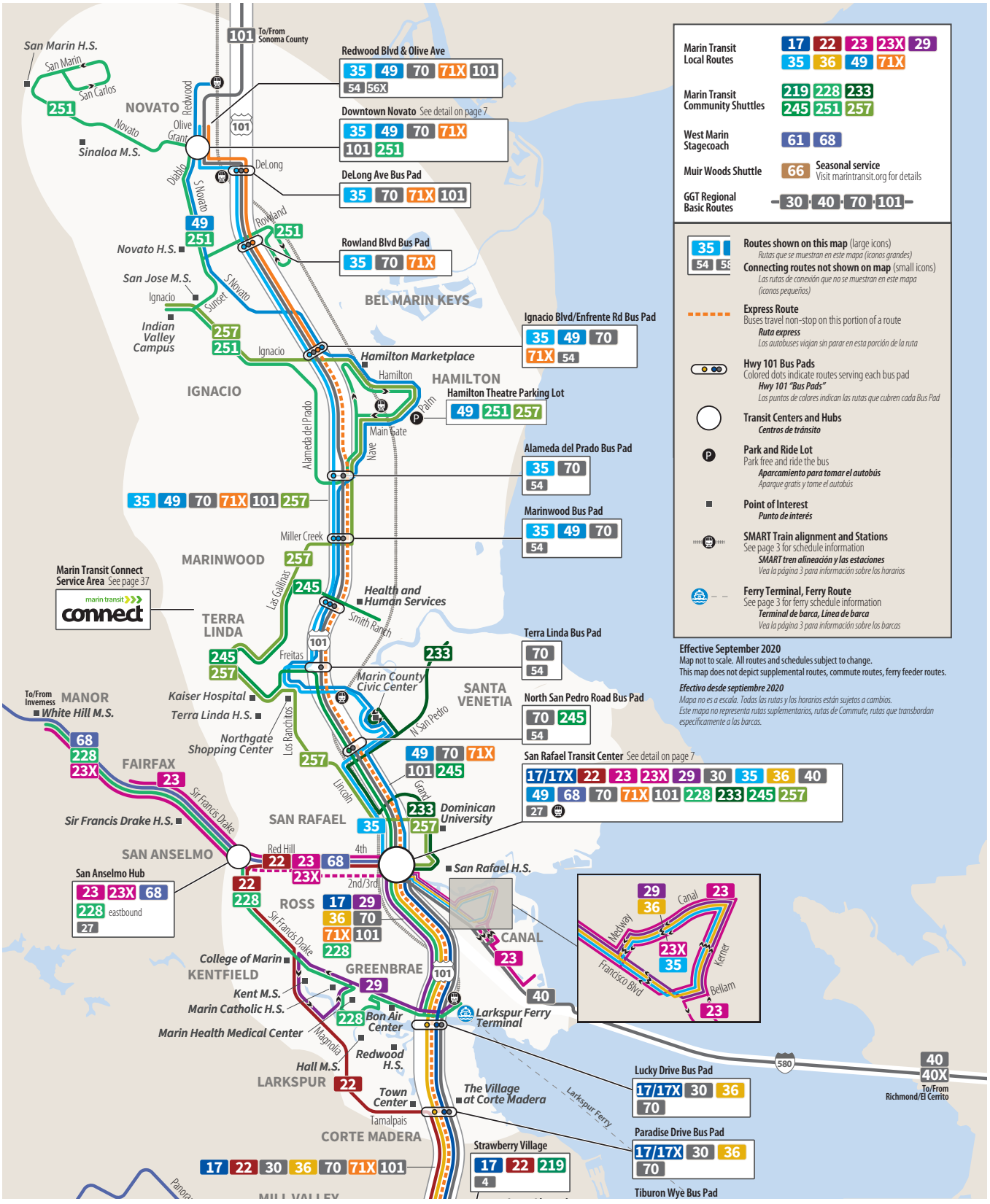
San Marin H.S.
San Marin
San Carlos
251
NOVATO
Redwood
Olive
Grant
Novato
Sinaloa M.S.
101
To/From Sonoma County
Redwood Blvd & Olive Ave
35 49 70 71X 101
54 56X
Downtown Novato See detail on page 7
35 49 70 71X
101 251
DeLong
DeLong Ave Bus Pad
35 70 71X 101
Diablo
S Novato
Rowland
49
251
Novato H.S.
Rowland Blvd Bus Pad
35 70 71X
San Jose M.S.
Ignacio
Sunset
Indian Valley Campus
257
251
BEL MARIN KEYS
Ignacio Blvd/Enfrente Rd Bus Pad
35 49 70
71X 54
IGNACIO
Ignacio
Hamilton Marketplace
Hamilton
HAMILTON
Hamilton Theatre Parking Lot
49 251 257
Palm
Main Gate
Nave
Alameda del Prado
Alameda del Prado Bus Pad
35 70
54
35 49 70 71X 101 257
Marinwood Bus Pad
35 49 70
54
Miller Creek
MARINWOOD
257
Marin Transit Connect Service Area See page 37
marin transit connect
Las Gallinas
245
Health and Human Services
Smith Ranch
TERRA LINDA
101
Freitas
245
257
233
Terra Linda Bus Pad
70
54
Marin County Civic Center
SANTA VENETIA
North San Pedro Road Bus Pad
70 245
54
To/From Inverness
MANOR
White Hill M.S.
Kaiser Hospital
Terra Linda H.S.
Northgate Shopping Center
Los Ranchitos
N San Pedro
257
49 70 71X
101 245
San Rafael Transit Center See detail on page 7
17/17X 22 23 23X 29 30 35 36 40
49 68 70 71X 101 228 233 245 257
27
68
228
23X
FAIRFAX
23
Sir Francis Drake
Sir Francis Drake H.S.
SAN RAFAEL
35
257
Dominican University
Lincoln
Grand
SAN ANSELMO
Red Hill
4th
22 23 68
23X
San Rafael H.S.
San Anselmo Hub
23 23X 68
228 eastbound
27
22
228
2nd/3rd
ROSS
17 29
36 70
71X 101
228
CANAL
23
40
College of Marin
KENTFIELD
GREENBRAE
101
29
Kent M.S.
Marin Catholic H.S.
228
Bon Air Center
Larkspur Ferry Terminal
Marin Health Medical Center
Magnolia
Redwood H.S.
Hall M.S.
LARKSPUR
22
Town Center
The Village at Corte Madera
Tamalpais
CORTE MADERA
Lucky Drive Bus Pad
17/17X 30 36
70
Paradise Drive Bus Pad
17/17X 30 36
70
Strawberry Village
17 22 219
4
17 22 30 36 70 71X 101
Tiburon Wye Bus Pad
29
36
Canal
23
Medway
23X
35
Kerner
Francisco Blvd
Bellam
23
580
40
40X
To/From Richmond/El Cerrito
Marin Transit Local Routes
17 22 23 23X 29
35 36 49 71X
Marin Transit Community Shuttles
219 228 233
245 251 257
West Marin Stagecoach
61 68
Muir Woods Shuttle
66
Seasonal service
Visit marintransit.org for details
GGT Regional Basic Routes
30 40 70 101
Routes shown on this map (large icons)
Rutas que se muestran en este mapa (iconos grandes)
Connecting routes not shown on map (small icons)
Las rutas de conexión que no se muestran en este mapa (iconos pequeños)
Express Route
Buses travel non-stop on this portion of a route
Ruta express
Los autobuses viajan sin parar en esta porción de la ruta
Hwy 101 Bus Pads
Colored dots indicate routes serving each bus pad
Hwy 101 "Bus Pads"
Los puntos de colores indican las rutas que cubren cada Bus Pad
Transit Centers and Hubs
Centros de tránsito
Park and Ride Lot
Park free and ride the bus
Aparcamiento para tomar el autobús
Aparque gratis y tome el autobús
Point of Interest
Punto de interés
SMART Train alignment and Stations
See page 3 for schedule information
SMART tren alineación y las estaciones
Vea la página 3 para información sobre los horarios
Ferry Terminal, Ferry Route
See page 3 for ferry schedule information
Terminal de barca, Línea de barca
Vea la página 3 para información sobre los barcas
Effective September 2020
Map not to scale. All routes and schedules subject to change.
This map does not depict supplemental routes, commute routes, ferry feeder routes.
Efectivo desde septiembre 2020
Mapa no es a escala. Todas las rutas y los horarios están sujetos a cambios.
Este mapa no representa rutas suplementarios, rutas de Commute, rutas que transbordan específicamente a las barcas.

SMART

SMART is a passenger-rail service that provides service in Marin and Sonoma County. The San Rafael SMART station is located at 3rd Street between West and East Tamalpais Avenue. This stop serves as a transfer point for bus riders at SRTC. SMART service terminates to the south near the Larkspur Ferry Terminal and to the north at Sonoma County Airport. Figure 3-4 shows the existing and planned SMART system map.

Figure 3-4: SMART System Map

Sonoma County Transit

Sonoma County Transit provides transit locally within Sonoma County, and also provides select routes connecting to regional destinations. The agency provided one route (Route 38) which terminated at SRTC; this route has been suspended during the COVID-19 pandemic and Sonoma County Transit has yet to establish a reopening date.

Sonoma County Airport Express

Sonoma County Airport Express provides scheduled transportation from Sonoma County to San Francisco International Airport (SFO) and Oakland International Airport (OAK). The airport express has scheduled stops at SRTC.

Greyhound

Greyhound is an intercity bus carrier serving destinations nationwide throughout the United States. Currently, Greyhound stops at SRTC twice a day.

Boardings and Transfer Activity

A summary of daily boardings GGT and Marin Transit services at SRTC is provided in Table 3-1. The transit center experiences 4,440 daily boardings on weekdays, not including ridership on airport shuttles, Greyhound buses, Sonoma County Transit Route 38, or SMART. Also not included in the table are taxis or subsidized TNC trips through the Marin Connect program. The busiest transfer activity at the transit center occurs between Marin Transit Routes 35 and 36. GGT Routes 40, 70, and 101 and Marin Transit Route 17 also have strong transfer activity at the transit center.

Table 3-1: Daily San Rafael Transit Center Golden Gate Transit and Marin Transit Bus Boardings

Route	Average Daily Boardings
17	384
22	192
23	234
23X	43
27	86
29	140
30	181
31	18
35	835
36	515
40	366
44	7
49	204
68	39
70	336
71X	167
101	341
122	47
125	3
145	45
228	79
233	34
245	79
257	65
Total	**4,440**

Source: Marin Transit and Golden Gate Transit, 2017

Figure 3-5 provides a summary of transfer activity that occurs at the SRTC. The analysis found that on a daily basis, 35 percent of daily bus boardings at the transit center are GGT/Marin Transit transfers. This percentage is based only on transfers that can be tracked through fares; this includes either recorded uses of paper transfer tickets, or transfers recorded in the Clipper system. Riders not utilizing transfer tickets or Clipper to make transfer movements are not captured in this analysis.

The largest driver of transfer activity is transfers between east-west routes and north-south bus routes providing service along US 101. Route 35 is the greatest generator of transfer activity, accounting for 569 transfers to or from that route. Transfer activity at the transit center peaks between 4 p.m. and 5 p.m., with 167 transfers occurring during that hour alone. Morning peak activity occurs between 7 a.m. and 9 a.m., with an average of 136 transfers occurring per hour during that period.

Figure 3-6 shows route-to-route transfer activity at the transit center. The high level of transfers suggests the need to ensure that the transit center facilitates this activity. Strong transfer pairs should be located near each other to minimize transfer times. The transit center operates on a pulse system, with multiple routes having coordinated arrival and departure times within a 5-minute pulse period.

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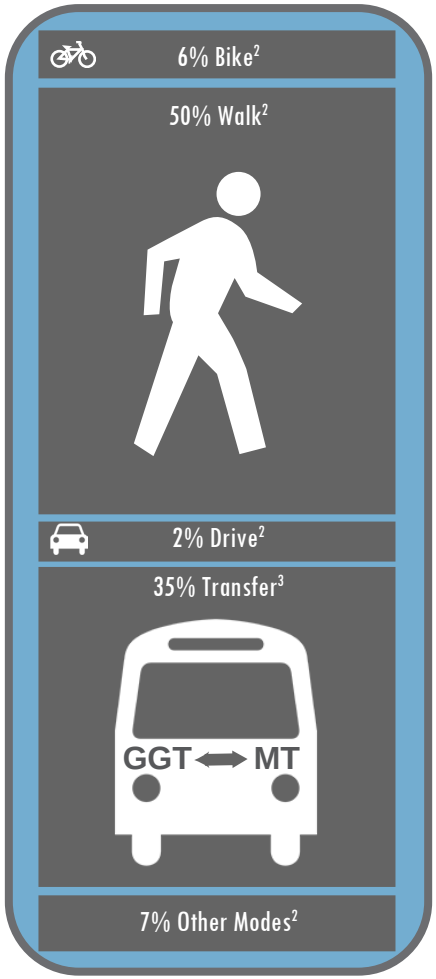
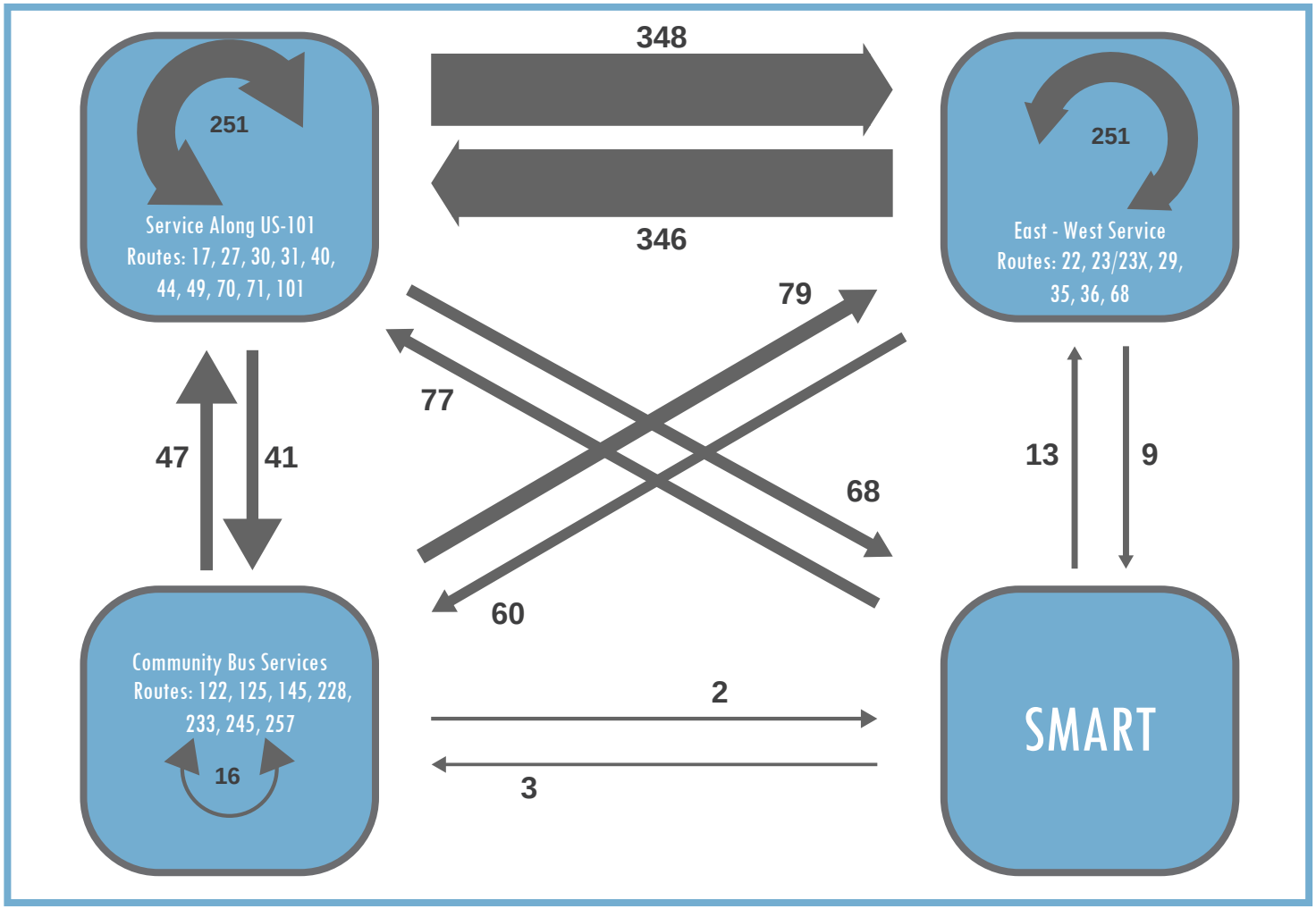
Mode of Access for GGT and MT Bus Boardings at SRTC

Average Daily Boardings: 4,440 Passengers[1]



GGT/MT/SCT/SMART Transfer Activity

Average Daily Transfer Activity - 1,612 Passengers[3]



1 - Golden Gate Transit Ridership from 2017 and Marin Transit Ridership from 2017

2 - Mode splits based on on-board surveys provided by Marin Transit (2017) and Golden Gate Transit (2015)

3 - Golden Gate Transit GFI, Marin Transit GFI, and MTC Clipper Data (each data source from October/November 2017)

2017 Average Weekday Transfers Between Transit Routes Serving the San Rafael Transit Center

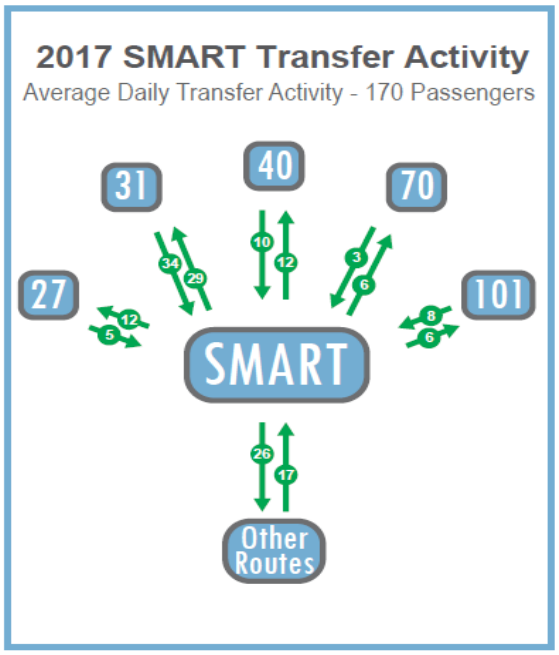
Transfer Issued	Transfer Received																								Total
	17	22	23	27	29	30	31	35	36	40	44	49	68	70	71	101	122	125	145	228	233	245	257	38	SMART	
17	4.8	3.1	2.7	0.8	2.3	5.7	0.0	34.1	13.9	9.0	0.0	2.1	0.9	8.6	2.8	2.4	0.5	0.0	0.0	2.2	1.6	0.6	2.6	0.0	2.8	**103**
22	5.0	5.2	5.5	1.4	4.1	2.6	0.1	20.2	5.0	7.2	0.0	2.4	1.8	7.0	0.2	3.7	0.4	0.3	0.0	3.0	1.2	2.0	0.8	0.0	3.3	**83**
23	8.3	2.1	2.9	2.3	0.8	0.6	0.0	11.9	12.0	4.9	0.2	6.3	1.9	5.7	0.8	16.9	0.5	0.2	0.3	3.1	0.5	0.8	0.9	0.0	1.0	**85**
27	0.4	1.5	2.4	0.3	0.8	0.6	0.0	5.6	4.3	1.7	0.1	2.4	0.9	2.1	0.9	1.5	0.1	0.1	0.0	0.6	0.7	0.2	0.2	0.3	5.5	**33**
29	1.8	0.3	0.6	0.1	0.1	3.0	0.1	3.0	1.6	0.4	0.1	0.4	0.0	1.6	0.2	1.0	0.0	0.0	0.1	0.3	0.2	0.9	0.1	0.0	0.6	**16**
30	2.3	2.2	2.5	0.4	0.6	2.4	0.0	27.8	6.8	5.3	0.0	1.4	0.9	5.2	2.3	2.4	0.1	0.0	0.0	0.4	0.2	0.2	0.4	0.0	3.0	**67**
31	0.0	0.1	0.2	0.1	0.0	0.1	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	34.2	**35**
35	43.4	11.3	14.9	6.0	4.1	35.1	0.2	19.6	25.4	10.0	0.1	11.9	4.4	46.4	1.3	11.8	1.4	0.1	1.5	6.0	5.4	5.0	6.6	0.0	0.4	**272**
36	24.7	10.7	18.6	2.5	2.2	6.1	0.0	31.9	10.4	6.8	0.3	11.0	2.5	14.5	3.5	15.7	2.2	0.1	3.9	2.6	1.5	5.3	0.1	0.0	3.4	**181**
40	11.1	4.4	4.3	0.5	0.6	3.5	0.0	12.2	4.9	2.0	0.1	6.4	2.1	12.2	2.9	6.5	0.9	0.1	0.1	1.9	0.5	1.7	1.9	0.0	10.0	**91**
44	0.1	0.1	1.0	0.0	0.1	0.3	0.0	0.4	0.9	0.0	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.1	**4**
49	5.7	1.3	13.3	1.6	2.1	2.1	0.0	14.8	23.6	7.6	0.1	5.0	1.4	4.3	1.0	5.4	0.7	0.0	0.1	1.9	3.0	0.8	1.6	0.0	0.2	**97**
68	0.9	0.7	2.4	0.5	0.4	1.4	0.0	6.8	4.1	2.9	0.0	1.1	1.7	2.0	0.7	1.2	0.3	0.1	0.0	1.1	0.5	0.6	0.0	0.0	0.1	**29**
70	16.2	6.5	4.4	1.6	5.1	3.2	0.1	44.0	9.2	9.7	0.0	4.9	1.1	3.6	0.5	8.2	0.7	0.1	0.0	2.3	1.5	2.4	0.7	0.0	3.3	**129**
71	1.2	1.1	1.5	1.3	0.7	0.2	0.1	2.9	5.6	2.4	0.0	1.1	0.2	1.6	0.1	1.4	0.1	0.0	0.0	0.2	0.1	0.2	0.2	0.0	0.6	**23**
101	8.4	3.3	19.3	1.6	3.0	1.7	0.1	19.5	16.5	7.8	0.2	8.2	1.8	12.7	1.8	4.4	1.0	0.1	0.1	2.8	0.7	0.8	2.0	0.1	8.0	**126**
122	0.2	0.1	0.3	0.1	0.0	0.5	0.0	2.5	0.8	0.5	0.0	0.5	0.4	1.1	0.2	0.4	0.1	0.0	0.1	0.4	0.1	0.1	0.2	0.0	0.0	**9**
125	0.1	0.1	0.3	0.0	0.1	0.1	0.0	0.3	0.2	0.4	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	**2**
145	0.1	0.0	2.0	0.0	0.1	0.0	0.0	1.9	2.4	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	1.1	0.1	0.0	0.0	0.0	**8**
228	1.5	1.0	8.3	0.4	0.8	0.3	0.0	7.4	2.1	0.9	0.0	0.6	1.4	1.7	0.9	0.2	1.4	0.0	0.0	1.9	0.4	0.2	0.6	0.0	1.1	**33**
233	2.5	1.0	1.0	0.7	1.3	2.6	0.0	9.0	0.8	2.2	0.1	1.0	0.3	1.6	0.1	0.8	0.1	0.0	0.0	0.3	0.5	0.7	0.2	0.0	0.1	**27**
245	1.5	1.0	2.9	0.8	2.3	3.2	0.0	7.0	3.5	2.1	0.1	0.4	0.3	0.7	0.1	2.9	0.8	0.0	0.0	0.5	1.6	1.4	0.2	0.0	0.2	**33**
257	4.6	0.5	0.7	0.6	0.4	0.1	0.0	11.1	3.1	2.0	0.0	2.2	0.3	2.6	0.4	0.2	0.4	0.0	0.0	0.7	0.3	0.9	1.1	0.0	0.2	**33**
38	0.0	0.0	0.0	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	**1**
SMART	3.9	4.4	2.7	12.4	0.8	5.4	29.4	2.4	2.1	12.0	0.0	0.0	0.2	6.1	0.8	6.4	0.1	0.0	0.0	2.0	0.1	0.0	0.8	0.0	-	**92**
Total	**149**	**62**	**115**	**37**	**33**	**81**	**30**	**297**	**159**	**98**	**2**	**70**	**25**	**141**	**21**	**94**	**12**	**1**	**6**	**34**	**22**	**25**	**21**	**1**	**78**	**1,612**

Key Transfer Route Pairs (Top 20)

Data Source: October 2017 GFI and Clipper Transaction Data. Some transfers shown may occur at locations other than the SRTC.

Figure 3-5 also identifies mode of access for SRTC passengers; on-board survey data was used to assess modes of access for passengers not making a transfer. With the limited number of surveys received, this information should be considered approximate. Half of all passengers boarding a bus at the transit center arrive by walking, making pedestrian connections to the transit center a critical element of a new transit center. Six percent of passengers access the transit center by bike; providing adequate bike parking and providing connectivity to the San Rafael bicycle network will support improved access for these riders.

Figure 3-7: SMART Transfer Activity *(Data Source: MTC Clipper Data)*



At the time of the transit ridership data collection for this project (2017), SMART had recently opened its initial operating segment and had yet to extend to Larkspur. At the time, the SMART system observed an average of 2,100 weekday boardings; detailed station-level ridership information was not made available. Anecdotally, the Downtown San Rafael station is known to be one of the busiest in the system. Figure 3-7 shows 2017 transfer activity between SMART and the top five bus routes with SMART transfer activity. It is anticipated that SMART transfer activity has changed since the period of data collection. With the extension of SMART to Larkspur, Route 31 was eliminated. It is expected that SMART transfer activity to other routes will increase as SMART ridership increases. At the time of the data collection, Route 31 was the route with the highest level of transfer activity with SMART at the SRTC.

3.2 Existing Transit Circulation – Baseline (No-Build Alternative)

Microsimulation results for bus circulation are shown in Table 3-2. Detailed results for bus circulation and reliability by route can be found in Appendix A. The appendix shows the average circulation time through the model for each route as well as the standard deviation of that circulation time. A greater standard deviation represents greater variability in the circulation time through the study area. Greater variability in bus circulation time causes additional operational challenges, often resulting in longer trip times, higher operating cost, and longer wait times for riders. Note that the circulation time does not represent the total travel time for all routes; rather, it represents the total travel time within the model study area only. It is not anticipated that the Project will result in changes to bus travel time outside of the model study area. These results serve as a baseline against which the build alternatives and Year 2040 conditions will be compared.

Table 3-2: Existing Baseline Conditions (No-Build) – Total Transit Circulation Time in Network

	Existing A.M.	Existing P.M.
Circulation Time	27,492 sec	25,739 sec

3.3 Existing Transit Circulation – Build Alternatives

The primary change from the existing No-Build Alternative to the existing build alternatives is simply the rerouting of bus alignments to reach the new location of the transit center. The assumed routing changes, and the measured effects on bus circulation, are detailed for each build alternative in their respective sections below. In addition, since roadway improvements constructed since the existing data collection period (January 2020) are reflected in the build models, results indicate the effects of those changes.

4th Street Gateway Alternative

A bay assignment and local routing scheme were developed for the 4th Street Gateway Alternative and are shown in Figure 3-8. Aside from these changes to route alignments, the only other factor affecting changes to bus circulation in this alternative is the redistribution of auto traffic. Auto traffic patterns are modified due to the removal of the right-turn movement from Hetherton Street to 4th Street and the removal of East Tamalpais Avenue between 3rd Street and 4th Street.

The total bus circulation times are shown in Table 3-3. More detailed results for the alternative can be found in Appendix A.

Table 3-3: 4th Street Gateway (Year 2020) – Total Transit Circulation Time in Network

Scenario	Existing A.M.	Existing P.M.	4th Street Gateway A.M.	4th Street Gateway P.M.
Circulation Time	27,492 sec	25,739 sec	25,550 sec	24,133 sec
% Change from Baseline			-7%	-6%

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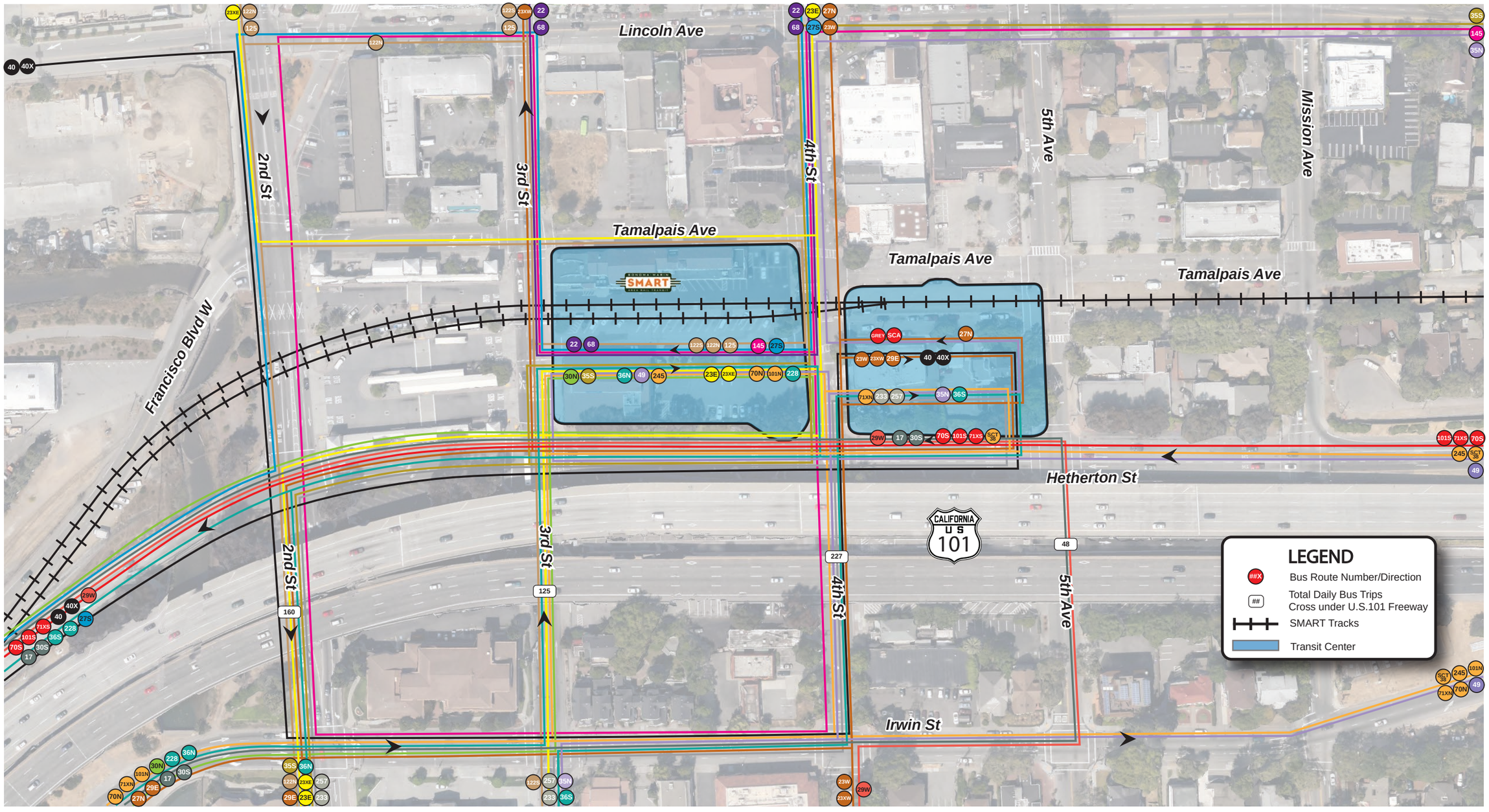

Figure 3-8: 4th Street Gateway - Existing Bus Routing

Under the Freeway Alternative

A bay assignment and local routing scheme were developed for the Under the Freeway Alternative and are shown in Figure 3-9. This alternative does not include any geometric changes to the network other than the location of transit center driveways.

The total bus circulation times are shown in Table 3-4. More detailed results for the alternative can be found in Appendix A.

Table 3-4: Under the Freeway (Year 2020) – Total Transit Circulation Time in Network

Scenario	Existing A.M.	Existing P.M.	Under the Freeway A.M.	Under the Freeway P.M.
Circulation Time	27,492 sec	25,739 sec	21,863 sec	22,487 sec
% Change from Baseline			-20%	-13%

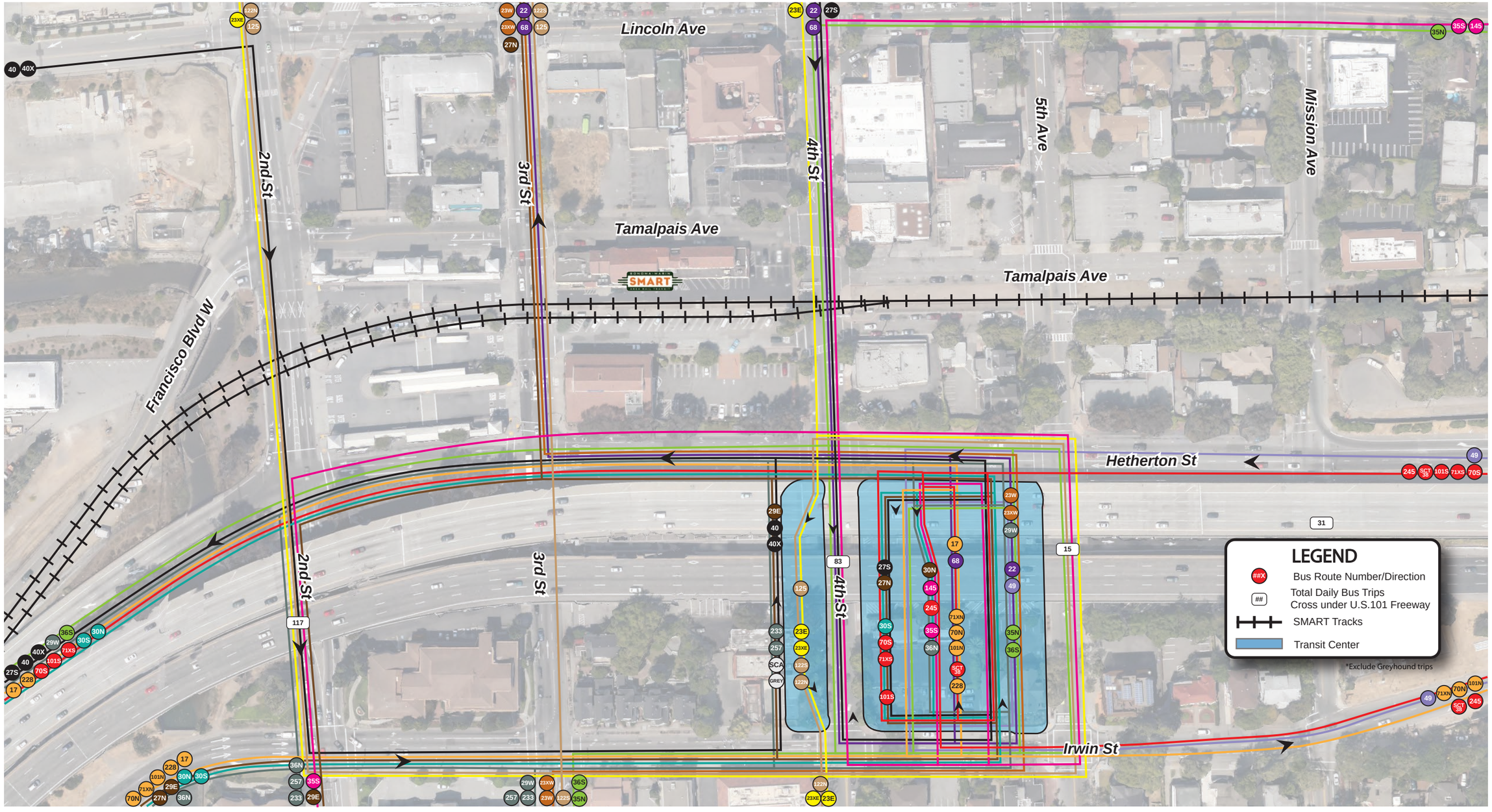

Figure 3-9: Under the Freeway - Existing Bus Routing

Whistlestop Block Alternatives

A bay assignment and local routing scheme were developed for the Whistlestop Block Alternatives and are shown in Figure 3-10. Aside from these changes to route alignments, other factors affecting changes to bus circulation in this alternative include the redistribution of existing auto traffic on West Tamalpais Avenue and East Tamalpais Avenue between 3rd Street and 4th Street and the provision of a second southbound right-turn lane on Hetherton Street to 3rd Street. Transit circulation between the Whistlestop Block Alternatives would be comparable, as the variant does not affect bay assignment, transit routing, or background traffic circulation. The location of the bus bays, transit-only driveways, and pedestrian crosswalks are identical, other than the shifted location of the bus-only West Tamalpais Avenue, between the two Whistlestop Block Alternatives.

The total bus circulation times are shown in Table 3-5. More detailed results for the alternative can be found in Appendix A.

Table 3-5: Whistlestop Block (Year 2020) – Total Transit Circulation Time in Network

Scenario	Existing A.M.	Existing P.M.	Whistlestop Block A.M.	Whistlestop Block P.M.
Circulation Time	27,492 sec	25,739 sec	23,664 sec	21,583 sec
% Change from Baseline			-14%	-16%

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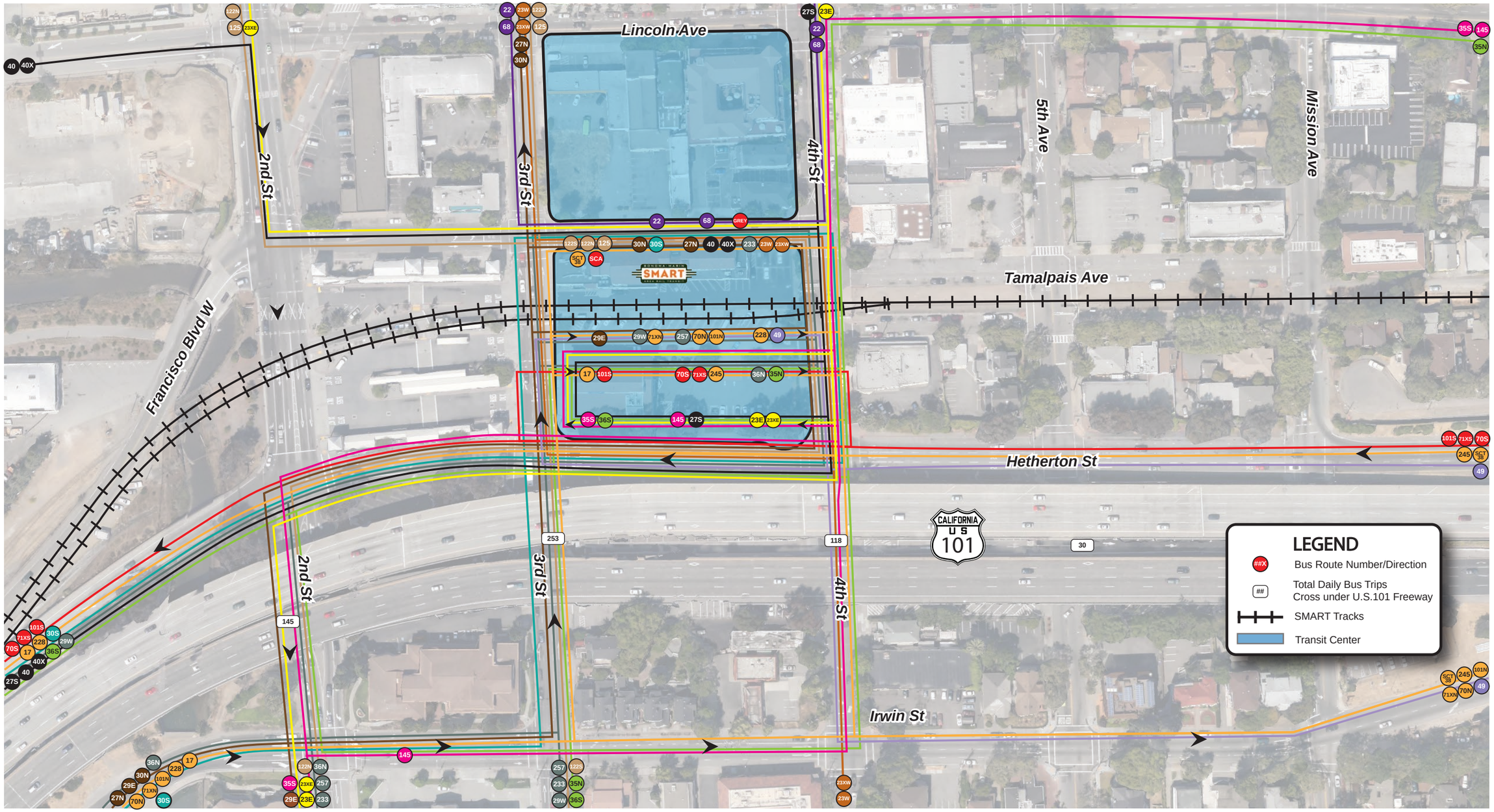

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Figure 3-10: Whistlestop Block - Existing Bus Routing

3.4 Baseline Year 2040 Transit Service (No-Build Alternative)

No changes to transit service levels were assumed between existing and Year 2040 transit service for the baseline and No-Build Alternative. The only effects on bus circulation are planned changes to the roadway network (detailed in the Vehicular Traffic section), and the projected growth in traffic volumes throughout the network.

The total bus circulation times are shown in Table 3-6. More detailed results for the alternative can be found in Appendix A.

Table 3-6: Year 2040 Baseline Conditions (No-Build) – Total Transit Circulation Time in Network

Scenario	Existing A.M.	Existing P.M.	Year 2040 A.M.	Year 2040 P.M.
Circulation Time	27,492 sec	25,739 sec	34,808 sec	26,856 sec
% Change from Baseline			+27%	+4%

3.5 Year 2040 Transit Service – Build Alternatives

Similar to the Existing build alternatives, the primary change from the Year 2040 No-Build Alternative to the Year 2040 build alternatives is simply the rerouting of bus alignments to reach the new location of the transit center. They also reflect changes to pedestrian volumes and specific geometric modifications noted with each alternative. The assumed routing changes under Year 2040 conditions, and the measured effects on bus circulation, are detailed for each build alternative in their respective sections below.

4th Street Gateway Alternative

A bay assignment and local routing scheme were developed for the 4th Street Gateway Alternative and are shown in Figure 3-11. The routing is similar to the Year 2020 routing, but with modifications to account for planned roadway network changes.

The total bus circulation times are shown in Table 3-7. In this scenario, a select number of individual model runs for the 4th Street Gateway Alternative resulted in network model gridlock due to extensive queueing at certain capacity-constrained locations spilling back and affecting upstream intersections. The a.m. model results reflect the gridlock caused in certain model runs that significantly affect the average results for this alternative. More detailed results for the alternative can be found in **Appendix A**.

Table 3-7: 4th Street Gateway (Year 2040) – Total Transit Circulation Time in Network

Scenario	Year 2040 A.M.	Year 2040 P.M.	Year 2040 4th Street Gateway A.M.	Year 2040 4th Street Gateway P.M.
Circulation Time	34,808 sec	26,856 sec	38,547[1] sec	24,416 sec
% Change from Baseline			+11%	-9%

[1] Does not reflect model runs that were gridlocked and thus did not output results. Actual circulation time may be higher.

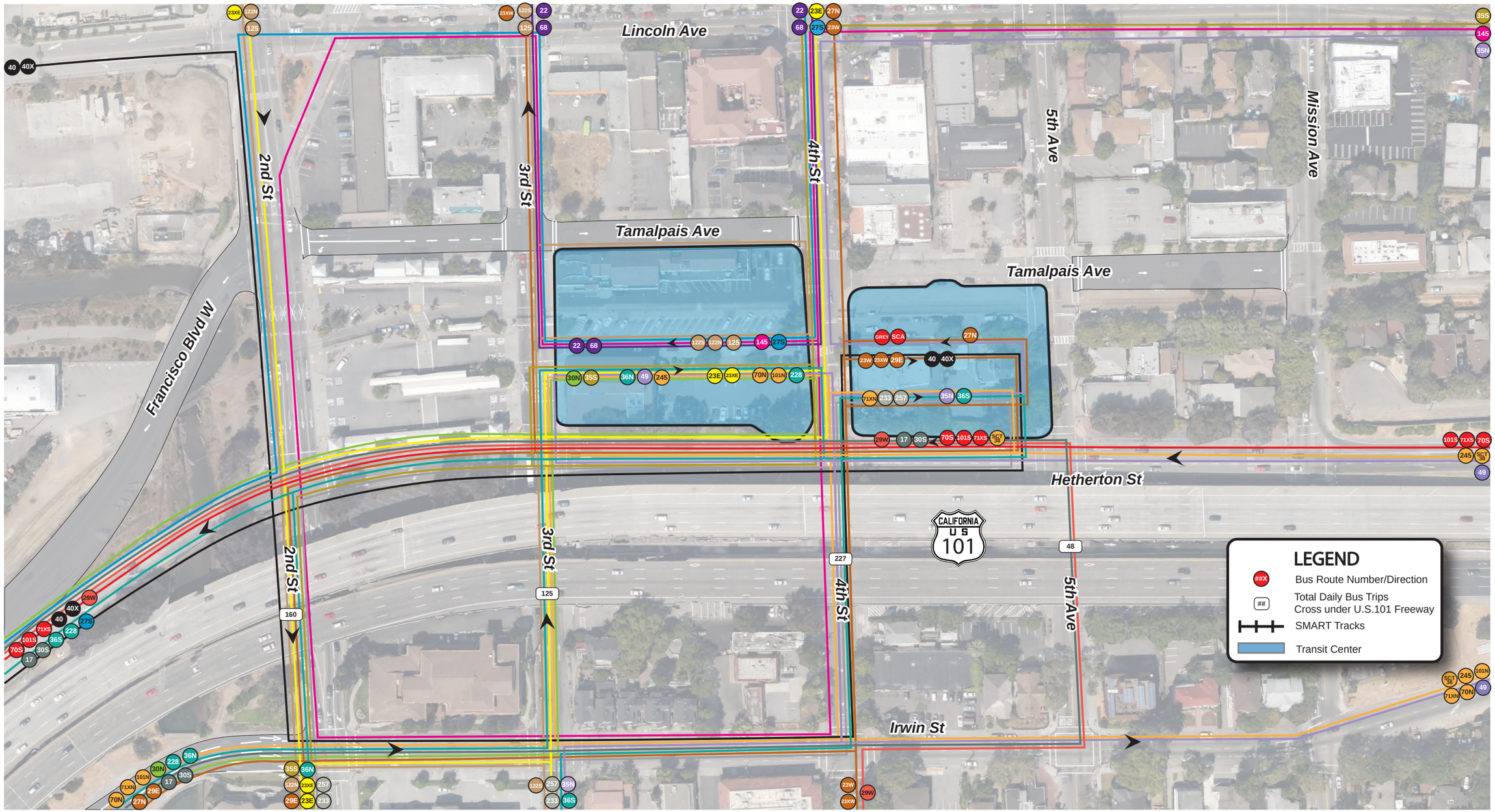

Figure 3-11: 4th Street Gateway - Year 2040 Bus Routing

Under the Freeway Alternative

A bay assignment and local routing scheme were developed for the Under the Freeway Alternative and are shown in Figure 3-12. The routing is similar to the Year 2020 routing, but with modifications to account for planned roadway network changes.

The total bus circulation times are shown in Table 3-8. More detailed results for the alternative can be found in Appendix A.

Table 3-8: Under the Freeway (Year 2040) – Total Transit Circulation Time in Network

Scenario	Year 2040 A.M.	Year 2040 P.M.	Year 2040 Under the Freeway A.M.	Year 2040 Under the Freeway P.M.
Circulation Time	34,808 sec	26,856 sec	29,300 sec	27,740 sec
% Change from Baseline			-16%	+3%

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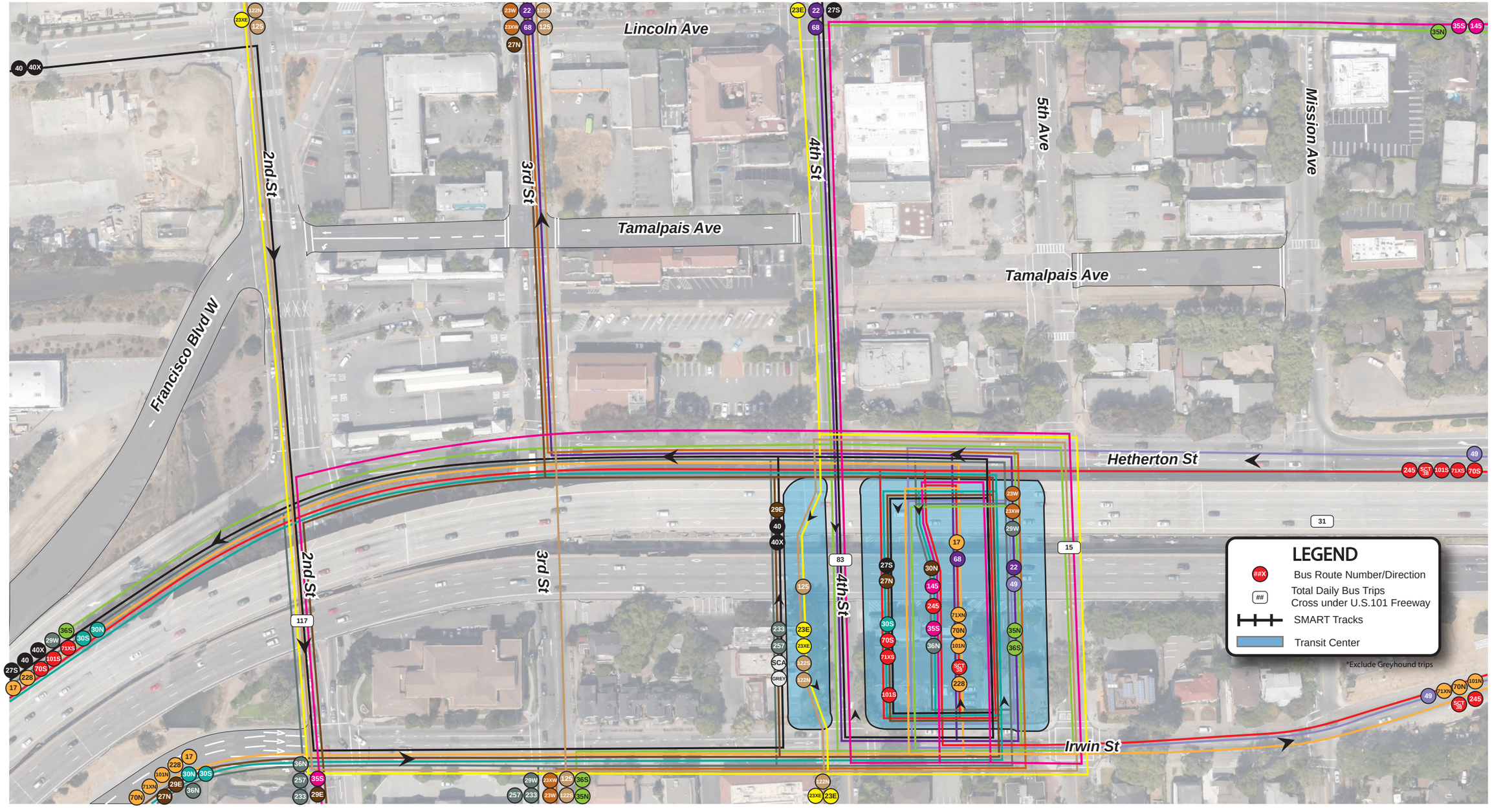

Figure 3-12: Under the Freeway - Year 2040 Bus Routing

Whistlestop Block Alternatives

A bay assignment and local routing scheme were developed for the Whistlestop Block Alternatives under Year 2040 conditions and are shown in Figure 3-13. The routing is similar to the Year 2020 routing, but with modifications to account for planned roadway network changes. With these Alternatives, the planned modification of Tamalpais Avenue to be one-way between 2nd and 4th Streets and the closure of Tamalpais Avenue between 4th Street and Fifth Avenue would be precluded. Tamalpais Avenue would operate as bus-only between 3rd and 4th Streets and as two-way traffic between 2nd and 3rd Streets and 4th Street and Fifth Avenue.

The total bus circulation times are shown in Table 3-9. More detailed results for the alternative can be found in Appendix A.

Table 3-9: Whistlestop Block (Year 2040) – Total Transit Circulation Time in Network

Scenario	Year 2040 A.M.	Year 2040 P.M.	Year 2040 Whistlestop Block A.M.	Year 2040 Whistlestop Block P.M.
Circulation Time	34,808 sec	26,856 sec	27,386 sec	23,056 sec
% Change from Baseline			-21%	-14%

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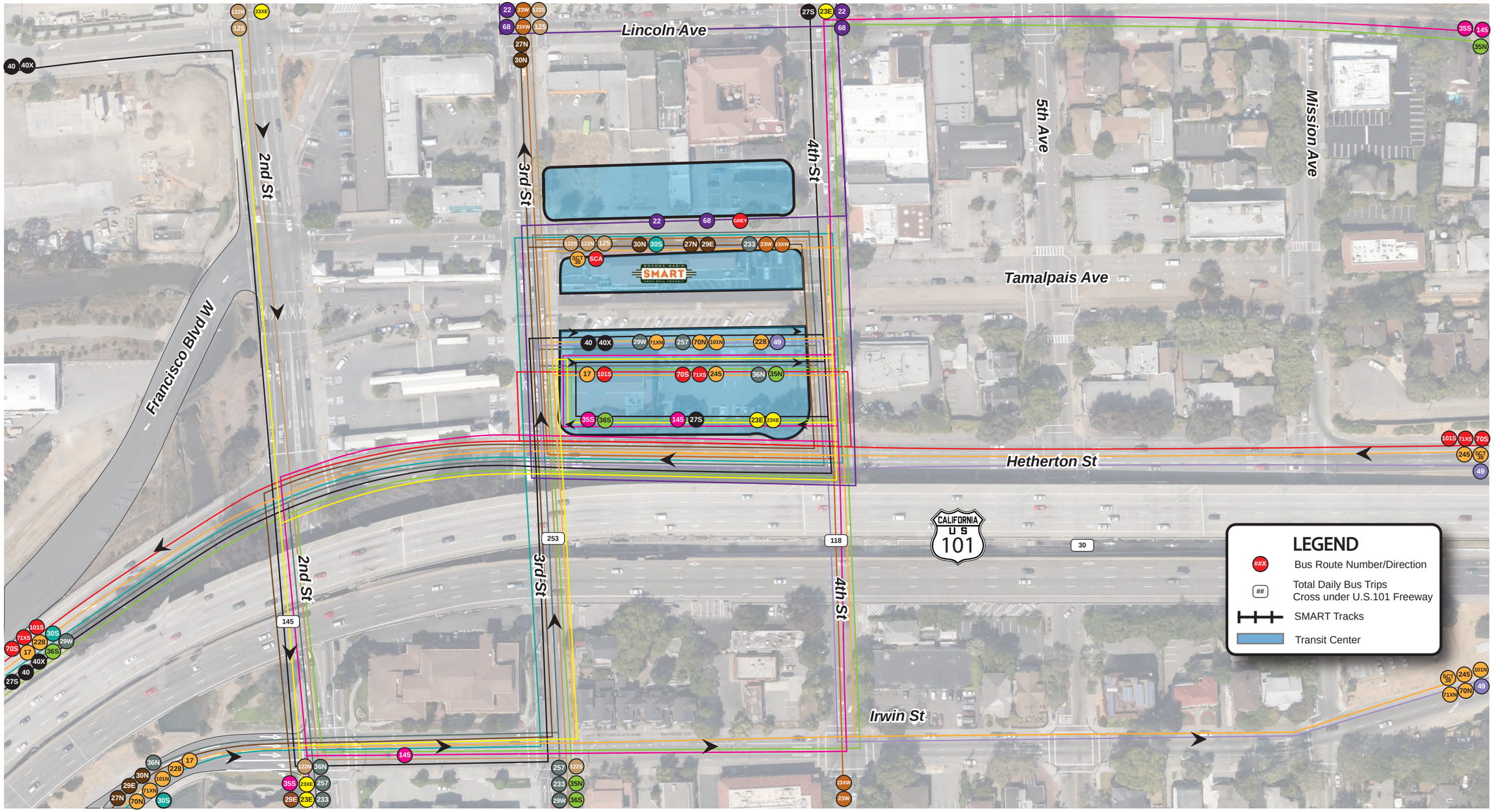

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Figure 3-13: Whistlestop Block - Year 2040 Bus Routing

3.6 Transit Service – Bus Circulation Analysis Summary

A summary of the total circulation time by all routes for each alternative is presented in Table 3-10 for Existing (Year 2020) conditions and Table 3-11 for Year 2040 conditions. The percent change for delay for each Build alternative compared to the No-Build Alternative is also presented.

Table 3-10: Total Circulation Time in Network – Existing (Year 2020) Conditions

Total Circulation Time by Routes		% Change
No-Build A.M. Peak Hour	27,492 sec	
No-Build P.M. Peak Hour	25,739 sec	
4th Street Gateway A.M. Peak Hour	25,550 sec	-7%
4th Street Gateway P.M. Peak Hour	24,133 sec	-6%
Under the Freeway A.M. Peak Hour	21,863 sec	-20%
Under the Freeway P.M. Peak Hour	22,487 sec	-13%
Whistlestop Block A.M. Peak Hour	23,664 sec	-14%
Whistlestop Block P.M. Peak Hour	21,583 sec	-16%

As shown in the table, in Year 2020 conditions, all build alternatives would result in a reduction in total circulation time relative to the No-Build Alternative. The Under the Freeway Alternative results in twenty percent reduction in transit travel time in the a.m. peak hour. The Whistlestop Block Alternatives results in a greater than ten percent reduction in transit travel time in both peak hours.

Table 3-11: Total Circulation Time in Network – Year 2040 Conditions

Total Circulation Time by Routes (s)		% Change
No-Build A.M. Peak Hour	34,808 sec	
No-Build P.M. Peak Hour	26,856 sec	
4th Street Gateway A.M. Peak Hour	38,547 sec	+11%
4th Street Gateway P.M. Peak Hour	24,416 sec	-9%
Under the Freeway A.M. Peak Hour	29,300 sec	-16%
Under the Freeway P.M. Peak Hour	27,740 sec	+3%
Whistlestop Block A.M. Peak Hour	27,386 sec	-21%
Whistlestop Block P.M. Peak Hour	23,056 sec	-14%

As shown in the table, in Year 2040 conditions, the Whistlestop Block Alternatives provide a greater than 10 percent reduction in transit travel time in both the a.m. and p.m. peak hours relative to the No-Build Alternative. The Under Freeway Alternative results in a decrease in circulation time in the a.m. peak hour and a slight increase in circulation time in the p.m. peak hour. This increase is the result of routing additional buses through heavily constrained intersections on 4th Street.

4.0 Vehicular Traffic

This section presents results of an assessment of potential impacts of the relocation of SRTC on vehicular traffic in the study area.

4.1 Existing Conditions (No-Build Alternative)

Traffic volumes in the study area were obtained from traffic counts conducted for the project in 2020 prior to the COVID-19 pandemic impacts. The volumes for both Existing (Year 2020) conditions can be found in Appendix B. Geometrics reflect conditions as of January 2020.

The results of the existing baseline (No-Build Alternative) analysis are presented in Table 4-1 and Table 4-2.

Table 4-1: Existing Baseline Conditions (No-Build) – Intersection Delay

		A.M. Peak Hour		P.M. Peak Hour	
ID	Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	2nd & Hetherton	17.1	B	18.2	B
2	3rd & Hetherton	24.6	C	32.5	C
3	4th & Hetherton	21.8	C	39.0	D
4	Fifth & Hetherton	16.7	B	18.5	B
5	Mission & Hetherton	26.4	C	26.7	C
6	2nd & Irwin	20.5	C	67.0	E
7	3rd & Irwin	19.3	B	33.5	C
8	4th & Irwin	24.2	C	23.3	C
9	Fifth & Irwin	13.2	B	10.5	B
10	Mission & Irwin	20.9	C	23.9	C
11	2nd & Grand	26.9	C	27.3	C
12	3rd & Grand	19.2	B	37.8	D
13	4th & Grand	36.5	D	32.9	C
14	Fifth & Grand	5.1	A	14.5	B
15	Mission & Grand	20.5	C	24.7	C
16	2nd & Lincoln	40.0	D	64.6	E
17	3rd & Lincoln	19.8	B	10.0	B
18	4th & Lincoln	27.5	C	20.7	C
19	Fifth & Lincoln	33.5	C	16.6	B
20	Mission & Lincoln	36.5	D	22.3	C
21	2nd & A	13.1	B	25.2	C
22	3rd & A	15.8	B	16.3	B
23	4th & A	14.0	B	16.8	B
24	Fifth & A	19.2	C	22.1	C
25	2nd & Tamalpais	20.8	C	32.5	C
26	3rd & Tamalpais	12.9	B	16.8	B
27	2nd & Lindaro	24.3	C	70.0	E
28	3rd & Lindaro	9.3	A	6.4	A
29	4th & Cijos	10.3	B	11.4	B
30	4th & Lootens	10.2	B	14.8	B
31	Fifth & Court	29.4	C	27.9	C
32	Mission & Court	11.0	B	4.8	A
33	Fifth & Tamalpais	6.6	A	6.5	A
34	Fifth & E Tamalpais	5.4	A	4.7	A
35	3rd & Ritter	3.1	A	2.1	A
36	Ritter & Lincoln	15.2	C	8.3	A
37	Fifth & Nye	4.7	A	2.5	A
38	Mission & Nye	5.4	A	2.3	A
39	Mission & E Tamalpais	4.6	A	4.1	A
40	Mission & Tamalpais	6.8	A	4.3	A
41	4th & Tamalpais	14.9	B	26.0	C
42	4th & E Tamalpais	7.3	A	9.7	A

Table 4-2: Existing Baseline Conditions (No-Build) – Corridor Travel Times

Route	A.M. Peak Hour	P.M. Peak Hour
3rd Street – Grand to A	03:47	04:01
2nd Street – A to Grand	03:41	05:08
4th Street WB – Grand to A	03:56	05:05
4th Street EB – A to Grand	04:06	05:07
Irwin Street – 101 to Mission	02:17	03:34
Hetherton Street – 101 to 2nd	02:05	02:41

Travel times provided in minutes:seconds format

4.2 Existing Conditions – Build Alternatives

4th Street Gateway Alternative

The following roadway geometric changes were associated specifically with the 4th Street Gateway Alternative.

- Hetherton Street and 3rd Street – Includes a second southbound right-turn lane
- Hetherton Street and 4th Street – Eliminates southbound right-turn movements
- East Tamalpais Avenue between 3rd Street and 4th Street – Roadway eliminated
- East Tamalpais Avenue between 4th Street and Fifth Avenue – Roadway eliminated

The closure of East Tamalpais Avenue between 3rd Street and Fifth Avenue resulted in a redistribution of vehicles. Southbound right-turn movements from Hetherton Street to 4th Street were diverted to similar right-turn movements from Hetherton Street to 3rd Street or Hetherton Street to Fifth Avenue. The vehicles are assumed to return to 4th Street via Lincoln Avenue or A Street.

In the Year 2020 analysis, all other intersections reflect geometrics as of January 2020.

In addition, buses were re-routed to the proposed bays with this alternative. New driveways are provided to access the proposed transit center. The existing eastbound left-turn from 4th Street to Irwin Street was also assumed to be converted from a permissive to a protected and permissive left-turn phase.

Intersection LOS and corridor travel time with this alternative is shown in Table 4-3 and Table 4-4, respectively.

Table 4-3: 4th Street Gateway (Year 2020) – Intersection Delay

		Existing Baseline				4th Street Gateway			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
ID	Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	2nd & Hetherton	17.1	B	18.2	B	19.5	B	17.4	B
2	3rd & Hetherton	24.6	C	32.5	C	29.9	C	34.5	C
3	4th & Hetherton	21.8	C	39.0	D	18.2	B	27.2	C
4	Fifth & Hetherton	16.7	B	18.5	B	22.2	C	14.6	B
5	Mission & Hetherton	26.4	C	26.7	C	31.7	C	26.8	C
6	2nd & Irwin	20.5	C	67.0	E	23.7	C	68.8	E
7	3rd & Irwin	19.3	B	33.5	C	21.4	C	32.9	C
8	4th & Irwin	24.2	C	23.3	C	23.5	C	15.7	B
9	Fifth & Irwin	13.2	B	10.5	B	14.0	B	11.0	B
10	Mission & Irwin	20.9	C	23.9	C	22.8	C	24.3	C
11	2nd & Grand	26.9	C	27.3	C	21.4	C	26.9	C
12	3rd & Grand	19.2	B	37.8	D	16.8	B	36.6	D
13	4th & Grand	36.5	D	32.9	C	27.4	C	29.8	C
14	Fifth & Grand	5.1	A	14.5	B	4.5	A	12.6	B
15	Mission & Grand	20.5	C	24.7	C	21.5	C	25.2	D
16	2nd & Lincoln	40.0	D	64.6	E	45.8	D	60.5	E
17	3rd & Lincoln	19.8	B	10.0	B	16.0	B	11.1	B
18	4th & Lincoln	27.5	C	20.7	C	26.9	C	14.3	B
19	Fifth & Lincoln	33.5	C	16.6	B	33.9	C	18.4	B
20	Mission & Lincoln	36.5	D	22.3	C	35.7	D	22.8	C
21	2nd & A	13.1	B	25.2	C	15.0	B	20.7	C
22	3rd & A	15.8	B	16.3	B	15.8	B	16.5	B
23	4th & A	14.0	B	16.8	B	12.5	B	14.8	B
24	Fifth & A	19.2	C	22.1	C	20.5	C	24.6	C
25	2nd & Tamalpais	20.8	C	32.5	C	22.8	C	31.6	C
26	3rd & Tamalpais	12.9	B	16.8	B	17.5	B	17.9	B
27	2nd & Lindaro	24.3	C	70.0	E	33.1	C	54.2	D
28	3rd & Lindaro	9.3	A	6.4	A	4.6	A	6.4	A
29	4th & Cijos	10.3	B	11.4	B	7.0	A	9.1	A
30	4th & Lootens	10.2	B	14.8	B	7.7	A	11.0	B
31	Fifth & Court	29.4	C	27.9	C	35.7	D	34.3	C
32	Mission & Court	11.0	B	4.8	A	14.2	B	7.3	A
33	Fifth & Tamalpais	6.6	A	6.5	A	6.2	A	5.5	A
34	Fifth & E Tamalpais	5.4	A	4.7	A	7.8	A	4.2	A
35	3rd & Ritter	3.1	A	2.1	A	1.3	A	2.2	A
36	Ritter & Lincoln	15.2	C	8.3	A	20.9	C	6.7	A
37	Fifth & Nye	4.7	A	2.5	A	3.8	A	4.2	A
38	Mission & Nye	5.4	A	2.3	A	7.5	A	3.1	A
39	Mission & E Tamalpais	4.6	A	4.1	A	5.5	A	3.9	A
40	Mission & Tamalpais	6.8	A	4.3	A	7.5	A	4.6	A
41	4th & Tamalpais	14.9	B	26.0	C	7.9	A	15.4	B
42	4th & E Tamalpais	7.3	A	9.7	A	2.4	A	3.0	A

As shown in the table, the 4th Street Gateway Alternative does not result in any additional intersections operating at LOS E or F. All intersections, except #6: 2nd Street and Irwin Street, operating at LOS E in the Existing Baseline scenario either improve in LOS or have a reduction in average delay.

Table 4-4: 4th Street Gateway (Year 2020) – Corridor Travel Times

Route	Existing Baseline		4th Street Gateway		Change from Baseline	
	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
3rd Street – Grand to A	03:47	04:01	03:40	04:08	-00:07	+00:07
2nd Street – A to Grand	03:41	05:08	04:04	04:46	+00:23	-00:22
4th Street WB – Grand to A	03:56	05:05	03:23	04:28	-00:33	-00:37
4th Street EB – A to Grand	04:06	05:07	03:04	03:39	-01:02	-01:28
Irwin Street – 101 to Mission	02:17	03:34	02:29	03:27	+00:12	-00:07
Hetherton Street – 101 to 2nd	02:05	02:41	02:17	02:24	+00:12	-00:17

Travel times provided in minutes:seconds format

As shown in the table, the alternative results in improvement in travel time along 4th Street, with a mix of changes in travel time on other corridors.

Under the Freeway Alternative

Buses were re-routed to the proposed bays with this alternative. New driveways are provided to access the proposed transit center. The eastbound left-turn from 4th Street to Irwin Street was also assumed to be converted from a permissive to a protected and permissive left-turn phase. This alternative does not include any other roadway geometry changes.

In the Year 2020 analysis, all intersections reflect geometrics as of January 2020. There were no roadway network changes associated with this alternative. Intersection LOS and corridor travel time with this alternative are shown in Table 4-5 and Table 4-6, respectively.

Table 4-5: Under the Freeway (Year 2020) – Intersection Delay

		Existing Baseline				Under the Freeway			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
ID	Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	2nd & Hetherton	17.1	B	18.2	B	17.6	B	17.7	B
2	3rd & Hetherton	24.6	C	32.5	C	25.5	C	28.4	C
3	4th & Hetherton	21.8	C	39.0	D	20.9	C	30.1	C
4	Fifth & Hetherton	16.7	B	18.5	B	16.4	B	14.2	B
5	Mission & Hetherton	26.4	C	26.7	C	25.3	C	25.5	C
6	2nd & Irwin	20.5	C	67.0	E	19.0	B	60.6	E
7	3rd & Irwin	19.3	B	33.5	C	18.0	B	30.6	C
8	4th & Irwin	24.2	C	23.3	C	21.4	C	17.1	B
9	Fifth & Irwin	13.2	B	10.5	B	10.1	B	10.2	B
10	Mission & Irwin	20.9	C	23.9	C	22.7	C	24.1	C
11	2nd & Grand	26.9	C	27.3	C	23.5	C	25.2	C
12	3rd & Grand	19.2	B	37.8	D	18.0	B	35.9	D
13	4th & Grand	36.5	D	32.9	C	32.4	C	27.5	C
14	Fifth & Grand	5.1	A	14.5	B	5.1	A	13.0	B
15	Mission & Grand	20.5	C	24.7	C	24.6	C	24.0	C
16	2nd & Lincoln	40.0	D	64.6	E	38.9	D	62.6	E
17	3rd & Lincoln	19.8	B	10.0	B	16.2	B	10.3	B
18	4th & Lincoln	27.5	C	20.7	C	20.9	C	16.0	B
19	Fifth & Lincoln	33.5	C	16.6	B	30.3	C	16.3	B
20	Mission & Lincoln	36.5	D	22.3	C	27.6	C	22.6	C
21	2nd & A	13.1	B	25.2	C	13.0	B	22.7	C
22	3rd & A	15.8	B	16.3	B	15.9	B	16.7	B
23	4th & A	14.0	B	16.8	B	13.5	B	16.4	B
24	Fifth & A	19.2	C	22.1	C	19.0	C	25.0	C
25	2nd & Tamalpais	20.8	C	32.5	C	21.0	C	31.7	C
26	3rd & Tamalpais	12.9	B	16.8	B	15.3	B	16.7	B
27	2nd & Lindaro	24.3	C	70.0	E	26.4	C	61.4	E
28	3rd & Lindaro	9.3	A	6.4	A	4.8	A	6.4	A
29	4th & Cijos	10.3	B	11.4	B	4.8	A	5.5	A
30	4th & Lootens	10.2	B	14.8	B	6.8	A	12.5	B
31	Fifth & Court	29.4	C	27.9	C	27.6	C	29.2	C
32	Mission & Court	11.0	B	4.8	A	9.2	A	5.6	A
33	Fifth & Tamalpais	6.6	A	6.5	A	6.3	A	5.4	A
34	Fifth & E Tamalpais	5.4	A	4.7	A	4.8	A	4.6	A
35	3rd & Ritter	3.1	A	2.1	A	1.3	A	2.2	A
36	Ritter & Lincoln	15.2	C	8.3	A	24.3	C	7.6	A
37	Fifth & Nye	4.7	A	2.5	A	2.5	A	2.3	A
38	Mission & Nye	5.4	A	2.3	A	4.5	A	2.7	A
39	Mission & E Tamalpais	4.6	A	4.1	A	4.4	A	4.2	A
40	Mission & Tamalpais	6.8	A	4.3	A	6.3	A	4.6	A
41	4th & Tamalpais	14.9	B	26.0	C	8.0	A	19.0	B
42	4th & E Tamalpais	7.3	A	9.7	A	7.9	A	9.8	A

As shown in the table, the Under the Freeway Alternative does not result in any additional intersections operating at LOS E or F. All intersections operating at LOS E in the Existing Baseline scenario either improve in LOS or have a reduction in average delay.

Table 4-6: Under the Freeway (Year 2020) – Corridor Travel Times

Route	Existing Baseline		Under the Freeway		Change from Baseline	
	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
3rd Street – Grand to A	03:47	04:01	03:35	03:58	-00:12	-00:03
2nd Street – A to Grand	03:41	05:08	03:40	04:58	-00:01	-00:10
4th Street WB – Grand to A	03:56	05:05	03:44	04:53	-00:12	-00:12
4th Street EB – A to Grand	04:06	05:07	03:08	03:47	-00:58	-01:20
Irwin Street – 101 to Mission	02:17	03:34	02:13	03:23	-00:04	-00:11
Hetherton Street – 101 to 2nd	02:05	02:41	02:14	02:21	+00:09	-00:20

Travel times provided in minutes:seconds format

As shown in the table, the alternative results in improvement in travel time along all corridors in both peak periods.

Whistlestop Block Alternatives

The following roadway geometric changes were associated specifically with the Whistlestop Block Alternatives.

- Hetherton Street and 3rd Street – Includes modifying an existing southbound through lane to a second exclusive southbound right lane and modifying signal phasing to eliminate conflicts between southbound right-turns and pedestrians
- East Tamalpais Avenue between 3rd Street and 4th Street – Removes roadway
- West Tamalpais Avenue between 3rd Street and 4th Street – Converts to bus-only for both northbound and southbound vehicles
- Add LPIs to all pedestrian movements at 4th Street and Hetherton Street intersection
- Vehicles on both East and West Tamalpais Avenue were re-routed to Lincoln Avenue

The Build (Year 2020) Whistlestop Block Alternatives model reflects recently implemented geometric improvements and signal timing changes in downtown San Rafael, as noted in section 2.3. These changes generally prioritize pedestrian and bicycle circulation to the detriment of auto circulation. Thus, the model shows a conservative effect of the project on auto circulation relative to existing conditions and some increases in delay are the result of already-implemented, non-Project modifications, not the project itself.

Buses were re-routed to the proposed bays with these alternatives. New driveways are provided to access the proposed transit center. The eastbound left-turn from 4th Street to Irwin Street was also assumed to be converted from a permissive to a protected and permissive left-turn phase.

Intersection LOS and corridor travel times with these alternatives are shown in Table 4-7 and Table 4-8, respectively.

Table 4-7: Whistlestop Block (Year 2020) – Intersection Delay

		Existing Baseline				Whistlestop Block			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
ID	Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	2nd & Hetherton	17.1	B	18.2	B	16.7	B	20.0	C
2	3rd & Hetherton	24.6	C	32.5	C	25.8	C	32.3	C
3	4th & Hetherton	21.8	C	39.0	D	20.9	C	41.1	D
4	Fifth & Hetherton	16.7	B	18.5	B	16.7	B	13.2	B
5	Mission & Hetherton	26.4	C	26.7	C	27.5	C	25.4	C
6	2nd & Irwin	20.5	C	67.0	E	20.8	C	45.2	D
7	3rd & Irwin	19.3	B	33.5	C	16.4	B	27.2	C
8	4th & Irwin	24.2	C	23.3	C	23.1	C	26.8	C
9	Fifth & Irwin	13.2	B	10.5	B	9.4	A	10.4	B
10	Mission & Irwin	20.9	C	23.9	C	21.3	C	24.2	C
11	2nd & Grand	26.9	C	27.3	C	25.3	C	28.3	C
12	3rd & Grand	19.2	B	37.8	D	21.4	C	34.3	C
13	4th & Grand	36.5	D	32.9	C	43.7	D	35.7	D
14	Fifth & Grand	5.1	A	14.5	B	4.5	A	8.3	A
15	Mission & Grand	20.5	C	24.7	C	21.8	C	24.7	C
16	2nd & Lincoln	40.0	D	64.6	E	40.2	D	99.7	F
17	3rd & Lincoln	19.8	B	10.0	B	16.5	B	9.3	A
18	4th & Lincoln	27.5	C	20.7	C	27.2	C	15.0	B
19	Fifth & Lincoln	33.5	C	16.6	B	33.4	C	12.2	B
20	Mission & Lincoln	36.5	D	22.3	C	40.9	D	22.4	C
21	2nd & A	13.1	B	25.2	C	12.3	B	24.6	C
22	3rd & A	15.8	B	16.3	B	15.4	B	16.1	B
23	4th & A	14.0	B	16.8	B	14.4	B	15.5	B
24	Fifth & A	19.2	C	22.1	C	19.3	C	21.3	C
25	2nd & Tamalpais	20.8	C	32.5	C	18.6	B	27.1	C
26	3rd & Tamalpais	12.9	B	16.8	B	9.2	A	11.6	B
27	2nd & Lindaro	24.3	C	70.0	E	23.3	C	69.3	E
28	3rd & Lindaro	9.3	A	6.4	A	7.3	A	7.7	A
29	4th & Cijos	10.3	B	11.4	B	8.0	A	6.2	A
30	4th & Lootens	10.2	B	14.8	B	8.1	A	12.7	B
31	Fifth & Court	29.4	C	27.9	C	29.5	C	30.8	C
32	Mission & Court	11.0	B	4.8	A	12.3	B	5.8	A
33	Fifth & Tamalpais	6.6	A	6.5	A	6.8	A	5.4	A
34	Fifth & E Tamalpais	5.4	A	4.7	A	5.1	A	4.3	A
35	3rd & Ritter	3.1	A	2.1	A	2.2	A	3.2	A
36	Ritter & Lincoln	15.2	C	8.3	A	13.8	B	12.2	B
37	Fifth & Nye	4.7	A	2.5	A	6.3	A	3.1	A
38	Mission & Nye	5.4	A	2.3	A	6.7	A	2.9	A
39	Mission & E Tamalpais	4.6	A	4.1	A	4.9	A	4.2	A
40	Mission & Tamalpais	6.8	A	4.3	A	6.4	A	4.3	A
41	4th & Tamalpais	14.9	B	26.0	C	12.2	B	14.1	B
42	4th & E Tamalpais	7.3	A	9.7	A	6.9	A	13.3	B

As shown in the table, the Whistlestop Block Alternatives model indicates that one intersection, #16: 2nd Street and Lincoln Avenue, which operated at LOS E with Year 2020 No-Build conditions to degrade to LOS F during the p.m. peak. The Whistlestop Block Alternatives are not modifying traffic volumes, geometrics, or signal timing at this intersection. The increase in delay is associated with a redistribution of existing (Year 2020) conditions trips from Francisco Boulevard to Lincoln Avenue, an already-implemented, non-project activity. The redistribution of these trips was not reflected in the Year 2020 No-Build conditions model, nor the other two build alternatives Year 2020 models.

Table 4-8: Whistlestop Block (Year 2020) – Corridor Travel Times

Route	Existing Baseline		Whistlestop Block		Change from Baseline	
	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
3rd Street – Grand to A	03:47	04:01	03:36	03:59	-00:11	-00:02
2nd Street – A to Grand	03:41	05:08	03:30	05:17	-00:11	+00:09
4th Street WB – Grand to A	03:56	05:05	03:52	05:57	-00:04	+00:52
4th Street EB – A to Grand	04:06	05:07	03:23	04:05	-00:43	-01:02
Irwin Street – 101 to Mission	02:17	03:34	02:15	02:58	-00:02	-00:36
Hetherton Street – 101 to 2nd	02:05	02:41	02:23	02:56	+00:18	+00:15

Travel times provided in minutes:seconds format

As shown in the table, the alternative results in improvement in travel time along most corridors.

4.3 Existing Conditions – Summary

In additional to intersection-level and corridor-level results, the VISSIM model was utilized to capture the network-wide effects of each alternative.

The overall network results for all alternatives are shown in Table 4-9.

Table 4-9: Network Evaluation – Existing Conditions

Scenario		Avg Delay/Vehicle	Avg # Stops/Vehicle	Net Change in Delay/Vehicle	Net Change in Delay/Vehicle (%)
Baseline (No-Build)	A.M. Peak Hour	175 sec	4		
	P.M. Peak Hour	123 sec	6		
4th Street Gateway	A.M. Peak Hour	200 sec	4	+25	+15%
	P.M. Peak Hour	144 sec	6	+21	+12%
Under the Freeway	A.M. Peak Hour	170 sec	4	-5	-3%
	P.M. Peak Hour	115 sec	5	-8	-5%
Whistlestop Block	A.M. Peak Hour	175 sec	4	0	--
	P.M. Peak Hour	121 sec	5	-2	-1%

As shown in the table, the Under the Freeway Alternative achieves a small reduction in vehicle delay in both peak hours and the Whistlestop Block Alternatives result in minimal change. In both peak hours, the 4th Street Gateway Alternative results in an increase in vehicle delay.

4.4 Baseline Year 2040 Conditions (No-Build Alternative)

The Year 2040 baseline model includes the City of San Rafael's proposed future roadway network changes and future planned growth with the San Rafael General Plan Update. The modifications associated with Year 2040 conditions are described in Chapter 2.

In addition to the anticipated geometric changes, it was assumed that signalized intersections under future conditions would generally have the same signal timings as existing conditions. Leading pedestrian intervals and other changes in signal timing were incorporated where already implemented. Minor phase split timing changes were included at a limited number of locations where demand exceeded capacity with projected growth.

Appendix B includes the traffic volumes used in the Year 2040 baseline conditions analysis. Intersection level of service and corridor travel time with this alternative is shown in Table 4-10 and Table 4-11, respectively.

Table 4-10: Year 2040 Baseline Conditions (No-Build) – Intersection Delay

		Existing Baseline				Year 2040 Baseline			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
ID	Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	2nd & Hetherton	17.1	B	18.2	B	22.4	C	22.9	C
2	3rd & Hetherton	24.6	C	32.5	C	34.2	C	32.2	C
3	4th & Hetherton	21.8	C	39.0	D	44.1	D	40.3	D
4	Fifth & Hetherton	16.7	B	18.5	B	25.1	C	18.6	B
5	Mission & Hetherton	26.4	C	26.7	C	50.7	D	41.1	D
6	2nd & Irwin	20.5	C	67.0	E	60.8	E	97.0	F
7	3rd & Irwin	19.3	B	33.5	C	24.4	C	23.9	C
8	4th & Irwin	24.2	C	23.3	C	60.0	E	23.1	C
9	Fifth & Irwin	13.2	B	10.5	B	18.3	B	16.1	B
10	Mission & Irwin	20.9	C	23.9	C	33.6	C	27.0	C
11	2nd & Grand	26.9	C	27.3	C	79.8	E	33.5	C
12	3rd & Grand	19.2	B	37.8	D	76.6	E	26.4	C
13	4th & Grand	36.5	D	32.9	C	172.2	F	35.0	D
14	Fifth & Grand	5.1	A	14.5	B	62.6	F	20.8	C
15	Mission & Grand	20.5	C	24.7	C	94.2	F	34.5	D
16	2nd & Lincoln	40.0	D	64.6	E	83.7	F	115.7	F
17	3rd & Lincoln	19.8	B	10.0	B	16.1	B	9.5	A
18	4th & Lincoln	27.5	C	20.7	C	42.1	D	16.8	B
19	Fifth & Lincoln	33.5	C	16.6	B	58.3	E	15.0	B
20	Mission & Lincoln	36.5	D	22.3	C	107.5	F	32.8	C
21	2nd & A	13.1	B	25.2	C	47.8	D	43.8	D
22	3rd & A	15.8	B	16.3	B	18.9	B	16.0	B
23	4th & A	14.0	B	16.8	B	30.8	C	18.4	B
24	Fifth & A	19.2	C	22.1	C	36.7	E	41.6	E
25	2nd & Tamalpais	20.8	C	32.5	C	28.6	C	33.3	C
26	3rd & Tamalpais	12.9	B	16.8	B	11.7	B	15.1	B
27	2nd & Lindaro	24.3	C	70.0	E	125.9	F	142.3	F
28	3rd & Lindaro	9.3	A	6.4	A	6.7	A	8.1	A
29	4th & Cijos	10.3	B	11.4	B	34.7	D	7.2	A
30	4th & Lootens	10.2	B	14.8	B	42.6	D	13.4	B
31	Fifth & Court	29.4	C	27.9	C	38.8	D	50.2	D
32	Mission & Court	11.0	B	4.8	A	21.8	C	23.9	C
33	Fifth & Tamalpais	6.6	A	6.5	A	10.0	A	8.0	A
34	Fifth & E Tamalpais	5.4	A	4.7	A	8.2	A	5.8	A
35	3rd & Ritter	3.1	A	2.1	A	1.8	A	3.7	A
36	Ritter & Lincoln	15.2	C	8.3	A	16.7	C	17.3	C
37	Fifth & Nye	4.7	A	2.5	A	28.2	D	8.6	A
38	Mission & Nye	5.4	A	2.3	A	10.0	B	10.1	B
39	Mission & E Tamalpais	4.6	A	4.1	A	6.9	A	6.4	A
40	Mission & Tamalpais	6.8	A	4.3	A	11.5	B	7.6	A
41	4th & Tamalpais	14.9	B	26.0	C	31.6	C	17.6	B
42	4th & E Tamalpais	7.3	A	9.7	A	16.3	B	8.0	A

Table 4-11: Year 2040 Baseline Conditions (No-Build) – Corridor Travel Times

Route	Existing Baseline		2040 Baseline	
	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
3rd Street – Grand to A	03:47	04:01	03:36	04:00
2nd Street – A to Grand	03:41	05:08	06:56	07:10
4th Street WB – Grand to A	03:56	05:05	07:52	04:38
4th Street EB – A to Grand	04:06	05:07	07:19	04:41
Irwin Street – 101 to Mission	02:17	03:34	03:33	04:32
Hetherton Street – 101 to 2nd	02:05	02:41	03:18	03:15

Travel times provided in minutes:seconds format

4.5 Year 2040 Conditions – Build Alternatives

4th Street Gateway Alternative

The same alternative-specific roadway network changes that were described in the existing conditions section were applied to the future conditions model.

Due to the growth in traffic volume and the geometric changes associated with the alternative, several of the individual model runs resulted in gridlock, particularly in the a.m. peak period, resulting in very poor traffic network performance. Gridlock formed in the network in the "box" of intersections formed by Irwin Street, Lincoln Avenue, 4th Street, and Fifth Avenue. The left-turning vehicles would begin queueing and back into the downstream intersections. Eventually, this would result in the other approaches backing up as well and since there is a grid network, this effect slowly propagated through the rest of the network, resulting in gridlock.

The results provided in Table 4-12 and Table 4-13 reflect intersection delay and corridor travel times, respectively. The deterioration in LOS at several intersections in the a.m. peak hour reflects the overall network gridlock observed.

Table 4-12: 4th Street Gateway (Year 2040) – Intersection Delay

		Year 2040 Baseline				4th Street Gateway			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
ID	Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	2nd & Hetherton	22.4	C	22.9	C	27.3	C	18.8	B
2	3rd & Hetherton	34.2	C	32.2	C	39.6	D	35.2	D
3	4th & Hetherton	44.1	D	40.3	D	40.2	D	21.0	C
4	Fifth & Hetherton	25.1	C	18.6	B	57.0	E	17.7	B
5	Mission & Hetherton	50.7	D	41.1	D	101.3	F	54.7	D
6	2nd & Irwin	60.8	E	97.0	F	70.7	E	66.7	E
7	3rd & Irwin	24.4	C	23.9	C	34.8	C	37.5	D
8	4th & Irwin	60.0	E	23.1	C	74.1	E	20.6	C
9	Fifth & Irwin	18.3	B	16.1	B	47.5	D	23.0	C
10	Mission & Irwin	33.6	C	27.0	C	43.3	D	32.1	C
11	2nd & Grand	79.8	E	33.5	C	67.1	E	28.9	C
12	3rd & Grand	76.6	E	26.4	C	53.9	D	26.3	C
13	4th & Grand	172.2	F	35.0	D	141.2	F	34.0	C
14	Fifth & Grand	62.6	F	20.8	C	43.8	E	19.8	C
15	Mission & Grand	94.2	F	34.5	D	64.9	F	39.1	E
16	2nd & Lincoln	83.7	F	115.7	F	123.5	F	103.2	F
17	3rd & Lincoln	16.1	B	9.5	A	21.3	C	11.5	B
18	4th & Lincoln	42.1	D	16.8	B	53.7	D	14.2	B
19	Fifth & Lincoln	58.3	E	15.0	B	71.5	E	21.7	C
20	Mission & Lincoln	107.5	F	32.8	C	140.3	F	46.0	D
21	2nd & A	47.8	D	43.8	D	61.7	E	37.3	D
22	3rd & A	18.9	B	16.0	B	17.4	B	16.3	B
23	4th & A	30.8	C	18.4	B	41.7	D	17.8	B
24	Fifth & A	36.7	E	41.6	E	43.3	E	47.4	E
25	2nd & Tamalpais	28.6	C	33.3	C	36.3	D	30.2	C
26	3rd & Tamalpais	11.7	B	15.1	B	17.4	B	19.2	B
27	2nd & Lindaro	125.9	F	142.3	F	158.7	F	127.4	F
28	3rd & Lindaro	6.7	A	8.1	A	6.2	A	7.8	A
29	4th & Cijos	34.7	D	7.2	A	38.9	E	11.0	B
30	4th & Lootens	42.6	D	13.4	B	53.7	D	12.5	B
31	Fifth & Court	38.8	D	50.2	D	47.7	D	63.3	E
32	Mission & Court	21.8	C	23.9	C	57.2	F	30.0	D
33	Fifth & Tamalpais	10.0	A	8.0	A	15.4	B	10.3	B
34	Fifth & E Tamalpais	8.2	A	5.8	A	19.0	B	5.8	A
35	3rd & Ritter	1.8	A	3.7	A	2.0	A	3.4	A
36	Ritter & Lincoln	16.7	C	17.3	C	16.2	C	11.5	B
37	Fifth & Nye	28.2	D	8.6	A	26.3	D	24.6	C
38	Mission & Nye	10.0	B	10.1	B	27.3	D	14.0	B
39	Mission & E Tamalpais	6.9	A	6.4	A	11.0	B	8.0	A
40	Mission & Tamalpais	11.5	B	7.6	A	29.7	C	7.5	A
41	4th & Tamalpais	31.6	C	17.6	B	37.6	D	20.2	C
42	4th & E Tamalpais	16.3	B	8.0	A	7.6	A	5.7	A

As shown in the table, all intersections operating at LOS E or LOS F either improve in LOS or have a reduction in average delay, except for #6: 2nd Street and Irwin Street, #8: 4th Street and Irwin Street, #16: 2nd Street and Lincoln Avenue, #19: Fifth Avenue and Lincoln Avenue, #20: Mission Avenue and Lincoln Avenue, #24: Fifth Avenue and A Street, and #27: 2nd Street and Lindaro St. There are other locations that see a deterioration in level of service to LOS E or F, including #4: Fifth Avenue and Hetherton Street, #5: Mission Avenue and Hetherton Street, #15: Mission Avenue and Grand Avenue, #21: 2nd Street and A Street, #29: 4th Street and Cijos Street, #31: Fifth Avenue and Court Street, and #32: Mission Avenue and Court Street.

Table 4-13: 4th Street Gateway (Year 2040) – Corridor Travel Times

Route	2040 Baseline		4th Street Gateway		Change from Baseline	
	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
3rd Street – Grand to A	03:36	04:00	03:47	04:14	+00:11	+00:14
2nd Street – A to Grand	06:56	07:10	08:04	06:17	+01:08	-00:53
4th Street WB – Grand to A	07:52	04:38	05:50	04:38	-02:02	00:00
4th Street EB – A to Grand	07:19	04:41	08:54	03:48	+01:35	-00:53
Irwin Street – 101 to Mission	03:33	04:32	05:05	03:56	+01:32	-00:36
Hetherton Street – 101 to 2nd	03:18	03:15	04:34	02:32	+01:16	-00:43

Travel times provided in minutes:seconds format

As shown in the table, in the a.m. peak hour, there is a large increase in travel times along several corridors. In the p.m. peak hour, the alternative generally results in a decrease in travel times along several corridors.

Under the Freeway Alternative

The Under the Freeway Alternative does not require any roadway network changes, other than driveway access to the transit center itself. Intersection LOS and corridor travel time with this alternative is shown in Table 4-14 and Table 4-15, respectively.

Table 4-14: Under the Freeway (Year 2040) – Intersection Delay

		Year 2040 Baseline				Under the Freeway			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
ID	Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	2nd & Hetherton	22.4	C	22.9	C	20.3	C	17.8	B
2	3rd & Hetherton	34.2	C	32.2	C	28.9	C	38.0	D
3	4th & Hetherton	44.1	D	40.3	D	37.5	D	51.1	D
4	Fifth & Hetherton	25.1	C	18.6	B	21.6	C	42.4	D
5	Mission & Hetherton	50.7	D	41.1	D	51.7	D	55.1	E
6	2nd & Irwin	60.8	E	97.0	F	43.1	D	64.3	E
7	3rd & Irwin	24.4	C	23.9	C	24.2	C	35.7	D
8	4th & Irwin	60.0	E	23.1	C	57.8	E	27.5	C
9	Fifth & Irwin	18.3	B	16.1	B	16.2	B	20.3	C
10	Mission & Irwin	33.6	C	27.0	C	30.3	C	27.9	C
11	2nd & Grand	79.8	E	33.5	C	83.1	F	29.2	C
12	3rd & Grand	76.6	E	26.4	C	77.6	E	27.7	C
13	4th & Grand	172.2	F	35.0	D	173.1	F	41.1	D
14	Fifth & Grand	62.6	F	20.8	C	64.9	F	22.6	C
15	Mission & Grand	94.2	F	34.5	D	91.6	F	33.4	D
16	2nd & Lincoln	83.7	F	115.7	F	79.0	E	97.5	F
17	3rd & Lincoln	16.1	B	9.5	A	15.4	B	10.3	B
18	4th & Lincoln	42.1	D	16.8	B	31.2	C	16.9	B
19	Fifth & Lincoln	58.3	E	15.0	B	40.3	D	21.5	C
20	Mission & Lincoln	107.5	F	32.8	C	100.8	F	32.3	C
21	2nd & A	47.8	D	43.8	D	46.1	D	31.8	C
22	3rd & A	18.9	B	16.0	B	17.0	B	15.9	B
23	4th & A	30.8	C	18.4	B	16.4	B	18.1	B
24	Fifth & A	36.7	E	41.6	E	28.4	D	42.5	E
25	2nd & Tamalpais	28.6	C	33.3	C	28.3	C	29.4	C
26	3rd & Tamalpais	11.7	B	15.1	B	13.2	B	17.4	B
27	2nd & Lindaro	125.9	F	142.3	F	119.9	F	113.3	F
28	3rd & Lindaro	6.7	A	8.1	A	6.8	A	8.3	A
29	4th & Cijos	34.7	D	7.2	A	16.2	C	9.6	A
30	4th & Lootens	42.6	D	13.4	B	14.8	B	16.1	B
31	Fifth & Court	38.8	D	50.2	D	41.2	D	47.7	D
32	Mission & Court	21.8	C	23.9	C	27.8	D	23.5	C
33	Fifth & Tamalpais	10.0	A	8.0	A	8.3	A	16.1	B
34	Fifth & E Tamalpais	8.2	A	5.8	A	5.1	A	7.6	A
35	3rd & Ritter	1.8	A	3.7	A	2.2	A	3.5	A
36	Ritter & Lincoln	16.7	C	17.3	C	17.1	C	12.9	B
37	Fifth & Nye	28.2	D	8.6	A	10.3	B	13.3	B
38	Mission & Nye	10.0	B	10.1	B	14.0	B	8.3	A
39	Mission & E Tamalpais	6.9	A	6.4	A	8.0	A	5.7	A
40	Mission & Tamalpais	11.5	B	7.6	A	11.3	B	6.6	A
41	4th & Tamalpais	31.6	C	17.6	B	20.1	C	20.7	C
42	4th & E Tamalpais	16.3	B	8.0	A	10.8	B	8.2	A

As shown in the table, all intersections operating at LOS E or LOS F either improve in LOS or have a reduction in average delay, except for #11: 2nd Street and Grand Avenue, #12: 3rd Street and Irwin Street, #13: 4th Street and Grand Avenue, and #14: Fifth Avenue and Grand Avenue. There is one intersection, #5: Mission Avenue and Hetherton Street, that sees a deterioration in level of service to LOS E or F.

Table 4-15: Under the Freeway (Year 2040) – Corridor Travel Times

Route	2040 Baseline		Under the Freeway		Change from Baseline	
	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
3rd Street – Grand to A	03:36	04:00	03:36	04:08	00:00	+00:08
2nd Street – A to Grand	06:56	07:10	06:43	05:52	-00:13	-01:18
4th Street WB – Grand to A	07:52	04:38	07:55	05:31	+00:03	+00:53
4th Street EB – A to Grand	07:19	04:41	04:44	04:16	-02:35	-00:25
Irwin Street – 101 to Mission	03:33	04:32	03:12	03:50	-00:21	-00:42
Hetherton Street – 101 to 2nd	03:18	03:15	02:56	04:13	-00:22	+00:58

Travel times provided in minutes:seconds format

As shown in the table, in the a.m. peak hour, there is a decrease in travel times along several corridors. In the p.m. peak hour, there is a mix of increases and decreases in travel times along the corridors.

Whistlestop Block Alternatives

The same alternative-specific roadway network changes that were described in the existing conditions section were applied to the future conditions model. In Year 2040 conditions, the planned modifications to West Tamalpais Avenue included in the baseline scenario are not included with these alternatives. West Tamalpais Avenue would remain open to two-way traffic between 2nd and 3rd Streets, bus traffic between 3rd and 4th Streets, and two-way traffic between 4th Street and Fifth Avenue.

Intersection LOS and corridor travel time with these alternatives are shown in Table 4-16 and Table 4-17, respectively.

Table 4-16: Whistlestop Block (Year 2040) – Intersection Delay

		Year 2040 Baseline				Whistlestop Block			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
ID	Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	2nd & Hetherton	22.4	C	22.9	C	21.6	C	18.9	B
2	3rd & Hetherton	34.2	C	32.2	C	28.9	C	32.1	C
3	4th & Hetherton	44.1	D	40.3	D	27.7	C	31.8	C
4	Fifth & Hetherton	25.1	C	18.6	B	17.3	B	14.3	B
5	Mission & Hetherton	50.7	D	41.1	D	46.9	D	41.5	D
6	2nd & Irwin	60.8	E	97.0	F	46.0	D	89.9	F
7	3rd & Irwin	24.4	C	23.9	C	21.6	C	25.1	C
8	4th & Irwin	60.0	E	23.1	C	43.8	D	26.8	C
9	Fifth & Irwin	18.3	B	16.1	B	14.2	B	16.1	B
10	Mission & Irwin	33.6	C	27.0	C	31.3	C	30.4	C
11	2nd & Grand	79.8	E	33.5	C	79.1	E	33.4	C
12	3rd & Grand	76.6	E	26.4	C	57.7	E	30.1	C
13	4th & Grand	172.2	F	35.0	D	131.8	F	46.5	D
14	Fifth & Grand	62.6	F	20.8	C	38.9	E	32.1	D
15	Mission & Grand	94.2	F	34.5	D	58.2	F	43.8	E
16	2nd & Lincoln	83.7	F	115.7	F	77.1	E	99.1	F
17	3rd & Lincoln	16.1	B	9.5	A	19.2	B	9.5	A
18	4th & Lincoln	42.1	D	16.8	B	32.5	C	13.8	B
19	Fifth & Lincoln	58.3	E	15.0	B	40.9	D	15.0	B
20	Mission & Lincoln	107.5	F	32.8	C	95.7	F	35.4	D
21	2nd & A	47.8	D	43.8	D	44.3	D	34.2	C
22	3rd & A	18.9	B	16.0	B	16.7	B	16.1	B
23	4th & A	30.8	C	18.4	B	15.6	B	15.8	B
24	Fifth & A	36.7	E	41.6	E	27.8	D	41.6	E
25	2nd & Tamalpais	28.6	C	33.3	C	27.9	C	28.5	C
26	3rd & Tamalpais	11.7	B	15.1	B	10.5	B	12.1	B
27	2nd & Lindaro	125.9	F	142.3	F	110.4	F	117.6	F
28	3rd & Lindaro	6.7	A	8.1	A	8.3	A	8.2	A
29	4th & Cijos	34.7	D	7.2	A	12.7	B	7.0	A
30	4th & Lootens	42.6	D	13.4	B	11.1	B	13.9	B
31	Fifth & Court	38.8	D	50.2	D	39.0	D	50.2	D
32	Mission & Court	21.8	C	23.9	C	21.7	C	23.6	C
33	Fifth & Tamalpais	10.0	A	8.0	A	7.8	A	7.9	A
34	Fifth & E Tamalpais	8.2	A	5.8	A	6.1	A	5.8	A
35	3rd & Ritter	1.8	A	3.7	A	3.3	A	3.6	A
36	Ritter & Lincoln	16.7	C	17.3	C	13.7	B	13.1	B
37	Fifth & Nye	28.2	D	8.6	A	12.1	B	10.4	B
38	Mission & Nye	10.0	B	10.1	B	12.2	B	9.3	A
39	Mission & E Tamalpais	6.9	A	6.4	A	7.2	A	6.2	A
40	Mission & Tamalpais	11.5	B	7.6	A	9.8	A	6.8	A
41	4th & Tamalpais	31.6	C	17.6	B	14.3	B	17.7	B
42	4th & E Tamalpais	16.3	B	8.0	A	7.2	A	10.0	A

As shown in the table, all intersections operating at LOS E or LOS F either improve in LOS or have a reduction in average delay. Only one location, intersection #15: Mission Avenue and Grand Avenue, deteriorates in level of service from LOS D to LOS E.

Table 4-17: Whistlestop Block (Year 2040) – Corridor Travel Times

Route	2040 Baseline		Whistlestop Block		Change from Baseline	
	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
3rd Street – Grand to A	03:36	04:00	03:42	03:59	+00:06	-00:01
2nd Street – A to Grand	06:56	07:10	06:34	06:04	-00:22	-01:06
4th Street WB – Grand to A	07:52	04:38	06:16	05:04	-01:36	+00:26
4th Street EB – A to Grand	07:19	04:41	03:46	04:09	-03:33	-00:32
Irwin Street – 101 to Mission	03:33	04:32	03:04	04:28	-00:29	-00:04
Hetherton Street – 101 to 2nd	03:18	03:15	02:39	03:02	-00:39	-00:13

Travel times provided in minutes:seconds format

As shown in the table, most corridors experience a decrease in travel time, with some of the decreases being substantial.

4.6 Year 2040 Conditions – Summary

The overall network results for all alternatives are shown in Table 4-18.

Table 4-18: Network Evaluation – Year 2040 Conditions

Scenario		Avg Delay/Vehicle	Avg # Stops/Vehicle	Net Change in Delay/Vehicle	Net Change in Delay/ Vehicle (%)
Baseline (No-Build)	A.M. Peak Hour	276 sec	6		
	P.M. Peak Hour	156 sec	8		
4th Street Gateway	A.M. Peak Hour	313 sec	7	+37	+13%
	P.M. Peak Hour	155 sec	7	-1	-1%
Under the Freeway	A.M. Peak Hour	314 sec	6	+38	+14%
	P.M. Peak Hour	153 sec	6	-3	-2%
Whistlestop Block	A.M. Peak Hour	248 sec	6	-28	-10%
	P.M. Peak Hour	151 sec	8	-5	-3%

Both peak hours see a decrease in delay per vehicle with the Whistlestop Block Alternatives. Both the 4th Street Gateway and Under the Freeway Alternatives are shown to cause a greater than 10% increase in delay in the a.m. peak hour.

5.0 Non-Motorized Transportation

5.1 Pedestrian Conditions

Existing Conditions

The transit center is located within Downtown San Rafael, which has high levels of pedestrian activity. The 4th Street corridor represents the primary commercial corridor in downtown, with several businesses and shopping destinations, particularly west of Lincoln Avenue. Other important generators of pedestrian activity in the area include San Rafael High School (located on the north side of 3rd Street east of US 101) and the BioMarin campus at the southwest corner of Lincoln Avenue and 2nd Street.

Most roadways in the project vicinity, with the exception of portions of the south side of 2nd Street and the east side of Hetherton Street, include sidewalks. Crosswalks are provided at nearly all legs of each intersection, except for certain locations along 2nd Street and 3rd Street. The crosswalk across the south leg of the Hetherton Street and 3rd Street intersection was recently removed by the City of San Rafael (subsequent to data collection in January 2020) and replaced by a new crosswalk across the east leg of the same intersection. Signalized crosswalks are currently provided across both 4th Street and Fifth Avenue at each of West and East Tamalpais Avenue.

Intersection pedestrian counts were collected in January 2020 at the project study intersections during the morning (7 a.m. to 9 a.m.) and evening (4 p.m. to 6 p.m.) peak periods concurrent with the vehicle data collection. Peak-hour pedestrian volumes are summarized by leg in Appendix C.

Year 2040 Conditions and Build Alternatives

In the Year 2040 baseline scenario, one planned pedestrian network change was assumed: relocation of the existing crosswalks on the east and north legs of the 2nd Street and Irwin Street intersection to the south and west legs. This would be in conjunction with the construction of a new sidewalk on the south side of 2nd Street.

In the build alternatives, the baseline pedestrian volumes were modified to account for the shifting of pedestrian movements resulting from the relocation of the transit center. The estimated pedestrian movements were shifted based on existing pedestrian volumes and ridership data and the location of bays in each alternative.

Year 2040 pedestrian volumes were developed by applying the quadrant-level growth rates (described in the methodology section) to the existing intersection-level pedestrian volumes. The Year 2040 projected baseline peak-hour crosswalk volumes are summarized by leg in Appendix C.

5.2 Pedestrian Connectivity to Downtown

To evaluate the connectivity of the No-Build and four build alternatives to downtown, the project team evaluated the pedestrian routes between Downtown San Rafael and the transit center. The team then estimated walk times and utilized existing vehicle volumes to determine the number of conflicting vehicles encountered by pedestrians on their route between the transit center and downtown. For the purposes of this analysis, the pedestrian routes to downtown were represented with a point selected at the intersection of 4th Street and A Street.

No-Build Alternative/Existing Transit Center Site

The No-Build Alternative would result in no significant changes to current pedestrian and bicycle infrastructure around the transit center. The existing deficiencies of pedestrian and bicycle access, circulation, and safety around the transit center and identified in the Draft Environmental Impact Report would remain. Pedestrian access to the transit center bus services requires pedestrians to walk along or cross 2nd or 3rd Street, which are the two highest volume streets in Downtown San Rafael. All passengers transferring to SMART must cross 3rd Street, and many of the transit center's passengers transferring between bus routes— which are nearly half of bus boardings—must cross the SMART tracks that run through the middle of the site. 3rd Street intersections with West Tamalpais Avenue and Hetherton Street have two of the three highest number of pedestrian-involved collisions in the study area between January 2015 and September 2021, representing a major barrier to transit center access.

To evaluate the No-Build Alternative's connectivity to nearby downtown destinations, the estimated walking time, and the number of conflicting vehicles that pedestrians would encounter along each path, were estimated. The pedestrian paths evaluate include the following:

- *Pedestrian Route 1:* This is the nearest path to downtown, which starts on the northwest corner of the station, along Tamalpais Avenue. This route is a 12.6-minute walk (0.38 miles).
- *Pedestrian Route 2:* This is the farthest path to downtown from existing southeast corner of the station, along Hetherton Street. This route is a 14.6-minute walk (0.45 miles).

For both of the above route options, the total conflicting vehicle movements depending on the peak hour are between 2,304 to 2,703 vehicles, as shown in Figure 5-1.

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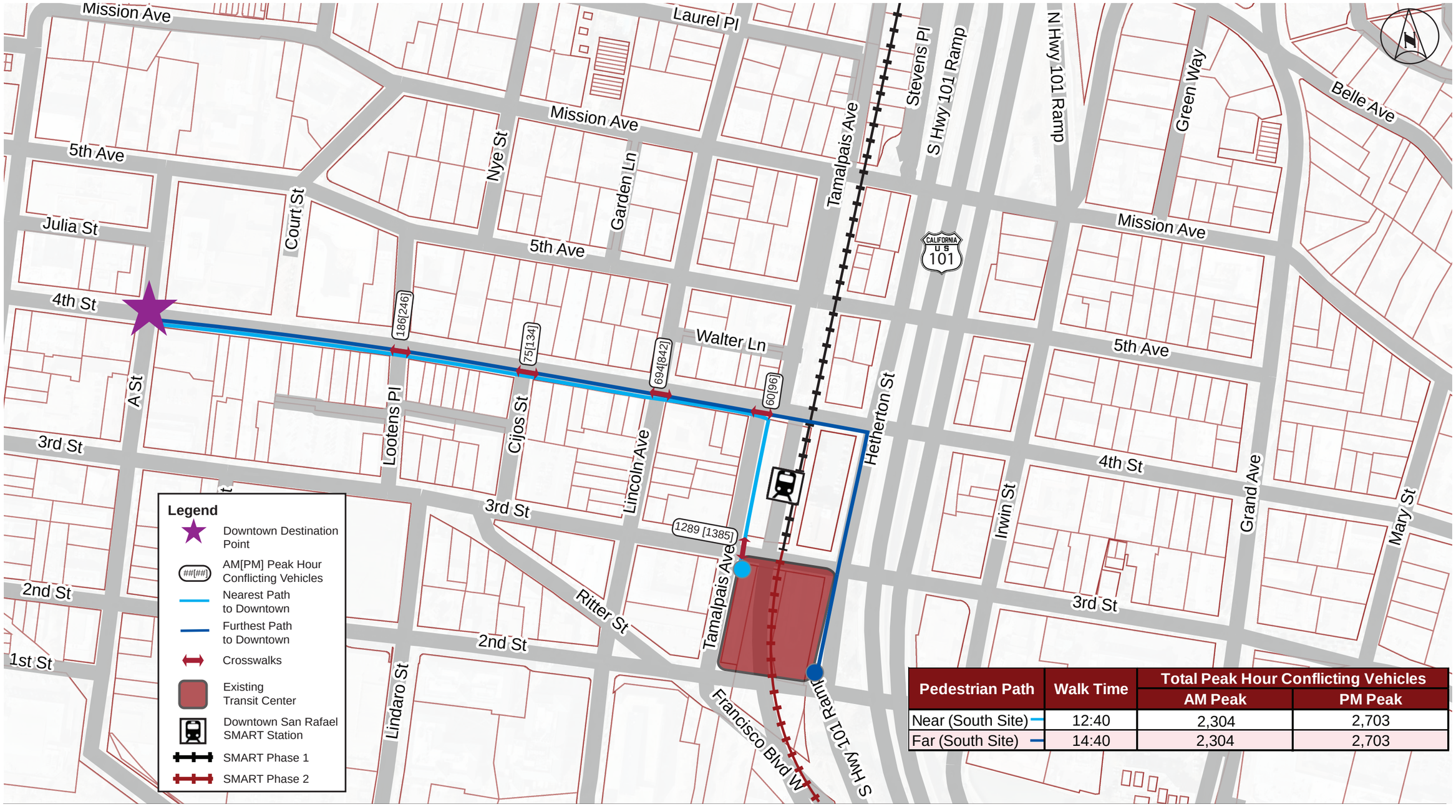

Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
Near (South Site)	12:40	2,304	2,703
Far (South Site)	14:40	2,304	2,703

Kimley»Horn

Figure 5-1: No-Build Alternative - Pedestrian Connectivity to Downtown

4th Street Gateway Alternative

Four pedestrian routes to downtown were identified for this alternative; routes were identified between both sides of the transit center on either side of 4th Street. For each side of the transit center, a "long" and "short" route was also identified. The long route is the route taken by pedestrians from the bay farthest from the downtown destination, while the short route is the closest. The routes identified are shown in Figure 5-2. Compared to other alternatives, the 4th Street Gateway Alternative has the least number of conflicting vehicles due to it being closer to downtown. For the north side of the transit center, pedestrian routes include the following:

- *Pedestrian Route 1:* This is the nearest path to downtown, which starts at the southwest corner of the north side of the transit center and follows along the north side of 4th Street. This route is a 10.2-minute walk (0.33 miles).
- *Pedestrian Route 2:* This is the farthest path to Downtown from Hetherton Street, coming from the northeast corner of the north side of the transit center and following along the north side of 4th Street. This route is a 11.5-minute walk (0.38 miles).

For both of the above route options, the total conflicting vehicle volume on 4th Street (from the three-cross streets of Tamalpais Avenue, Lincoln Avenue, and Lootens Place) during the a.m. peak hour is 897 vehicles and during the p.m. peak hour is 1,205 vehicles.

For the south side of the transit center, pedestrian routes include:

- *Pedestrian Route 3:* This is the nearest path to downtown from the northwest corner of the south side of the transit center and along the south side of 4th Street. This option is a 10.7-minute walk (0.32 miles).
- *Pedestrian Route 4:* This is the farthest path to downtown from Hetherton Street, east of the transit center and along the south side of 4th Street. This option is a 12.2-minute walk (0.38 miles).

For the above route options, the total conflicting vehicle volume along 4th Street (from the four cross streets of Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 1,015 vehicles and during the p.m. peak hour is 1,318 vehicles.

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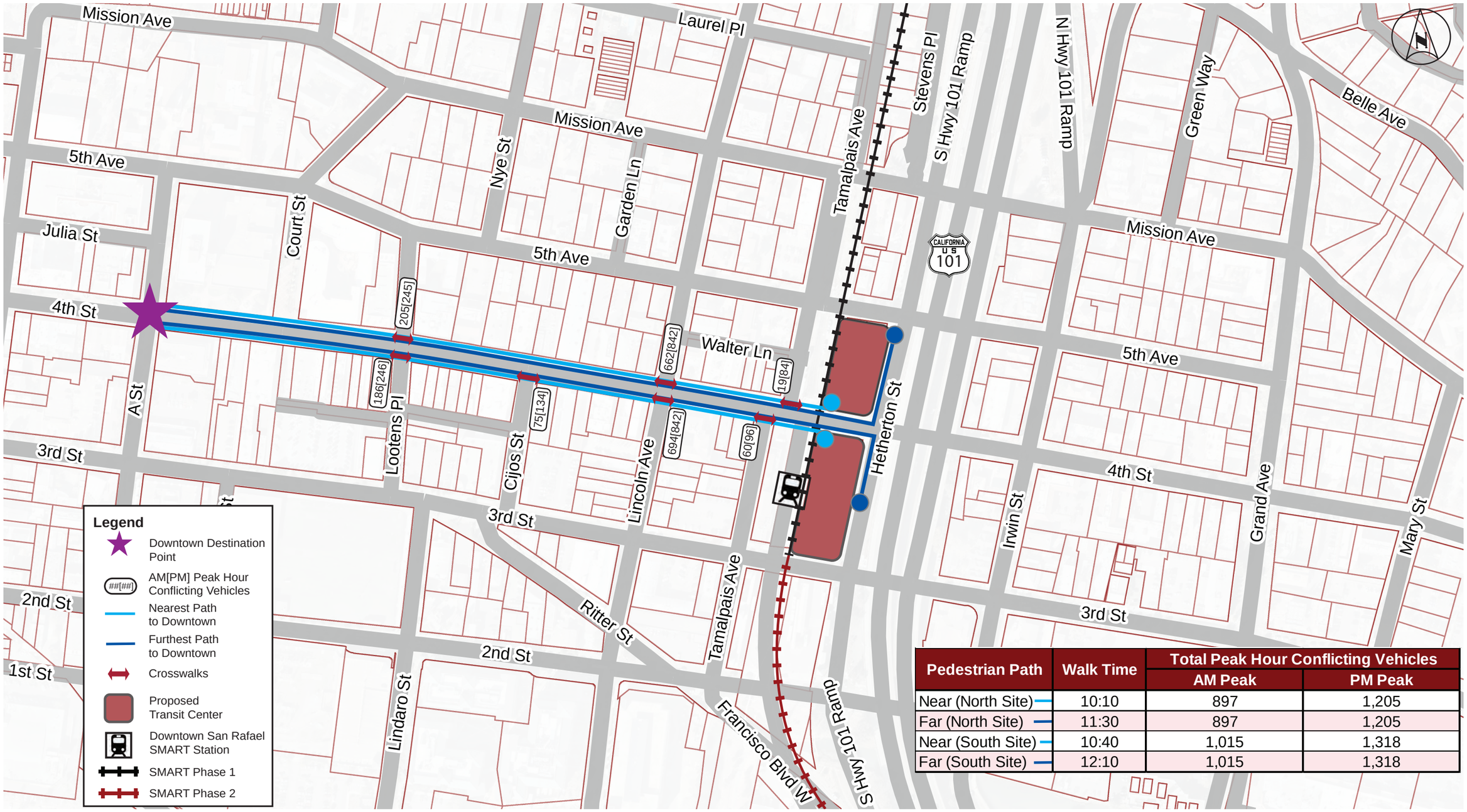

Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
Near (North Site)	10:10	897	1,205
Far (North Site)	11:30	897	1,205
Near (South Site)	10:40	1,015	1,318
Far (South Site)	12:10	1,015	1,318

Kimley»Horn

Figure 5-2: 4th Street Gateway Alternative - Pedestrian Connectivity to Downtown

Under the Freeway Alternative

Two pedestrian routes to Downtown San Rafael were identified for this alternative, one "long" route and one "short" route. The long route is the route taken by pedestrians from the Bay farthest from the downtown destination, while the short route is the closest. The routes identified are shown in Figure 5-3. For the north side of the transit center, pedestrian routes include the following:

- *Pedestrian Route 1:* This is the nearest path to downtown from the north side of the transit center, starting at the southernmost bays of the northern site near 4th Street. This option is a 12.3-minute walk (0.38 miles). The total conflicting vehicle volume along 4th Street (from the cross streets of Hetherton Street, West and East Tamalpais Ave, Lincoln Avenue, and Lootens Place) during the a.m. peak hour is 1,840 vehicles and during the p.m. peak hour is 2,128 vehicles.
- *Pedestrian Route 2:* This is the farthest path to downtown from north side of the transit center, starting at the corner of Irwin Street and Fifth Avenue. This option is a 14-minute walk (0.45 miles). The total conflicting vehicle volume (from the intersection of Hetherton Street and Fifth Avenue, and the intersections of 4th Street with Hetherton Street, East and West Tamalpais Avenue, Lincoln Avenue, and Lootens Place) during the a.m. peak hour is 1,840 vehicles and during the p.m. peak hour is 2,128 vehicles.

For the south side of the transit center, pedestrian routes include the following:

- *Pedestrian Route 3*: This is the nearest path to downtown, from the northwest corner of the south side of the transit center at 4th Street and Hetherton Street. This option is a 12.8-minute walk (0.35 miles). The total conflicting vehicle volume on 4th Street (from the six cross streets of Hetherton Street, West and East Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 2,162 vehicles and during the p.m. peak hour is 2,373 vehicles.
- *Pedestrian Route 4:* This is the farthest path to downtown from the south side of the transit center. This option is a 12.8-minute walk (0.4 miles). The total conflicting vehicle volume on 4th Street (from the six cross streets of Hetherton Street, West and East Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 2,162 vehicles and during the p.m. peak hour is 2,373 vehicles.

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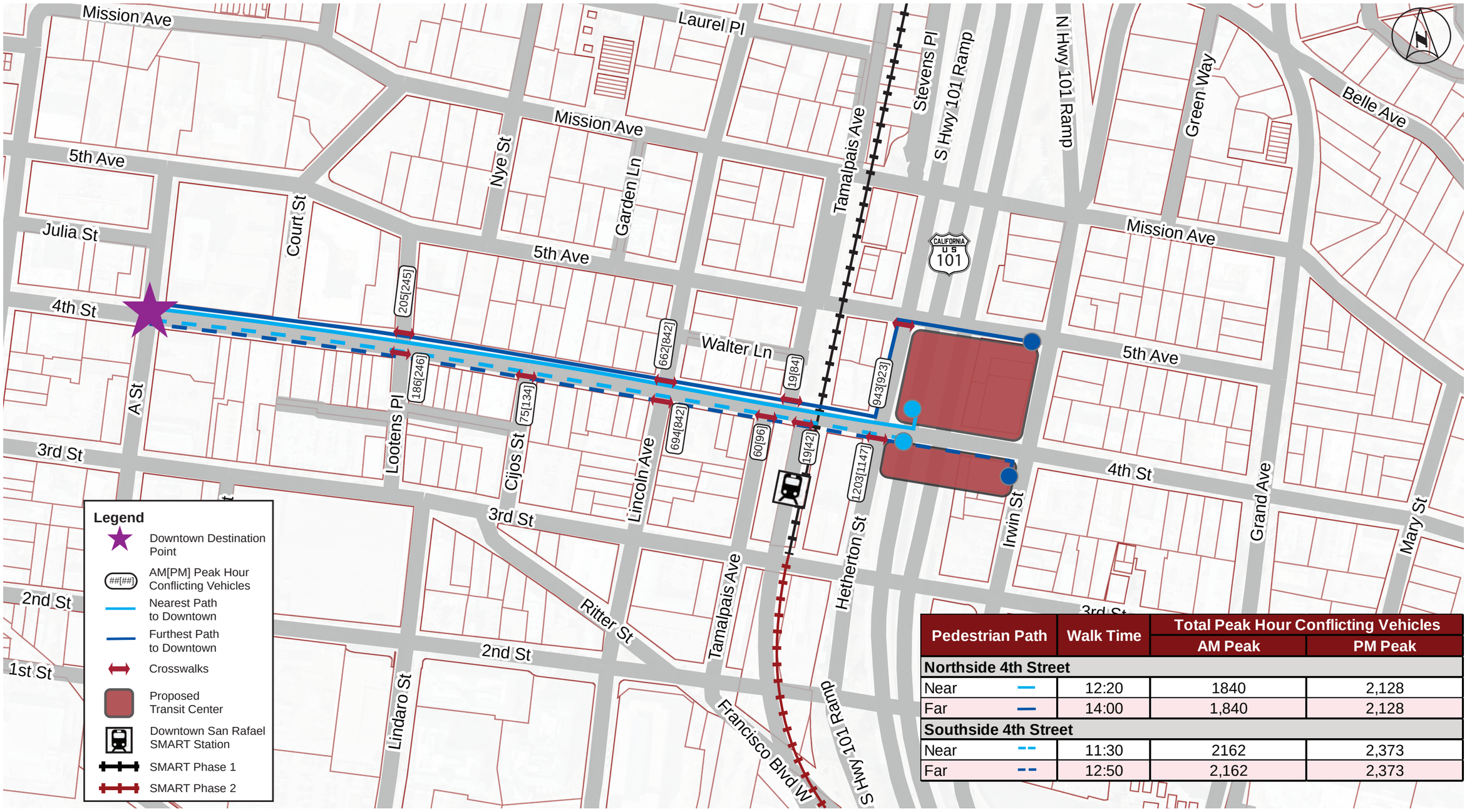

Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
Northside 4th Street			
Near —	12:20	1840	2,128
Far —	14:00	1,840	2,128
Southside 4th Street			
Near --	11:30	2162	2,373
Far --	12:50	2,162	2,373

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Figure 5-3: Under the Freeway Alternative - Pedestrian Connectivity to Downtown

Whistlestop Block Alternatives

Two pedestrian routes to downtown were identified for these alternatives, one "long" route and one "short" route. The long route is the route taken by pedestrians from the Bay farthest from the downtown destination, while the short route is the closest. The routes identified are shown in Figure 5-4. Compared to other alternatives, the Whistlestop Block Alternatives have shortest walk times. The pedestrian routes identified include:

- *Pedestrian Route 1*: This is the nearest path to downtown, from the northeast corner of the transit center, at 4th Street and Tamalpais Avenue. This option is a 9.3-minute walk (0.29 miles). The total conflicting vehicle volume on 4th Street (from the four cross streets of Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 955 vehicles and during the p.m. peak hour is 1,222 vehicles.
- *Pedestrian Route 2:* This is the farthest path to downtown from east side of transit center, at the corner of Hetherton Street and 3rd Street. This option is a 12-minute walk time (0.37 miles). The total conflicting vehicle volume on 4th Street (from the four cross streets of Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 1,034 vehicles and during the p.m. peak hour is 1,360 vehicles.

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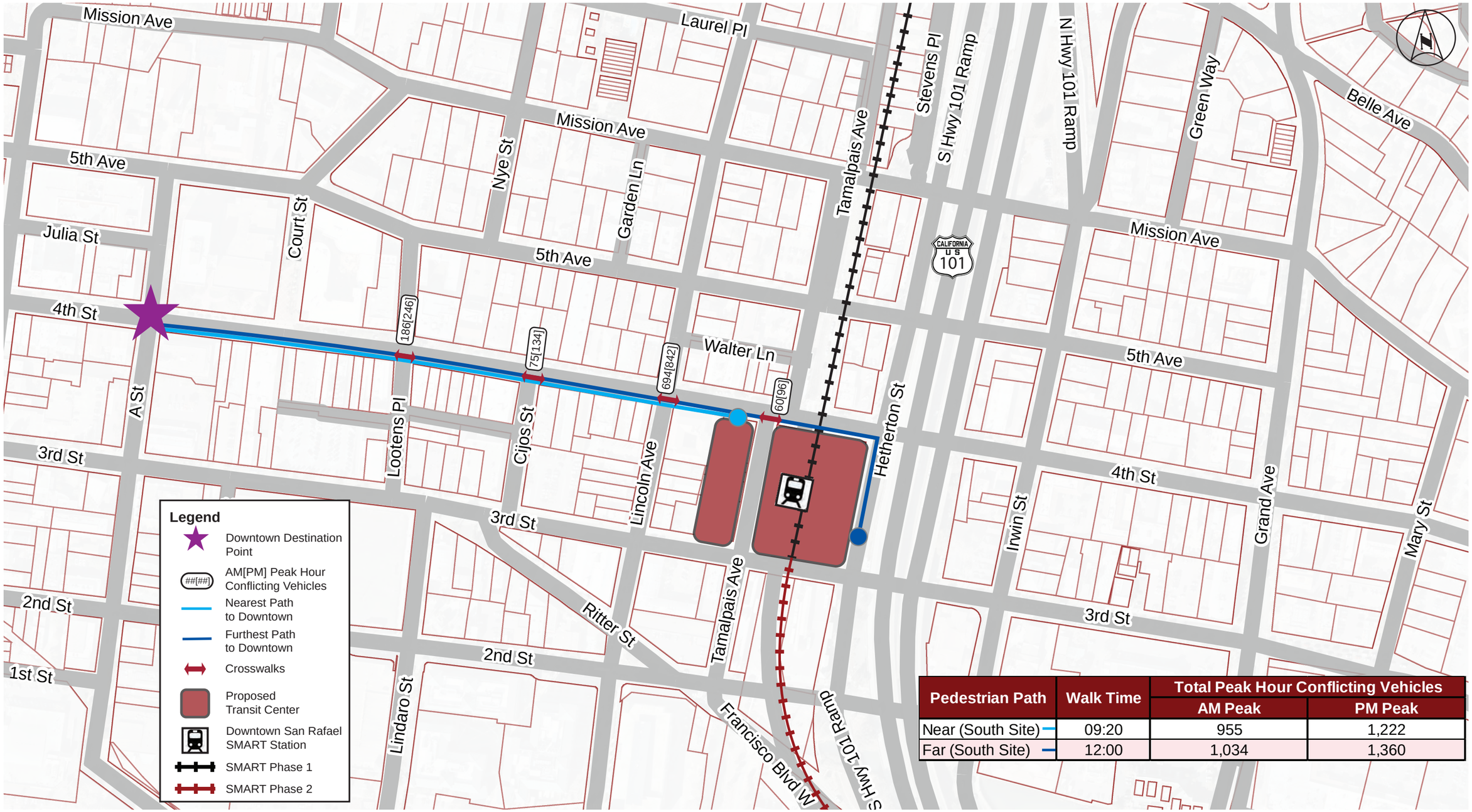

Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
Near (South Site)	09:20	955	1,222
Far (South Site)	12:00	1,034	1,360

Kimley»Horn

Figure 5-4: Whistlestop Block Alternative - Pedestrian Connectivity to Downtown

Summary

Table 5-1 summarizes the analysis of pedestrian paths to Downtown San Rafael for the No-Build and each Build Alternative. Only the shortest and longest paths for each alternative are shown. As can be seen in the results, all build alternatives exhibit a savings in travel time and a reduction in vehicle conflicts to Downtown compared to the No-Build Alternative. The 4th Street Gateway and Whistlestop Block Alternatives exhibit a savings in travel time to Downtown compared to the Under the Freeway Alternative. Notably, the Under the Freeway Alternative, being located on the east side of Hetherton Street, leads pedestrians to have to make a greater number of street crossings and encounter conflict with a substantially higher number of vehicles than the other Build alternatives.

Table 5-1: Pedestrian Connectivity to Downtown – Summary

Alternative	Pedestrian Path	Walk Distance (mi)	Walk Time	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.38	12:40	2,304	2,703
	Far	0.45	14:40	2,304	2,703
4th Street Gateway	Near (N)	0.33	10:10	897	1,205
	Far (S)	0.38	12:10	1,015	1,318
Under the Freeway	Near (S)	0.35	11:30	2,162	2,373
	Far (N)	0.45	14:00	1,840	2,128
Whistlestop Block	Near	0.29	09:20	955	1,222
	Far	0.37	12:00	1,034	1,360

Walk times provided in minutes:seconds format

5.3 Pedestrian Connectivity to Local Destinations

In addition to Downtown San Rafael, other local destinations serve as trip attractors for transit center users. To evaluate each alternative's strength in providing connectivity to non-downtown local destinations, the project team evaluated the pedestrian routes between the transit center and two locations for each alternative:

- San Rafael High School (specifically, the front of the school on 3rd Street between Union Street and Embarcadero Way)
- BioMarin campus (specifically, a point on the campus fronting 2nd Street between Lincoln Avenue and Lindaro Street)

The team then estimated walk times and utilized existing vehicle volumes to determine the number of conflicting vehicles encountered by pedestrians on their route between the transit center and the above destinations.

No-Build Alternative/Existing Transit Center Site

The existing transit center is on the block bound by 2nd Street, Tamalpais Avenue, 3rd Street, and Hetherton Street. Figure 5-5 presents the pedestrian connectivity analysis from the No-Build Alternative to San Rafael High School and BioMarin's campus.

The pedestrian routes identified for San Rafael High School include:

- *Pedestrian Route 1:* This is the nearest path to the school starting from the northeast of transit center at Hetherton Street and 3rd Street. Pedestrians would utilize the north side of 3rd Street and proceed east toward the school. This option is a 17.5-minute walk (0.44 miles). The total conflicting vehicle volume on 3rd Street (from the five cross streets of Hetherton Street, Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 5,164 vehicles and during the p.m. peak hour is 4,710 vehicles.
- *Pedestrian Route 2*: This is the farthest path to the school from the west side of the transit center at Tamalpais Avenue and Ritter Street. Pedestrians would proceed north on Tamalpais Avenue and turn right on 3rd Street. Pedestrians would utilize the north side of 3rd Street and proceed east toward the school. This option is a 20.1-minute walk (0.53 miles). The total conflicting vehicle volume during the a.m. peak hour is 5,164 vehicles and during the p.m. peak hour is 4,710 vehicles.

The pedestrian routes identified for the BioMarin Campus include:

- *Pedestrian Route 1*: This is the nearest path to the BioMarin Campus from the west side of the transit center at Tamalpais Avenue and Ritter Street. Pedestrians would proceed west on 2nd Street to get to the campus. This option is a 5.5-minute walk (0.14 miles).
- *Pedestrian Route 2*: This is the farthest path to the BioMarin Campus from the west side of the transit center at Tamalpais Avenue and Ritter Street. Pedestrians would proceed south on Hetherton Street and make a right on 2nd Street. This option is a 7.5-minute walk (0.22 miles).

The walk trip to BioMarin encounter 2,700 to 3,050 vehicle conflicts.

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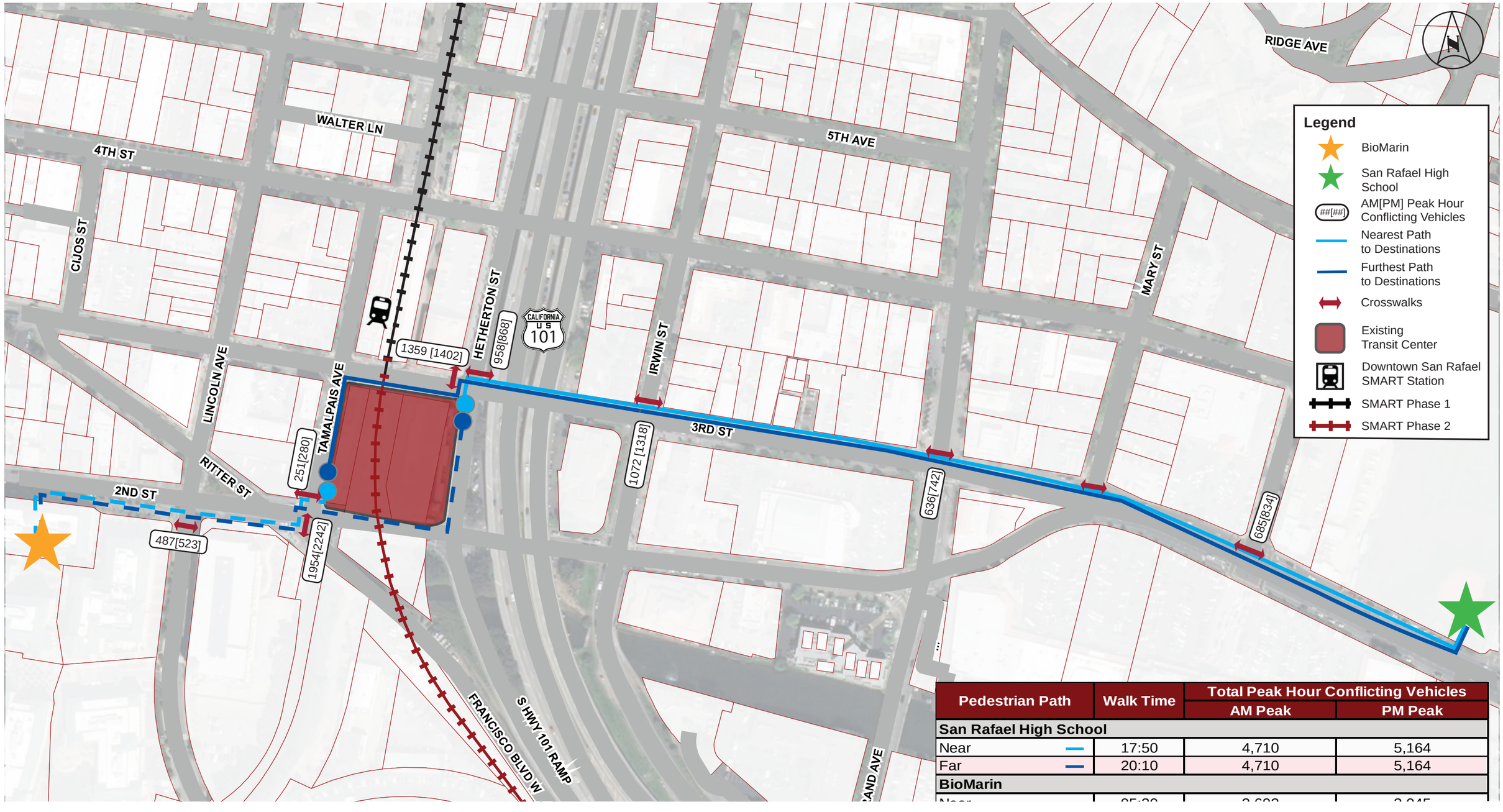

Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
San Rafael High School			
Near	17:50	4,710	5,164
Far	20:10	4,710	5,164
BioMarin			

Kimley»Horn

Figure 5-5: No-Build Alternative - Connectivity to Other Local Destinations

4th Street Gateway Alternative

Two pedestrian routes were identified for this alternative for each of the two local destinations considered, one "long" and one "short" route. The long route is the route taken by pedestrians from the Bay farthest from the selected destination, while the short route is the closest. The routes identified are shown in Figure 5-6.

The pedestrian routes identified for San Rafael High School include:

- *Pedestrian Route 1*: This is the nearest path to the school from the southern block of the transit center, located at the corner of 3rd Street and Hetherton Street. Pedestrians would utilize the north side of 3rd Street and proceed east toward the school. This option is a 17-minute walk (0.54 miles). The total conflicting vehicle volume on 3rd Street (from the five cross streets of Hetherton Street, Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 3,351 vehicles and during the p.m. peak hour is 3,762 vehicles.
- *Pedestrian Route 2*: This is the farthest path to the school, from the northern block of the transit center near Fifth Avenue and Hetherton Street. Pedestrians would utilize Hetherton Street and the north side of 3rd Street to reach the school under this modeled route. This option is a 20.7-minute walk (0.66 miles). The total conflicting vehicle volume (from the crossing volumes at Hetherton Street and 4th Street, and the four intersections of 3rd Street and Hetherton Street, Irwin Street, Grand Avenue, and Mary Street) during the a.m. peak hour is 4,294 vehicles and during the p.m. peak hour is 4,685 vehicles.

The pedestrian routes identified for the BioMarin campus include:

- *Pedestrian Route 1*: This is the nearest path to BioMarin from the southern block of the transit center, located at the corner along 3rd Street. The assumed route would utilize 3rd Street, Lincoln Avenue, and 2nd Street to reach the campus. This option is an 8.5-minute walk (0.21 miles). The total conflicting vehicle volume (from the crossing volumes at 3rd Street and Tamalpais Avenue, 3rd Street and Lincoln Avenue, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 3,636 vehicles and during the p.m. peak hour is 4,342 vehicles.
- *Pedestrian Route 2*: This is the farthest path to BioMarin from northern block of the transit center near Fifth Avenue and Hetherton Street. The assumed route would utilize 4th Street, Lincoln Avenue, and 2nd Street to reach the campus. This option is a 12.2-minute walk (0.32 mile). Total conflict vehicles encounter over five crossings (across Tamalpais Avenue, Lincoln Avenue, Ritter Street, and 2nd Street) during the a.m. peak hour is 3,636 vehicles and during the p.m. peak hour is 4,342 vehicles.

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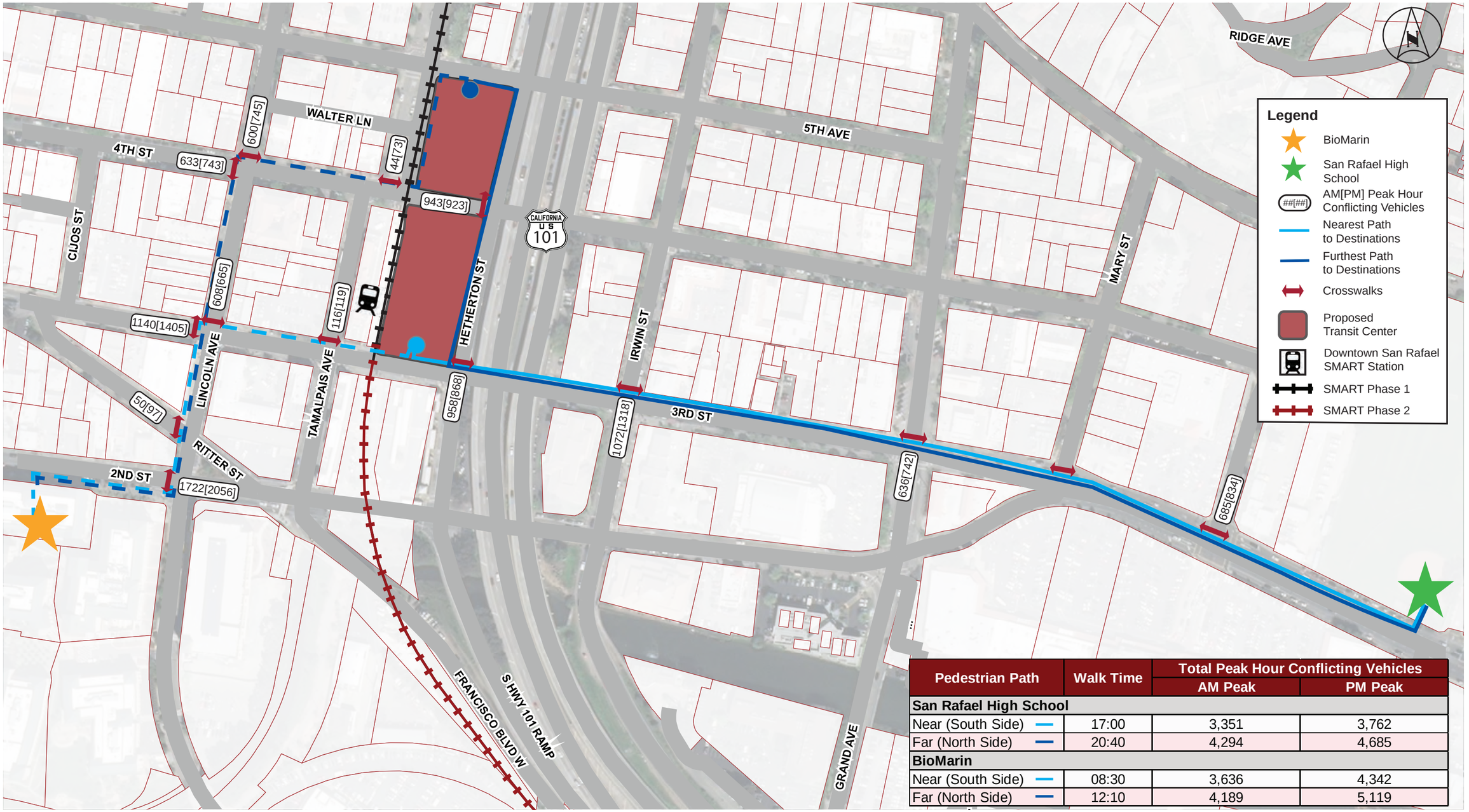


Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
San Rafael High School			
Near (South Side)	17:00	3,351	3,762
Far (North Side)	20:40	4,294	4,685
BioMarin			
Near (South Side)	08:30	3,636	4,342
Far (North Side)	12:10	4,189	5,119

Figure 5-6: 4th Street Gateway Alternative - Connectivity to Other Local Destinations

Under the Freeway Alternative

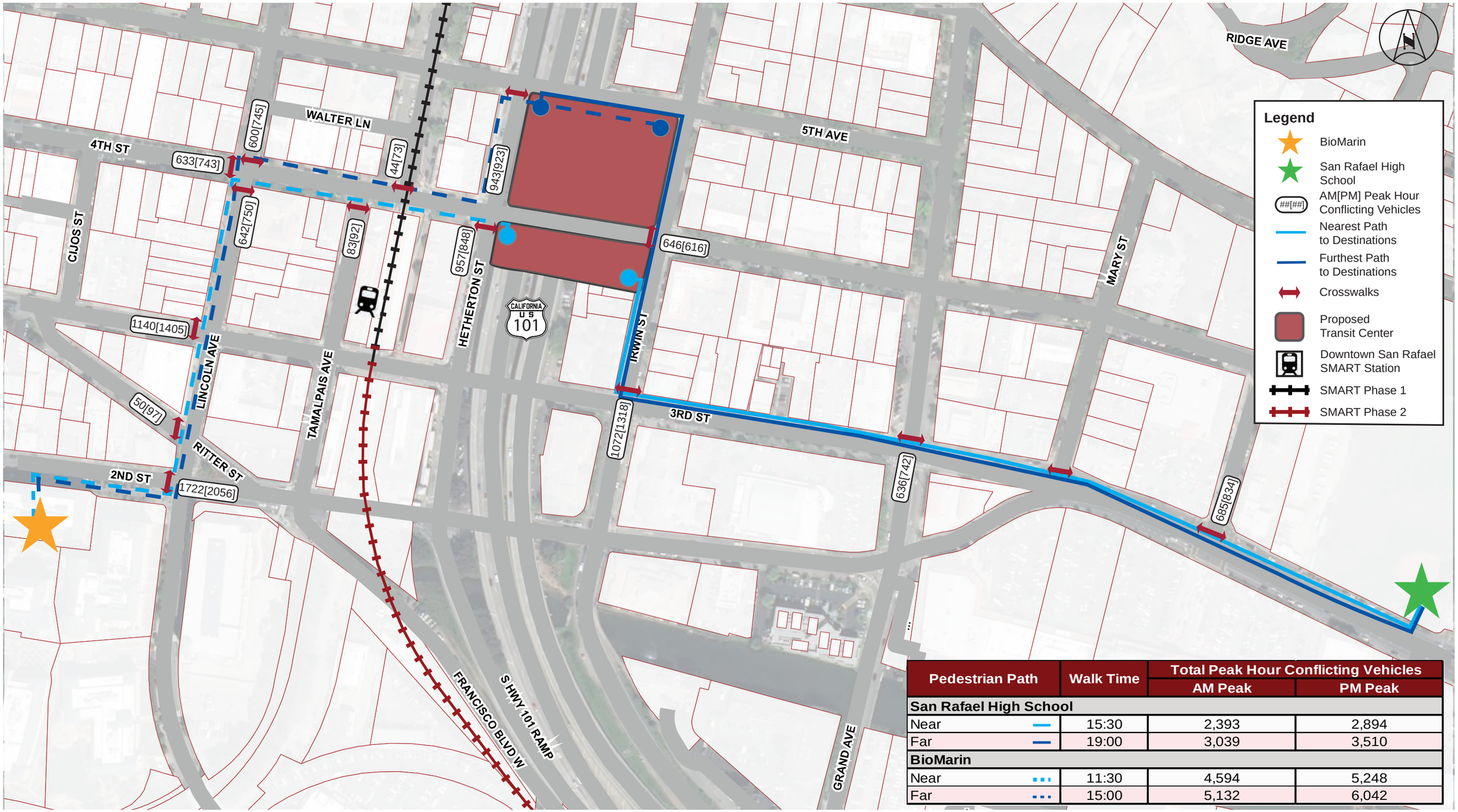
Two pedestrian routes were identified for this alternative for each of the two local destinations considered, one "long" and one "short" route. The long route is the route taken by pedestrians from the Bay farthest from the selected destination, while the short route is the closest. The routes identified are shown in Figure 5-7.

The pedestrian routes identified for San Rafael High School include:

- *Pedestrian Route 1:* This is the nearest path to the school from the southern block of the transit center near the corner of 4th Street and Irwin Street. Pedestrians would utilize the west side of Irwin Street and the north side of 3rd Street to reach the school. This option is a 15.5-minute walk (0.55 miles). The total conflicting vehicle volume on 3rd Street (from the crossing volumes at Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 2,393 vehicles and during the p.m. peak hour is 2,894 vehicles.
- *Pedestrian Route 2*: This is the furthest path to the school from the northern block of the transit center near the corner of Fifth Avenue and Hetherton Street. Pedestrians would utilize Fifth Avenue, Irwin Street, and the north side of 3rd Street to reach the school. This option is a 19-minute walk (0.62 miles). The total conflicting vehicle volume (from the crossing volumes at 4th Street and Irwin Street and the intersections of 3rd Street with Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 3,039 vehicles and during the p.m. peak hour is 3,510 vehicles.

The pedestrian routes identified for the BioMarin campus include:

- *Pedestrian Route 1:* This is the nearest path to BioMarin from the southern block of the transit center near Hetherton Street and 4th Street. Pedestrians would utilize the south side of 4th Street, turn onto Lincoln Avenue, and proceed south toward 2nd Street. This option is a 11.5-minute walk (0.3 miles). The total conflicting vehicle volume (from the crossing volumes at 4th Street and Hetherton Street, 4th Street and East and West Tamalpais Avenue, 4th Street and Lincoln Avenue, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 4,594 vehicles and during the p.m. peak hour is 5,248 vehicles.
- *Pedestrian Route 2*: This is the farthest path to BioMarin from the northern block of the transit center near the corner of Fifth Avenue and Hetherton Street. Pedestrians would utilize Hetherton Street, the north side of 4th Street, and Lincoln Avenue to reach the campus This option is a 15-minute walk (0.41 miles). The total conflicting vehicle volume (from the crossing volumes at 4th Street and Hetherton Street, 4th Street and East and West Tamalpais Avenue, 4th Street and Lincoln Avenue, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 5,132 vehicles and during the p.m. peak hour is 6,042 vehicles.



Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
San Rafael High School			
Near	15:30	2,393	2,894
Far	19:00	3,039	3,510
BioMarin			
Near	11:30	4,594	5,248
Far	15:00	5,132	6,042

Figure 5-7: Under the Freeway Alternative - Pedestrian Connectivity to Downtow

Whistlestop Block Alternatives

Two pedestrian routes were identified for these alternatives for each of the two local destinations considered, one "long" and one "short" route. The long route is the route taken by pedestrians from the Bay farthest from the selected destination, while the short route is the closest. The routes identified are shown in Figure 5-8.

The pedestrian routes identified for San Rafael High School include:

- *Pedestrian Route 1*: This is the nearest path to the school from the southern portion of the transit center, located at the corner of 3rd Street and Hetherton Street. Pedestrians would utilize the north side of 3rd Street and proceed east toward the school. This option is a 17.2-minute walk (0.55 miles). The total conflicting vehicle volume on 3rd Street (from the five cross streets of Hetherton Street, Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 3,351 vehicles and during the p.m. peak hour is 3,762 vehicles.
- *Pedestrian Route 2*: This is the farthest path to the school from the northern portion of the transit center, at 4th Street and Tamalpais Avenue. Pedestrians would utilize Tamalpais Avenue and the north side of 3rd Street to reach the school. This option is a 20.3-minute walk (0.65 miles). The total conflicting vehicle volume on 3rd Street (from the five cross streets of Hetherton Street, Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 3,467 vehicles and during the p.m. peak hour is 3,881 vehicles.

The pedestrian routes identified for the BioMarin campus include:

- *Pedestrian Route 1*: This is the nearest path to BioMarin from south of the station, at Tamalpais Avenue and 3rd Street. Pedestrians would utilize 3rd Street, Lincoln Avenue, and 2nd Street to reach the BioMarin campus. This option is a 7-minute walk (0.17 miles). The total conflicting vehicle volume (from the crossing volumes at Lincoln Avenue and 3rd Street, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 3,520 vehicles and during the p.m. peak hour is 4,223 vehicles.
- *Pedestrian Route 2*: This is the farthest path to BioMarin from the northeast corner of the station, at 4th Street and Hetherton Street. Pedestrians would utilize 3rd Street, Lincoln Avenue, and 2nd Street to reach the campus. This option is a 10.2-minute walk (0.27 miles). The total conflicting vehicle volume (from the crossing volumes at Lincoln Avenue and 3rd Street, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 3,636 vehicles and during the p.m. peak hour is 4,342 vehicles.

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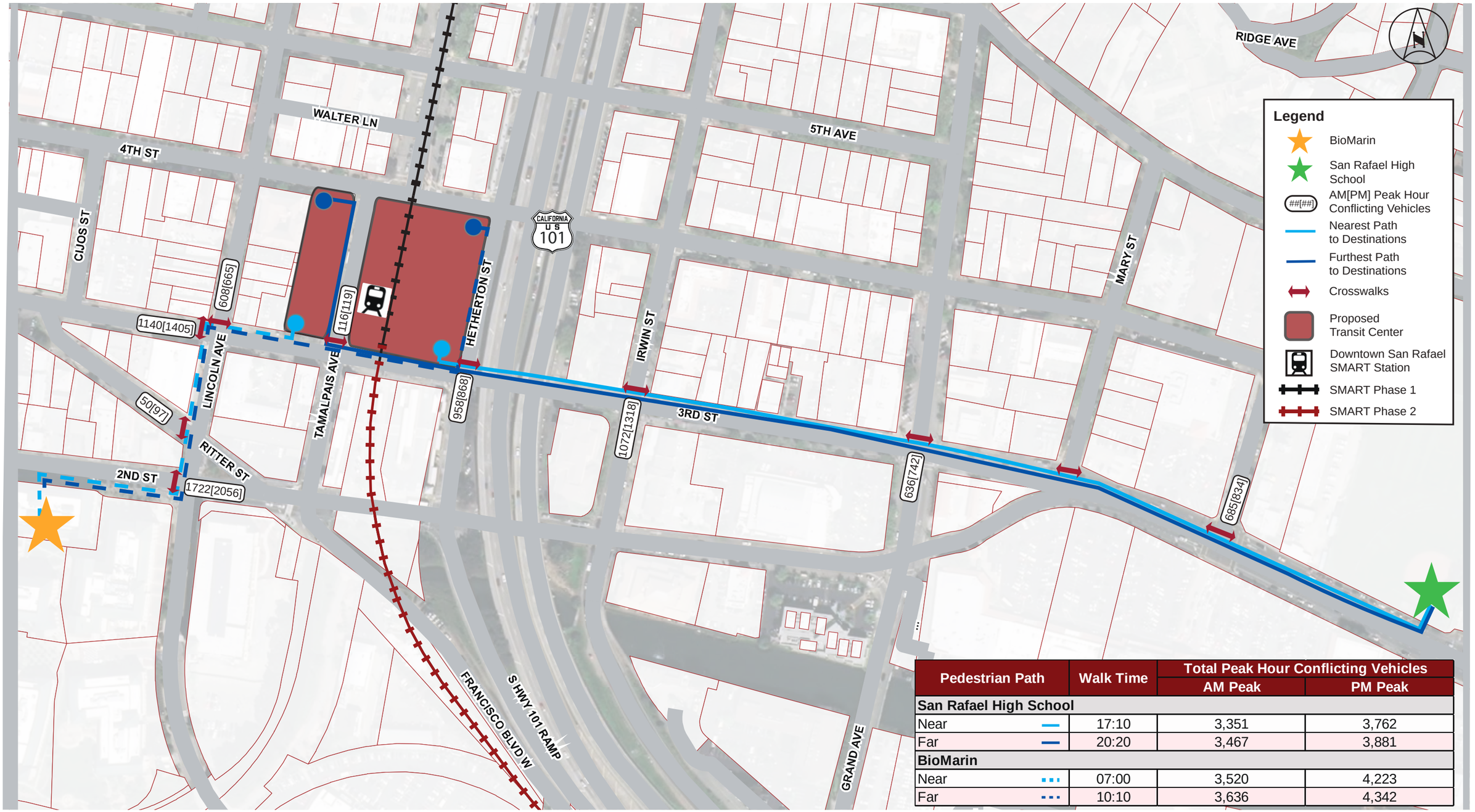

Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
San Rafael High School			
Near	17:10	3,351	3,762
Far	20:20	3,467	3,881
BioMarin			
Near	07:00	3,520	4,223
Far	10:10	3,636	4,342

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Figure 5-8: Whistlestop Block Alternative - Pedestrian and Bicycle Connectivity to Other Local Destinations

Summary

Table 5-2 summarizes the analysis of pedestrian paths to San Rafael High School for each alternative. As shown in the results, all build alternatives exhibit a savings in travel time and a reduction in vehicle conflicts on walking trips to San Rafael High School compared to the No-Build Alternative. The Under the Freeway Alternative, by nature of being on the east side of Hetherton Street, requires pedestrians to conflict with fewer vehicles when making street crossings on the way to the school. That alternative also exhibits shorter walk times to the transit center, though passengers coming from the north side of the transit center may experience a walk time similar to those of other alternatives. The 4th Street Gateway Alternative, by nature of being the farthest away from the school, exhibits longer walk times and greater conflicting vehicle volumes for pedestrians than the other build alternatives.

Table 5-2: Pedestrian Connectivity to Other Destinations – San Rafael High School

Alternative	Pedestrian Path	Walk Distance (mi)	Walk Time	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.44	17:50	4,710	5,164
	Far	0.53	20:10	4,710	5,164
4th Street Gateway	Near (S)	0.54	17:00	3,351	3,762
	Far (N)	0.66	20:40	4,294	4,685
Under the Freeway	Near	0.51	15:30	2,393	2,894
	Far	0.62	19:00	3,039	3,510
Whistlestop Block	Near	0.55	17:10	3,351	3,762
	Far	0.65	20:20	3,467	3,881

Walk times provided in minutes:seconds format

Table 5-3 summarizes the analysis of pedestrian paths to the BioMarin campus for the No-Build Alternative and each build alternative. Aside from the No-Build Alternative, the results show the Whistlestop Block Alternatives have the shortest walk times to the campus compared to the other build alternatives. The Under the Freeway Alternative, by nature of being the farthest away from the campus, requires pedestrians to make crossings that conflict with a greater number of vehicles than the other alternatives. Like in other scenarios, this is largely a result of it being located on the east side of Hetherton Street, which is a high-volume street.

Table 5-3: Pedestrian Connectivity to Other Destinations – BioMarin Campus

Alternative	Pedestrian Path	Walk Distance (mi)	Walk Time	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.14	05:30	2,692	3,045
	Far	0.22	07:30	2,692	3,045
4th Street Gateway	Near (S)	0.21	08:30	3,636	4,342
	Far (N)	0.32	12:10	4,189	5,119
Under the Freeway	Near	0.30	11:30	4,594	5,248
	Far	0.41	15:00	5,132	6,042
Whistlestop Block	Near	0.18	07:10	3,520	4,223
	Far	0.27	10:10	3,636	4,342

Walk times provided in minutes:seconds format

5.4 Pedestrian Connectivity between SMART and Bus

Each alternative's effectiveness at serving the SMART and bus connection was evaluated by identifying the major pedestrian barriers (i.e., street crossings) to making this transfer. Using data included in Chapter 3 on existing transfer patterns by route, the number of daily transfers between SMART and bus routes at the transit center that would need to cross a city street to make the transfer was estimated. These transfer volumes are shown in Table 5-4.

Table 5-4. Weekday Daily Average Transfer Volume between SMART and Bus

Alternative and Street Crossing	Daily SMART/Bus Transfers Required to Make Street Crossings				
	SMART to Bus	Bus to SMART	Longest SMART to Bus Transfer Distance (ft)	Longest SMART to Bus Transfer Time	Total
No-Build	66	46	625	03:40	112
4th Street Gateway (Crossing 4th Street)	56	39	625	03:40	95
Under the Freeway (Crossing Hetherton Street and/or 4th Street)	66	46	1,050	06:30	112
Whistlestop Block	0	0	500	02:25	0

As can be seen in the above table, the 4th Street Gateway and Under the Freeway Alternatives result in similar numbers of SMART transfers having to cross a city street to make the transfer; however, the nature of the street that they have to cross is very different. To quantify the conflict between these added pedestrian crossings and vehicle traffic, a conflict quotient was estimated by multiplying the number of peak hour crossings by the conflicting peak hour vehicle volume. These are shown in Table 5-5 for the p.m. peak hour, which is the hour with the highest SMART and bus transfer activity. The peak-hour transfer volume was estimated based on hourly ridership patterns at the transit center.

Notably, while all build alternatives are better than the No-Build Alternative by removing the crossing of 3rd Street, the Under the Freeway Alternative produces a greater conflict quotient than the other build alternatives because it forces all transfers to SMART to cross higher-volume streets (i.e., Hetherton Street) than the other alternatives.

Table 5-5. P.M. Peak Hour SMART – Bus Transfer Conflict Quotients

Alternative	Peak Hour Transfer Volume	Conflicting Vehicle Volume	Conflict Quotient
No-Build	34	1,483	50,422
4th Street Gateway	29	616	17,864
Under the Freeway	34	713	24,242
Whistlestop Block	0	0	0

5.5 Pedestrian Connectivity within the Transit Center

While approximately half of the transit center users are destinated to or from Downtown San Rafael, the other half are transferring between routes. To identify the effectiveness of the alternatives in meeting the needs of transferring passengers, analysis was performed on the quality of the bus-to-bus transfer.

The 4th Street Gateway Alternative utilizes two blocks separated by 4th Street. The Under the Freeway Alternative uses two blocks also separated by 4th Street. The Whistlestop Block Alternatives are on a single block as West Tamalpais Avenue is converted to bus traffic only and East Tamalpais Avenue is closed. To quantify the impact to users for having to cross city streets, the proposed bay assignments, existing pedestrian volumes, and existing transfer activity data were used to estimate the number of pedestrian crossings of city streets. The results are shown in Table 5-6.

Table 5-6. Peak Hour Bus-to-Bus Transfers and Existing Pedestrian Volume

Alternative	A.M. Peak Hour			P.M. Peak Hour			Longest Bus to Bus Transfer Distance (ft)	Longest Bus to Bus Transfer Time
	Transfer Volume Across Street	Conflicting Vehicles	Conflict Quotient	Transfer Volume Across Street	Conflicting Vehicles	Conflict Quotient		
No-Build	0	0	0	0	0	0	450	2:10
4th Street Gateway	93	631	58,683	112	616	68,992	625	3:40
Under the Freeway	32	713	22,816	39	718	28,002	625	3:40
Whistlestop Block	0	0	0	0	0	0	625	3:40

The No-Build and Whistlestop Block Alternatives, as a result of being located on one contiguous site, do not require transfers across city streets. As the results show, the 4th Street Gateway Alternative results in the greatest number of added pedestrian volume to street crossings; this is a result of it being the most evenly bifurcated of the alternatives. The Under the Freeway Alternative is divided by 4th Street, but the majority of bays and the majority of heavy-transfer routes are located to the north of 4th Street.

5.6 Bicycle Conditions

Existing Conditions

The following bicycle facilities are located in close proximity to the Project alternatives and are shown in Figure 5-9:

- Puerto Suello Bike Path – A Class I north-south off-street trail that runs along the east side Hetherton Street and has a southern terminus at 4th Street
- Mahon Creek Path – A Class I east-west off-street trail that runs along the San Rafael Creek and through the BioMarin campus
- Francisco Boulevard Cycle Track – A Class IV two-way cycle track on the west side of Francisco Boulevard between Rice Drive and 2nd Street (connecting to the Mahon Creek path)
- Class III east-west bike route on 4th Street throughout the study area, with a gap between Hetherton Street and Irwin Street
- Class III north-south bike route on Lincoln Avenue with a northern terminus at 2nd Street
- Class III north-south bike route on Grand Avenue with a southern terminus at Fifth Avenue

Existing bicycle parking on the current transit center site consists of two racks with a capacity for eight bikes each. Additionally, there are 10 U-shaped bike racks and four bike lockers located along the east side of West Tamalpais Avenue, immediately north of 4th Street. Secured bicycle parking is also available in the Caltrans park & ride lot under US 101, north of 3rd Street.

Year 2040 Conditions and Build Alternatives

In 2018, the City of San Rafael completed an update to its Bicycle and Pedestrian Master Plan, which included proposed improvements to the bicycle network in the study area. Improvements proposed in close proximity to the Project alternatives, and shown in Figure 5-9 include:

- A Class I bike path along the SMART right-of-way south of 2nd Street
- The North South Greenway, a Class IV protected bike facility along Tamalpais Avenue between 2nd Street and Laurel Place

Construction of the build alternatives would include some modifications to the existing bicycle network. All build alternatives are proposed to include at least 20 unsecure and 10 secure bicycle parking spaces on site.

Under the 4th Street Gateway Alternative, the existing Class I path on the west side of Hetherton Street would be removed between 4th Street and Fifth Avenue (shown in Figure 5-10). Instead, bikes would use Fifth Avenue to connect from the Puerto Suello Bike Path to the planned Class IV facility on Tamalpais Avenue.

The Under the Freeway Alternative does not include any modifications to the existing bike network (shown in Figure 5-11).

The Whistlestop Block Alternatives would construct the City's planned North South Greenway on Tamalpais Avenue between 2nd Street and 4th Street (shown in Figure 5-12).

SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

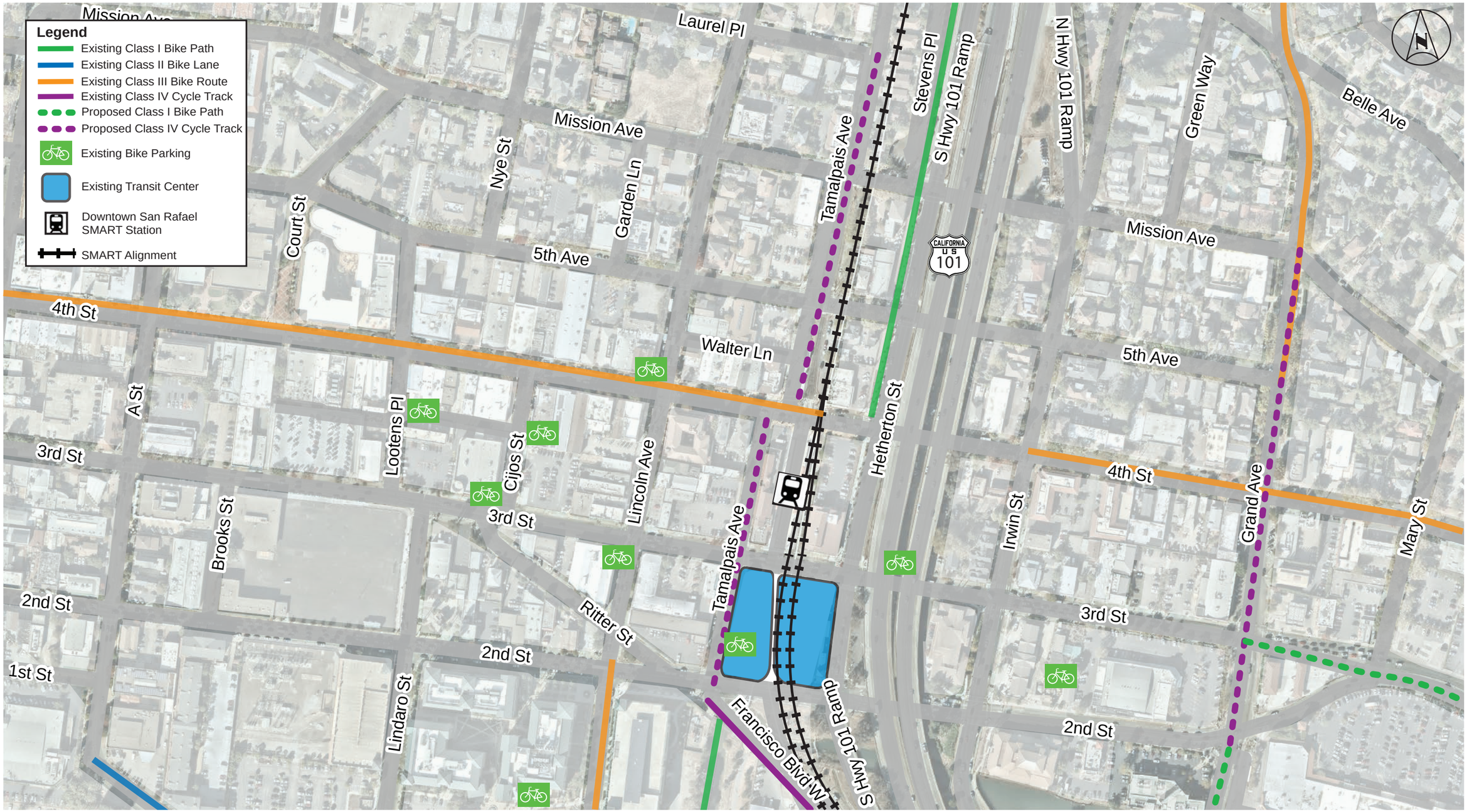

Figure 5-9: Existing and Planned Bicycle Network

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Relocation Analysis, Environmental Clearance, and Preliminary Design

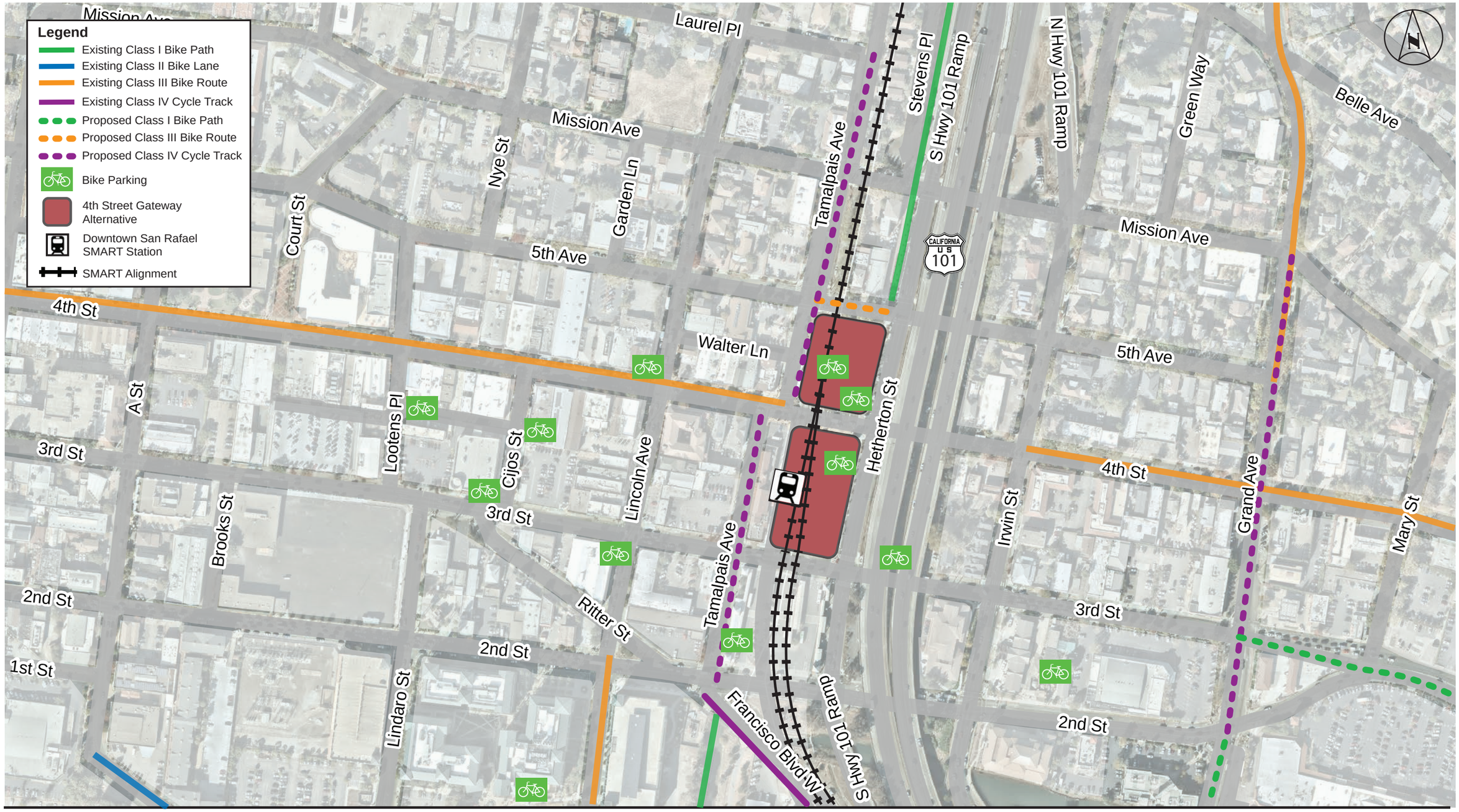

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Figure 5-10 Planned Bicycle Network - 4th Street Gateway

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Relocation Analysis, Environmental Clearance, and Preliminary Design

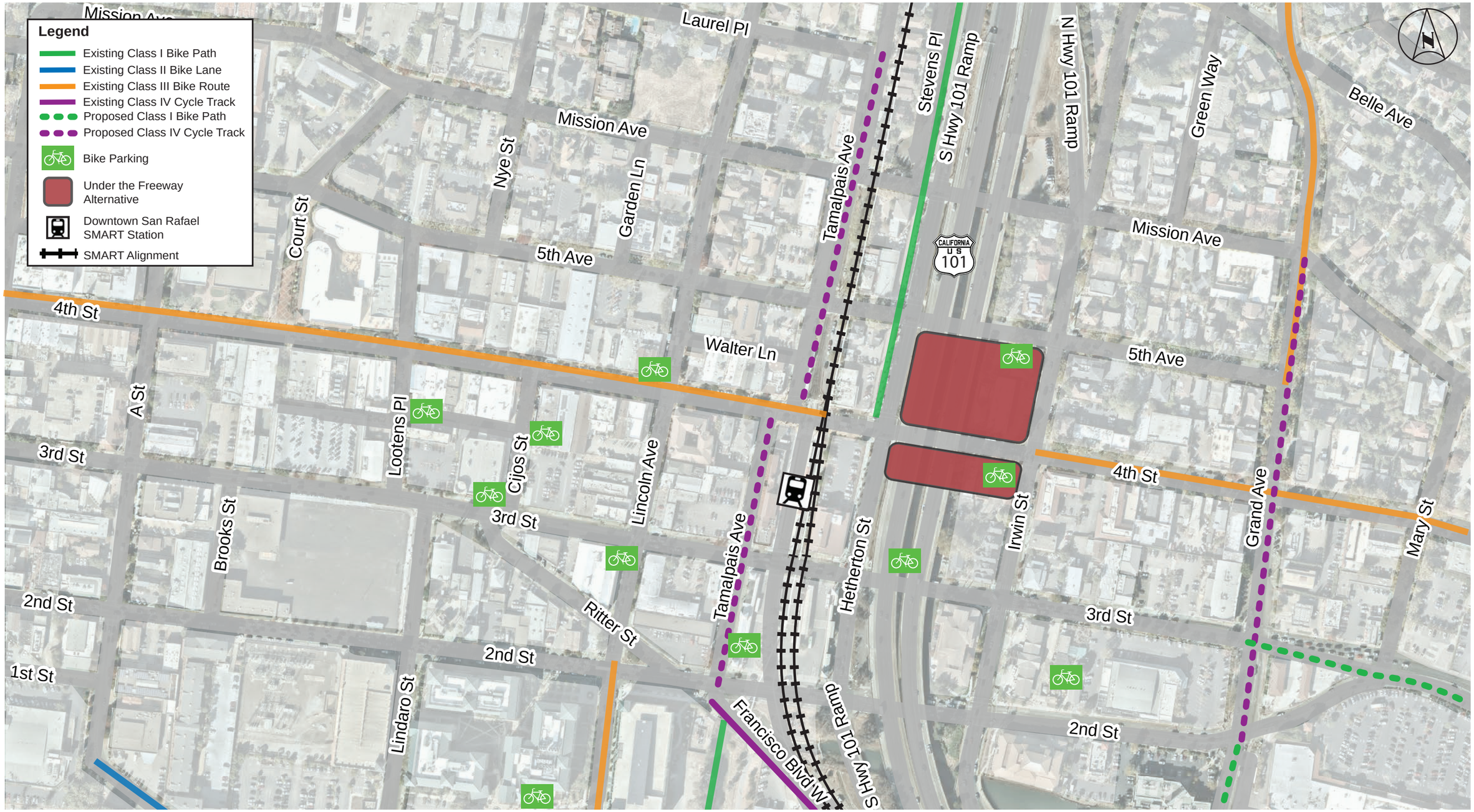

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Figure 5-11: Planned Bicycle Network - Under the Freeway

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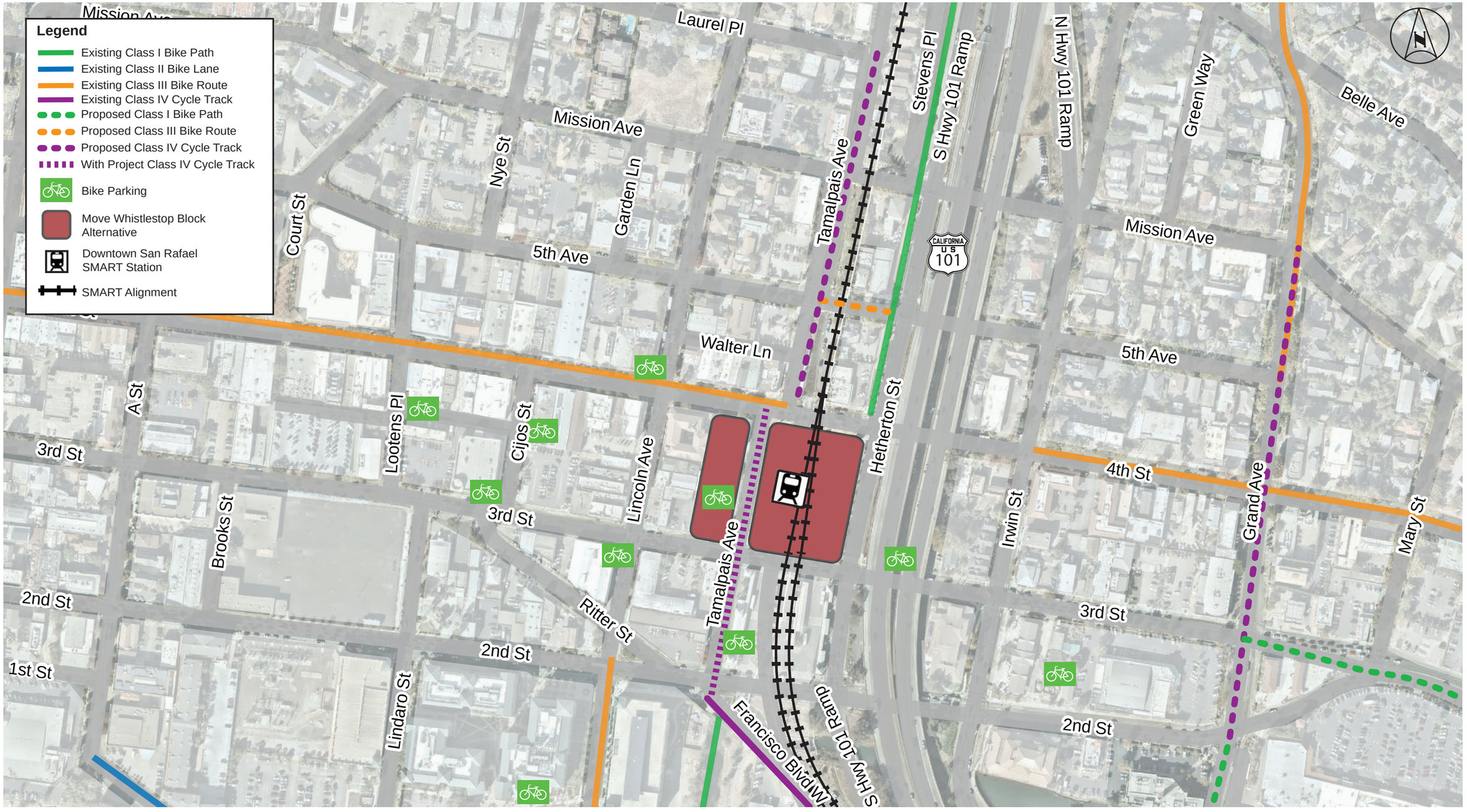

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Figure 5-12: Planned Bicycle Network - Whistlestop Block

6.0 Safety

The safety analysis includes the blocks immediately surrounding the Project alternatives and includes the block bounded by 2nd Street, Irwin Street, Fifth Avenue, and West Tamalpais Avenue.

All of the Project alternatives provide several advantages relative to the No-Build Alternative. This includes a reduction in vehicle-auto conflicts for most users and the implementation of pedestrian safety treatments, such as high-visibility crosswalks, LPIs, and enhanced lighting. Appendix D summarizes the findings of the pedestrian paths analysis to nearby destinations.

6.1 No-Build Alternative

The results identified that the intersections around the transit center and SMART station collision rates are higher than statewide averages with the existing transit center location in the No-Build Alternative.

6.2 4th Street Gateway Alternative

The 4th Street Gateway Alternative requires some passengers to cross 4th Street to transfer between transit services, which is a lower volume street than 3rd Street, but still introduces some conflicts. This alternative reduces the number of driveway and vehicle conflicts on the south side of 4th Street; however, it introduces a larger pedestrian crossing on the north side of 4th Street across the transit center driveway that increases pedestrian exposure.

6.3 Under the Freeway Alternative

The Under the Freeway Alternative also shifts the transit center north of 3rd Street, reducing the number of vehicle conflicts for pedestrians traveling north into downtown, it shifts the transit center east of Hetherton Street, adding a new barrier with significant vehicle-pedestrian conflicts. It requires passengers transferring between SMART and bus accessing Downtown San Rafael to cross Hetherton Street at 4th Street or Fifth Avenue, which are high-traffic volume intersections. Additionally, many transfers would also have to cross 4th Street to transfer between buses or between bus and SMART. The 4th Street and Hetherton Street intersection has the highest existing total collision rate amongst intersections within the study area, while 4th Street and Irwin Street has the highest number of existing pedestrian and bicycle collisions. The 4th Street and Irwin Street intersection also has more than double the existing rate of pedestrian- and bicycle-involved collisions as any other intersection in the study area. Increasing pedestrian activity at this intersection with this alternative may introduce new safety hazards. The Under the Freeway Alternative would also introduce a very long driveway along Irwin Street, increasing pedestrian exposure and adding a barrier to pedestrian movements along Irwin Street. Additionally, crosswalks within the transit center would have constrained visibility due to the presence of columns supporting the US 101 viaduct.

6.4 Whistlestop Block Alternatives

Analysis of pedestrian paths of travel indicate that the Move Whistlestop Alternative is the most effective at reducing or eliminating pedestrian conflicts for both transfers between transit modes and between the transit center and Downtown San Rafael. The Whistlestop Block Alternatives are the only alternatives where users transferring between transit modes do not experience any auto conflicts. Those alternatives, along with 4th Street Gateway, also result in the shortest walk time and substantially

fewer vehicle-pedestrian conflicts for movements to Downtown San Rafael, the predominate destination for transit riders, than both the Under the Freeway and No-Build Alternatives.

The Whistlestop Block Alternatives keep all transfer activity within the intermodal station block and passengers do not have to cross any streets, further enhancing pedestrian safety and reducing conflicts. Crosswalks within the transit center would have good visibility and would include crossing a single-direction bus lane. Outside of the limits of the transit center itself, these alternatives also include removing the vehicle-pedestrian conflict through signalization between the southbound right-turn movement at Hetherton Street and 3rd Street and the west leg pedestrian movement, a location that has a history of severe pedestrian injuries.

The Whistlestop Block Alternatives also incorporate dedicated bicycle facilities along West Tamalpais Avenue between 2nd and 4th Streets, connecting to the Mahon Creek Path and the new protected bicycle facility on Francisco Boulevard, which will provide safer bicycle conditions to/from the SRTC. By re-aligning West Tamalpais Avenue, crossing distances across 3rd Street and 4th Street will be shortened and visibility improved, benefitting bicycle and pedestrian safety for this movement.

7.0 Parking

This section describes the effects of each alternative on parking supply in the study area. The loss of parking is not a significant impact according to CEQA. Parking loss is noted for informational purposes only.

7.1 No-Build Alternative

Under the No-Build Alternative there would be no effects to the baseline parking supply.

7.2 4th Street Gateway Alternative

In the 4th Street Gateway Alternative, a total of 32 parking spaces would be removed in the following locations: six on-street taxicab parking spaces on the east side of East Tamalpais Avenue between 3rd Street and 4th Street; two parking spaces on the east side of West Tamalpais Avenue between 3rd Street and 4th Street; two on-street spaces on the north side of 4th Street between East Tamalpais Avenue and Hetherton Street; 11 on-street parking spaces on East Tamalpais Avenue between 4th Street and Fifth Avenue; eight on-street parking spaces on the east side of Tamalpais Avenue between 4th Street and Fifth Avenue; and three on-street parking spaces on the south side of Fifth Avenue between East Tamalpais Avenue and Hetherton Street. The businesses on East Tamalpais Avenue, between 4th Street and Fifth Avenue, on 4th Street, and on Fifth Avenue that are closest to the on-street parking would be relocated with the 4th Street Gateway Alternative.

Three parking spaces are planned to be added for taxicab parking on the east side of West Tamalpais Avenue between 3rd Street and 4th Street. The 4th Street Gateway Alternative would result in a net loss of 29 parking spaces.

7.3 Under the Freeway Alternative

In the Under the Freeway Alternative, a total of 16 on-street and 72 off-street parking spots would be removed. Eight parking spaces on the south side of Fifth Avenue between Irwin Street and Hetherton Street would be removed, as well as eight parking spaces on the west side of Irwin Street between 4th Street and Fifth Avenue. The businesses on Irwin Street that are closest to the on-street parking would be relocated with the Under the Freeway Alternative. The new transit center would utilize the entire space currently occupied by the Caltrans park & ride under Highway 101 between 4th Street and Fifth Avenue, resulting in a loss of 55 spaces. It would also utilize 17 spaces of the Caltrans park & ride lot under the freeway between 3rd Street and 4th Street.

Two parking spaces are planned to be added for taxicab parking on the south side of Fifth Avenue between Hetherton Street and Irwin Street. The Under the Freeway Alternative would result in a net loss of 14 on-street and 72 off-street park & ride spots. As required by Caltrans, the park & ride spaces will need to be replaced elsewhere in a location that serves a similar commute market. No location for replacement park & ride parking has been identified.

7.4 Whistlestop Block Alternatives

In the Whistlestop Block Alternatives, 31 on-street parking stalls would be removed in the following locations: six on-street parking stalls on Tamalpais avenue between Second Street and 3rd Street; six on-street taxicab parking spaces on the east side of East Tamalpais Avenue between 3rd Street and 4th Street; 16 on-street parking stalls on Tamalpais Avenue between 3rd Street and 4th Street; one on-street

parking stall on the south side of 4th Street between Lincoln Avenue and Tamalpais Avenue; and two on-street spaces on the north side of 4th Street between East Tamalpais Avenue and Hetherton Street. The existing businesses on Tamalpais Avenue that are closest to the on-street parking would be relocated with the Whistlestop Block Alternatives.

In the Move Whistlestop Alternative, a total of 18 parking stalls would be added in the following locations: 16 parking stalls will be added on Tamalpais Avenue between Second Street and 3rd Street; and two taxicab parking stalls on the north side of 4th Street between East Tamalpais Avenue and Hetherton Street. The Move Whistlestop Alternative would result in a net loss of 13 on-street parking stalls.

In the Adapt Whistlestop Alternative, a total of 10 parking stalls would be added in the following locations: 8 parking stalls will be added on the east side of Tamalpais Avenue between Second Street and 3rd Street; and two taxicab parking stalls on the north side of 4th Street between East Tamalpais Avenue and Hetherton Street. The Adapt Whistlestop Alternative would result in a net loss of 21 on-street parking stalls. Table 7-1 provides a summary of the parking removed and planned for each alternative.

Table 7-1. Net Change in Public Parking

Alternative	Removed		Planned		Net Total	
	On-Street	Off-Street	On-Street	Off-Street	On-Street	Off-Street
4th Street Gateway	26	0	0	0	-26	0
Under the Freeway	16	72	0	0[1]	-16	-72[1]
Adapt Whistlestop	25	0	8	0	-17	0
Move Whistlestop	25	0	16	0	-9	0

[1] The impacted 72 spaces at the Caltrans park & ride lots will be required to be replaced at a similar location within the existing park & ride driveshed; however, no replacement parking area has yet been identified.

8.0 Summary

This report documents the four alternatives for the SRTC Project. The project team analyzed the three build alternatives, plus a No-Build Alternative, under existing (Year 2020) and future (Year 2040) conditions, focusing on the effects of the alternatives on transit circulation, vehicular traffic, non-motorized transportation, and parking. The analysis included the development of a VISSIM microsimulation model, which was utilized to estimate vehicle delay and transit circulation time for the alternatives. Effects on parking and pedestrian and bicycle circulation were analyzed qualitatively and quantitatively, using data on existing conditions to project conditions under the build alternatives.

The transit circulation analysis indicated that only the Whistlestop Block Alternatives achieved reductions in transit travel time and variability in both existing and future conditions in both the a.m. and p.m. peak hours. While both the Under the Freeway and 4th Street Gateway Alternatives provide benefits in existing conditions, they each increased transit travel time in one future peak hour condition.

The traffic circulation analysis found that both the Under the Freeway and Whistlestop Block Alternatives achieved reductions in delay at several congested intersections in the study area in both existing and future conditions. Both alternatives also either held congestion levels relatively constant (10 percent change or less, measured as overall network-wide vehicle delay) in both the existing and future conditions for both the a.m. and p.m. peak hours, with the exception of the Under the Freeway p.m. peak hour with future conditions where there is a 14% increase in delay. Both alternatives resulted in travel time reductions on some corridors, with small increases on other corridors. The 4th Street Gateway Alternative resulted in gridlock in a subset of the VISSIM model runs in the a.m. peak hour in Year 2040 conditions. This represented a degradation of traffic operations relative to the No-Build and other project alternatives.

The safety analysis of the blocks immediately surrounding the Project alternatives identified that the intersections around the transit center and SMART station have collision rates higher than statewide averages. This emphasizes the need to consider pedestrian and bicycle safety and access improvements as a key element of the SRTC Project. All of the build alternatives provide several advantages to the No-Build Alternative by reducing the number of vehicle-pedestrian conflicts, particularly along high-volume pedestrian routes and at high collision propensity. Data shows that pedestrian trips to and from the transit center are predominately oriented towards Downtown San Rafael to the north and west. By relocating the transit center to blocks north of 3rd Street, pedestrian crossings of 3rd Street will be greatly reduced, reducing the number of pedestrian-vehicle conflicts, particularly at intersections with a history of pedestrian- and bicycle-involved collisions and fatalities.

Analysis of pedestrian paths of travel indicate that the Whistlestop Block Alternatives are the only alternatives that limit conflicts for transferring transit passengers, have shortest walk time, and have fewer vehicle-pedestrian conflicts for movements to Downtown San Rafael and provide a high-quality bicycle facility to close a critical gap in the City's bicycle network. Outside of the limits of the transit center itself, these alternatives also include removing the existing vehicle-pedestrian conflict through signalization between the southbound right-turn movement at Hetherton Street and 3rd Street and the west leg pedestrian movement, a location that has a history of severe pedestrian injuries. The 4th Street Gateway Alternative would require a number of passengers to cross 4th Street to transfer between bus

routes. The Under the Freeway Alternative would require passengers to cross Hetherton Street at 4th Street or Fifth Avenue to access Downtown San Rafael. In addition, several passengers would have to cross 4th Street to transfer between bus routes. The Under the Freeway Alternative is adjacent to the 4th Street and Irwin Street intersection, which has more than double the existing rate of pedestrian- and bicycle-involved collisions as any other intersection in the study area. Increasing pedestrian activity at this intersection with this alternative may introduce new safety hazards.

The Whistlestop Block Alternatives were found to provide users the best transfer experience, with no required street crossings either for connections between bus and SMART or connections between bus and bus. The Under the Freeway Alternative was least desirable for SMART and bus transfers due to the requirement to cross busy Hetherton Street. The 4th Street Gateway Alternative was least desirable for bus-to-bus transfers due to the higher number of transfers across 4th Street.

The 4th Street Gateway Alternative is placed closest to Downtown San Rafael, while the Under the Freeway Alternative is placed closest to San Rafael High School, and the Whistlestop Alternatives are placed closest to BioMarin.

For bicycle connections, the Whistlestop Block Alternatives would best promote the City's planned bicycle network by constructing two blocks of the proposed Class IV bikeway on Tamalpais Avenue as a high-quality raised two-way Class IV facility. The 4th Street Gateway Alternative would require removal of one block of the Puerto Suello bike path but would provide strong connections to the Mahon Creek Path and the Puerto Suello bike path. The Under the Freeway Alternative would not closely integrate with the City's planned network nor would it affect any planned facilities.

Appendix A: Transit Circulation Tables

Existing Baseline: Average Circulation Time in Network (sec)				
Route #	Existing A.M.	AM Std Dev	Existing P.M.	PM Std Dev
17	755.1	44.9	626.4	16.4
22	760.8	49.3	650.1	41.8
23 EB	864.1	132.2	966.4	223.1
23 WB	654.0	63.9	536.9	73.7
23X EB	780.5	91.8	642.8	15.7
23X WB	574.7	50.2	530.1	47.6
27 NB	N/A	N/A	517.1	61.0
27 SB	728.1	71.9	656.2	23.6
29 EB	944.5	80.0	815.2	60.8
29 WB	913.3	62.0	715.5	37.9
30 SB	922.2	59.3	726.2	35.3
30 NB	507.7	26.3	498.0	78.0
35 SB	886.2	95.6	748.4	66.3
35 NB	870.6	139.4	764.8	52.0
36 NB	567.8	20.4	799.8	51.5
36 SB	701.7	34.2	785.3	36.1
40	638.2	29.3	561.0	29.8
40X	517.2	18.0	N/A	N/A
49	456.9	15.4	598.2	57.4
68	568.7	74.1	692.7	94.9
70 NB	657.8	118.3	505.1	81.4
70 SB	552.3	6.6	625.6	34.6
71X SB	551.7	31.5	562.4	19.6
71X NB	511.0	75.4	606.9	74.3
101 NB	518.4	39.2	698.1	82.3
101 SB	558.8	8.8	538.2	6.7
122 NB	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7
145	683.4	152.5	N/A	N/A
228	240.7	56.0	593.1	31.4
233	575.4	80.4	408.0	34.0
245	551.9	74.1	694.8	119.1
257	463.0	31.7	397.2	32.3
38 SCT	N/A	0.0	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Existing 4th Street Gateway – Average Circulation Time in Network (sec)								
Route #	Existing A.M.	Existing A.M. Standard Deviation	Existing P.M.	Existing P.M. Standard Deviation	4th Street Gateway A.M.	4th Street Gateway A.M. Standard Deviation	4th Street Gateway P.M.	4th Street Gateway P.M. Standard Deviation
17	755.1	44.9	626.4	16.4	547.1	109.4	598.9	90.5
22	760.8	49.3	650.1	41.8	746.8	123.2	530.6	29.3
23 EB	864.1	132.2	966.4	223.1	532.1	57.6	582.5	81.9
23 WB	654.0	63.9	536.9	73.7	530.4	108.2	601.1	69.9
23X EB	780.5	91.8	642.8	15.7	772.3	303.7	719.8	63.7
23X WB	574.7	50.2	530.1	47.6	693.2	75.7	760.6	216
27 NB	N/A	N/A	517.1	61.0	N/A	N/A	517.9	108.1
27 SB	728.1	71.9	656.2	23.6	722.1	113.5	545.6	42.1
29 EB	944.5	80.0	815.2	60.8	647.1	53.1	612.1	92.4
29 WB	913.3	62.0	715.5	37.9	623.1	141.4	530.6	91.1
30 SB	922.2	59.3	726.2	35.3	816.1	148.4	573.3	103.1
30 NB	507.7	26.3	498.0	78.0	712.3	87.5	734.7	99.9
35 SB	886.2	95.6	748.4	66.3	718.2	207.1	740.3	66.6
35 NB	870.6	139.4	764.8	52.0	597	56.5	573.1	37.1
36 NB	567.8	20.4	799.8	51.5	554.3	62.1	654	97.5
36 SB	701.7	34.2	785.3	36.1	477	73.5	577.5	15.5
40	638.2	29.3	561.0	29.8	626	96	651.9	90
40X	517.2	18.0	N/A	N/A	502.3	93.7	N/A	N/A
49	456.9	15.4	598.2	57.4	512.9	86.4	552.6	75.5
68	568.7	74.1	692.7	94.9	484.2	59.8	490.9	132.9
70 NB	657.8	118.3	505.1	81.4	633.7	116.3	475.8	50.7
70 SB	552.3	6.6	625.6	34.6	523.7	35.6	538.7	56.3
71X SB	551.7	31.5	562.4	19.6	499.4	142.4	619.7	28.2
71X NB	511.0	75.4	606.9	74.3	495.6	95.8	525.5	56.9
101 NB	518.4	39.2	698.1	82.3	476.3	78.6	584.7	115.8
101 SB	558.8	8.8	538.2	6.7	511.4	61.9	722.1	43.1
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7	N/A	N/A	693.1	101.4
145	683.4	152.5	N/A	N/A	863.6	164.9	N/A	N/A
228	240.7	56.0	593.1	31.4	600.6	67.2	652.9	99.2
233	575.4	80.4	408.0	34.0	528	138.2	510.6	69.9
245	551.9	74.1	694.8	119.1	526.9	59	532.3	94.6
257	463.0	31.7	397.2	32.3	466.9	67.1	646.8	163.7
38 SCT	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A	498.9	34.3	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A	473.1	3.4	N/A	N/A
Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.								

Existing Under the Freeway - Average Circulation Time in Network (sec)								
Route #	Existing A.M.	Existing A.M. Standard Deviation	Existing P.M.	Existing P.M. Standard Deviation	Under the Freeway A.M.	Under the Freeway A.M. Standard Deviation	Under the Freeway P.M.	Under the Freeway P.M. Standard Deviation
17	755.1	44.9	626.4	16.4	481.3	15.4	588.4	86.5
22	760.8	49.3	650.1	41.8	645.6	56.4	640.2	90.1
23 EB	864.1	132.2	966.4	223.1	398.1	26.6	569.2	79.2
23 WB	654.0	63.9	536.9	73.7	660.9	64.1	645.4	47.8
23X EB	780.5	91.8	642.8	15.7	494.9	243.7	771.5	109.2
23X WB	574.7	50.2	530.1	47.6	679.6	157.9	658.2	85.3
27 NB	N/A	N/A	517.1	61.0	N/A	N/A	528	103.6
27 SB	728.1	71.9	656.2	23.6	472.6	13	512.9	8.4
29 EB	944.5	80.0	815.2	60.8	534	6.4	553.6	37.8
29 WB	913.3	62.0	715.5	37.9	528	69.9	507.5	88.8
30 SB	922.2	59.3	726.2	35.3	751.2	53.5	602.7	82.7
30 NB	507.7	26.3	498.0	78.0	676.6	162.2	697.1	208.3
35 SB	886.2	95.6	748.4	66.3	678	176.7	695.3	77.9
35 NB	870.6	139.4	764.8	52.0	741.4	214.3	661.7	71.5
36 NB	567.8	20.4	799.8	51.5	537	23.5	601.5	79.5
36 SB	701.7	34.2	785.3	36.1	471.5	78	503.3	32.5
40	638.2	29.3	561.0	29.8	513.8	18.1	462.7	13.3
40X	517.2	18.0	N/A	N/A	417.7	14	N/A	N/A
49	456.9	15.4	598.2	57.4	414.6	25.1	399.1	6.6
68	568.7	74.1	692.7	94.9	513.8	78.1	788.8	157.5
70 NB	657.8	118.3	505.1	81.4	417.3	18	452.5	35.4
70 SB	552.3	6.6	625.6	34.6	463.4	27.7	498.8	67.4
71X SB	551.7	31.5	562.4	19.6	476.4	25.5	511.9	13.7
71X NB	511.0	75.4	606.9	74.3	431.7	20.7	434.1	84.4
101 NB	518.4	39.2	698.1	82.3	440	28.5	435.4	37.1
101 SB	558.8	8.8	538.2	6.7	448.9	17.3	465.8	10.6
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7	N/A	N/A	805.3	82.7
145	683.4	152.5	N/A	N/A	646.6	126.1	N/A	N/A
228	240.7	56.0	593.1	31.4	466.4	10.8	605.7	189.9
233	575.4	80.4	408.0	34.0	469.9	47.3	476	39.8
245	551.9	74.1	694.8	119.1	374.5	28	430.6	37.9
257	463.0	31.7	397.2	32.3	460.4	22.9	485.2	27.3
38 SCT	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A	402.2	4.6	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A	392.2	31.8	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Existing Whistlestop Block – Average Circulation Time in Network (sec)								
Route #	Existing A.M.	Existing A.M. Standard Deviation	Existing P.M.	Existing P.M. Standard Deviation	Whistlestop Block A.M.	Whistlestop Block A.M. Standard Deviation	Whistlestop Block P.M.	Whistlestop Block P.M. Standard Deviation
17	755.1	44.9	626.4	16.4	652.0	33.8	536.4	32.5
22	760.8	49.3	650.1	41.8	382.8	24.6	431.3	11.6
23 EB	864.1	132.2	966.4	223.1	513.9	35.3	548.2	11.8
23 WB	654.0	63.9	536.9	73.7	504.8	23.8	586.0	31.7
23X EB	780.5	91.8	642.8	15.7	593.8	162.9	659.1	74.8
23X WB	574.7	50.2	530.1	47.6	679.1	197.2	548.6	75.2
27 NB	N/A	N/A	517.1	61.0	N/A	N/A	524.8	15.4
27 SB	728.1	71.9	656.2	23.6	520.2	17.1	501.9	16.1
29 EB	944.5	80.0	815.2	60.8	650.6	43.7	570.6	34.9
29 WB	913.3	62.0	715.5	37.9	631.1	53.2	569.3	41.1
30 SB	922.2	59.3	726.2	35.3	612.1	62.9	559.8	32.3
30 NB	507.7	26.3	498.0	78.0	621.5	44.6	534.2	61.8
35 SB	886.2	95.6	748.4	66.3	768.7	103.4	549.6	39.0
35 NB	870.6	139.4	764.8	52.0	706.1	271.0	587.9	35.0
36 NB	567.8	20.4	799.8	51.5	528.4	12.5	526.0	55.3
36 SB	701.7	34.2	785.3	36.1	538.8	19.9	536.6	40.2
40	638.2	29.3	561.0	29.8	571.8	72.5	712.2	52.3
40X	517.2	18.0	N/A	N/A	521.4	10.2	N/A	N/A
49	456.9	15.4	598.2	57.4	512.3	39.3	558.5	60.6
68	568.7	74.1	692.7	94.9	410.6	35.0	426.5	15.4
70 NB	657.8	118.3	505.1	81.4	622.9	45.9	463.8	41.1
70 SB	552.3	6.6	625.6	34.6	556.8	66.8	504.1	29.7
71X SB	551.7	31.5	562.4	19.6	512.6	14.5	507.2	24.5
71X NB	511.0	75.4	606.9	74.3	485.0	28.0	535.5	55.4
101 NB	518.4	39.2	698.1	82.3	560.3	56.2	444.9	28.8
101 SB	558.8	8.8	538.2	6.7	510.0	94.0	497.9	11.1
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7	N/A	N/A	776.7	45.2
145	683.4	152.5	N/A	N/A	465.5	43.9	N/A	N/A
228	240.7	56.0	593.1	31.4	701.4	44.1	539.5	40.4
233	575.4	80.4	408.0	34.0	596.5	60.0	497.0	34.7
245	551.9	74.1	694.8	119.1	473.7	38.0	485.6	59.0
257	463.0	31.7	397.2	32.3	482.1	49.9	473.1	51.3
38 SCT	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A	537.0	97.7	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A	498.6	95.0	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Year 2040 Baseline – Average Circulation Time in Network (sec)								
Route #	Existing A.M.	Existing A.M. Standard Deviation	Existing P.M.	Existing P.M. Standard Deviation	Year 2040 A.M.	Year 2040 A.M. Standard Deviation	Year 2040 P.M.	Year 2040 P.M. Standard Deviation
17	755.1	44.9	626.4	16.4	742.9	59.2	726.7	59.7
22	760.8	49.3	650.1	41.8	979.5	165.7	666.2	57.7
23 EB	864.1	132.2	966.4	223.1	1297.0	345.1	899.0	158.0
23 WB	654.0	63.9	536.9	73.7	1552.8	537.4	545.1	41.7
23X EB	780.5	91.8	642.8	15.7	884.1	320.4	643.0	78.6
23X WB	574.7	50.2	530.1	47.6	1402.9	433.3	567.4	114.9
27 NB	N/A	N/A	517.1	61.0	N/A	N/A	583.4	22.7
27 SB	728.1	71.9	656.2	23.6	907.6	185.7	572.1	2.8
29 EB	944.5	80.0	815.2	60.8	978.0	127.6	982.2	134.8
29 WB	913.3	62.0	715.5	37.9	791.8	43.5	669.9	26.4
30 SB	922.2	59.3	726.2	35.3	1294.9	469.8	888.0	498.7
30 NB	507.7	26.3	498.0	78.0	570.4	105.4	594.9	89.2
35 SB	886.2	95.6	748.4	66.3	942.0	324.4	786.3	108.8
35 NB	870.6	139.4	764.8	52.0	1594.8	325.2	832.5	37.0
36 NB	567.8	20.4	799.8	51.5	602.0	110.3	758.4	46.7
36 SB	701.7	34.2	785.3	36.1	1016.1	132.7	697.2	84.7
40	638.2	29.3	561.0	29.8	615.6	112.3	646.7	64.0
40X	517.2	18.0	N/A	N/A	493.7	103.0	N/A	N/A
49	456.9	15.4	598.2	57.4	573.7	80.4	682.0	96.6
68	568.7	74.1	692.7	94.9	782.2	237.0	663.1	87.6
70 NB	657.8	118.3	505.1	81.4	646.1	136.2	518.4	65.4
70 SB	552.3	6.6	625.6	34.6	723.8	168.3	642.8	59.0
71X SB	551.7	31.5	562.4	19.6	539.7	13.9	607.2	33.9
71X NB	511.0	75.4	606.9	74.3	609.8	146.5	553.5	45.4
101 NB	518.4	39.2	698.1	82.3	633.6	190.8	622.7	46.3
101 SB	558.8	8.8	538.2	6.7	589.6	69.8	591.4	42.5
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7	N/A	N/A	839.5	139.6
145	683.4	152.5	N/A	N/A	1251.4	264.2	N/A	N/A
228	240.7	56.0	593.1	31.4	401.7	111.7	695.5	105.5
233	575.4	80.4	408.0	34.0	512.4	37.3	387.4	4.2
245	551.9	74.1	694.8	119.1	737.4	114.2	539.9	114.0
257	463.0	31.7	397.2	32.3	680.2	280.8	428.0	60.3
38 SCT	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A	467.1	152.0	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A	541.0	164.8	N/A	N/A
Note: *N/A* denotes that there was no result recorded since the route does not occur during the specified peak hour.								

Year 2040 4th Street Gateway – Average Circulation Time in Network (sec)								
Route #	Year 2040 Baseline A.M.	Year 2040 Baseline A.M. Standard Deviation	Year 2040 Baseline P.M.	Year 2040 Baseline P.M. Standard Deviation	Year 2040 4th Street Gateway A.M.	Year 2040 4th Street Gateway A.M. Standard Deviation	Year 2040 4th Street Gateway P.M.	Year 2040 4th Street Gateway P.M. Standard Deviation
17	742.9	59.2	726.7	59.7	794.2	185.7	550.5	70.3
22	979.5	165.7	666.2	57.7	1024.9	282.2	544.8	31.8
23 EB	1297.0	345.1	899.0	158.0	1332.6	730.9	555.3	15.5
23 WB	1552.8	537.4	545.1	41.7	1002.8	345	633.7	132
23X EB	884.1	320.4	643.0	78.6	1497.2	357.8	776.3	56.3
23X WB	1402.9	433.3	567.4	114.9	1304.4	331.7	659.8	100
27 NB	N/A	N/A	583.4	22.7	N/A	N/A	539.9	63.8
27 SB	907.6	185.7	572.1	2.8	887.2	192.2	568.1	58.5
29 EB	978.0	127.6	982.2	134.8	859.6	335.8	621.4	133.6
29 WB	791.8	43.5	669.9	26.4	822.3	193.8	559.3	166
30 SB	1294.9	469.8	888.0	498.7	1575.8	434.3	925.5	363.8
30 NB	570.4	105.4	594.9	89.2	756.2	149.2	707.2	85.6
35 SB	942.0	324.4	786.3	108.8	1013.3	693.1	704.9	44.1
35 NB	1594.8	325.2	832.5	37.0	1121.5	341	617.1	59.3
36 NB	602.0	110.3	758.4	46.7	730.3	79.6	673.6	73.2
36 SB	1016.1	132.7	697.2	84.7	891.4	254.9	641.4	110.2
40	615.6	112.3	646.7	64.0	1070.5	134	758.8	109.7
40X	493.7	103.0	N/A	N/A	943.4	251.9	N/A	N/A
49	573.7	80.4	682.0	96.6	812.7	131.6	513.8	46.4
68	782.2	237.0	663.1	87.6	862	285.9	481.5	87.7
70 NB	646.1	136.2	518.4	65.4	839.3	272.7	487.2	92.7
70 SB	723.8	168.3	642.8	59.0	649.3	197.9	458.5	8.4
71X SB	539.7	13.9	607.2	33.9	507.1	105.2	591.3	45.9
71X NB	609.8	146.5	553.5	45.4	823.9	95.3	512.1	37.2
101 NB	633.6	190.8	622.7	46.3	939.5	338.8	556.3	64.3
101 SB	589.6	69.8	591.4	42.5	552.3	107.7	703.8	43.8
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	839.5	139.6	N/A	N/A	795.5	98.4
145	1251.4	264.2	N/A	N/A	1670.1	651.1	N/A	N/A
228	401.7	111.7	695.5	105.5	670.5	70.9	595.1	79.5
233	512.4	37.3	387.4	4.2	584.5	92.2	521.6	139.1
245	737.4	114.2	539.9	114.0	973	261.7	496.3	69.5
257	680.2	280.8	428.0	60.3	597.5	229.5	512.5	41.5
38 SCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	467.1	152.0	N/A	N/A	522.6	54	N/A	N/A
Sonoma Airporter	541.0	164.8	N/A	N/A	553	169.6	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Year 2040 Under the Freeway – Average Circulation Time in Network (sec)								
Route #	Year 2040 Baseline A.M.	Year 2040 Baseline A.M. Standard Deviation	Year 2040 Baseline P.M.	Year 2040 Baseline P.M. Standard Deviation	Year 2040 Under the Freeway A.M.	Year 2040 Under the Freeway A.M. Standard Deviation	Year 2040 Under the Freeway P.M.	Year 2040 Under the Freeway P.M. Standard Deviation
17	742.9	59.2	726.7	59.7	532.7	70.2	810.3	132.7
22	979.5	165.7	666.2	57.7	783.5	53.4	837.9	87.7
23 EB	1297.0	345.1	899.0	158.0	569.7	193.9	572.4	167.7
23 WB	1552.8	537.4	545.1	41.7	1676.7	470.6	863.4	199.8
23X EB	884.1	320.4	643.0	78.6	836.9	124.4	683	84.4
23X WB	1402.9	433.3	567.4	114.9	1397.8	220.6	839.5	182
27 NB	N/A	N/A	583.4	22.7	N/A	N/A	737.4	226
27 SB	907.6	185.7	572.1	2.8	514.5	40.4	530.3	36.5
29 EB	978.0	127.6	982.2	134.8	559	33.3	574.3	108.8
29 WB	791.8	43.5	669.9	26.4	634.7	84.6	736.9	221.6
30 SB	1294.9	469.8	888.0	498.7	1306.1	381.2	940.5	200.9
30 NB	570.4	105.4	594.9	89.2	695	65.4	967.5	94.8
35 SB	942.0	324.4	786.3	108.8	1067.5	156.7	979.4	83.9
35 NB	1594.8	325.2	832.5	37.0	1478.4	284.9	871.7	129.6
36 NB	602.0	110.3	758.4	46.7	589	72.2	673.6	141.4
36 SB	1016.1	132.7	697.2	84.7	1258.5	269	585.7	127.3
40	615.6	112.3	646.7	64.0	604.6	98.7	636.1	72.1
40X	493.7	103.0	N/A	N/A	487.1	75.3	N/A	N/A
49	573.7	80.4	682.0	96.6	406.3	83.2	430.7	102.4
68	782.2	237.0	663.1	87.6	494.1	58.4	1025.3	211.2
70 NB	646.1	136.2	518.4	65.4	407.5	79.8	599.8	204.8
70 SB	723.8	168.3	642.8	59.0	498	83.6	733.9	244.9
71X SB	539.7	13.9	607.2	33.9	487.5	31.5	523	57.4
71X NB	609.8	146.5	553.5	45.4	468.9	70.4	456.4	128.4
101 NB	633.6	190.8	622.7	46.3	495.2	118.3	468.4	62.1
101 SB	589.6	69.8	591.4	42.5	432.3	26.1	485.8	61.9
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	839.5	139.6	N/A	N/A	983.2	176.1
145	1251.4	264.2	N/A	N/A	1029.5	66.6	N/A	N/A
228	401.7	111.7	695.5	105.5	573.9	109.7	968.1	187.8
233	512.4	37.3	387.4	4.2	487.2	53.8	474.4	98.1
245	737.4	114.2	539.9	114.0	384.5	34.3	472.6	120
257	680.2	280.8	428.0	60.3	614.8	258.1	461.8	28.9
38 SCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	467.1	152.0	N/A	N/A	414.3	24.6	N/A	N/A
Sonoma Airporter	541.0	164.8	N/A	N/A	494.7	141.1	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Year 2040 Whistlestop Block – Average Circulation Time in Network (sec)								
Route #	Year 2040 Baseline A.M.	Year 2040 Baseline A.M. Standard Deviation	Year 2040 Baseline P.M.	Year 2040 Baseline P.M. Standard Deviation	Year 2040 Whistlestop Block A.M.	Year 2040 Whistlestop Block A.M. Standard Deviation	Year 2040 Whistlestop Block P.M.	Year 2040 Whistlestop Block P.M. Standard Deviation
17	742.9	59.2	726.7	59.7	673.2	45.5	601.7	47.7
22	979.5	165.7	666.2	57.7	408.5	45.5	431.6	14.9
23 EB	1297.0	345.1	899.0	158.0	599.5	50.2	547.6	11.7
23 WB	1552.8	537.4	545.1	41.7	942.1	457.4	613.1	87.8
23X EB	884.1	320.4	643.0	78.6	817.9	48.8	670.5	49.3
23X WB	1402.9	433.3	567.4	114.9	900.4	301.0	587.4	71.5
27 NB	N/A	N/A	583.4	22.7	N/A	N/A	536.7	24.0
27 SB	907.6	185.7	572.1	2.8	568.8	40.1	503.5	15.8
29 EB	978.0	127.6	982.2	134.8	612.6	145.7	580.6	35.5
29 WB	791.8	43.5	669.9	26.4	668.2	59.5	566.7	134.5
30 SB	1294.9	469.8	888.0	498.7	788.7	80.3	552.3	47.4
30 NB	570.4	105.4	594.9	89.2	659.5	52.8	658.3	63.9
35 SB	942.0	324.4	786.3	108.8	908.7	79.7	620.4	42.8
35 NB	1594.8	325.2	832.5	37.0	951.2	361.0	647.1	86.8
36 NB	602.0	110.3	758.4	46.7	593.4	62.4	589.5	106.5
36 SB	1016.1	132.7	697.2	84.7	866.2	164.6	574.3	84.8
40	615.6	112.3	646.7	64.0	626.1	56.3	702.5	65.3
40X	493.7	103.0	N/A	N/A	586.3	35.4	N/A	N/A
49	573.7	80.4	682.0	96.6	532.7	48.9	564.1	39.8
68	782.2	237.0	663.1	87.6	446.7	95.3	424.5	30.2
70 NB	646.1	136.2	518.4	65.4	623.9	67.6	608.9	86.2
70 SB	723.8	168.3	642.8	59.0	603.1	66.7	573.9	39.6
71X SB	539.7	13.9	607.2	33.9	514.8	15.7	527.4	36.8
71X NB	609.8	146.5	553.5	45.4	581.3	77.4	571.0	67.6
101 NB	633.6	190.8	622.7	46.3	623.4	158.9	543.3	99.9
101 SB	589.6	69.8	591.4	42.5	491.3	33.8	487.6	13.9
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	839.5	139.6	N/A	N/A	830.2	65.6
145	1251.4	264.2	N/A	N/A	757.7	214.5	N/A	N/A
228	401.7	111.7	695.5	105.5	718.4	61.3	650.6	48.3
233	512.4	37.3	387.4	4.2	636.4	68.9	482.6	27.3
245	737.4	114.2	539.9	114.0	532.2	53.1	525.4	68.5
257	680.2	280.8	428.0	60.3	547.2	104.9	479.9	27.5
38 SCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	467.1	152.0	N/A	N/A	645.9	183.4	N/A	N/A
Sonoma Airporter	541.0	164.8	N/A	N/A	480.6	41.6	N/A	N/A
Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.								

Appendix B: Traffic Volumes

INT #	Intersection Name	Existing Baseline A.M. Peak Hour											
		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Hetherton & 2nd				256	843			1050	940			
2	Hetherton & 3rd					727	219				372	1132	
3	Hetherton & 4th				87	692	161		217	130	124	290	
4	Hetherton & Fifth				35	737	167		209	149	54	234	
5	Hetherton & Mission				180	843	407		416	62	34	200	
6	Irwin & 2nd		1346	399				580	726				
7	Irwin & 3rd	807	1119									697	66
8	Irwin & 4th	126	990	69				110	194			288	65
9	Irwin & Fifth	141	1010	14				163	81			147	90
10	Irwin & Mission	88	1135	40				347	249			146	328
11	Grand & 2nd		405	235	18	438		112	675	338			
12	Grand & 3rd	203	314			193	64				263	496	135
13	Grand & 4th	114	275	60	34	160	50	24	165	74	23	189	102
14	Grand & Fifth	167	234			175	70	26		69			
15	Grand & Mission	134	105	21	43	175	72	25	226	38	32	268	27
16	Lincoln & 2nd		124	75	77	273		87	1632	34			
17	Lincoln & 3rd	14	172			258	136				112	1039	48
18	Lincoln & 4th	17	159	44	26	308	36	36	268	31	55	348	19
19	Lincoln & Fifth	8	177	29	30	285	39	42	281	31	54	327	22
20	Lincoln & Mission	2	209	30	64	293	370	147	376	15	46	522	40
21	A & 2nd		203	25	34	95		85	1567	181			
22	A & 3rd	166	122			105	22				24	926	50
23	A & 4th	18	106	15	20	97	29	43	272	27	37	300	23
24	A & Fifth	55		117					537	29	117	487	
25	Tamalpais & 2nd		48	148	90	112		11	1752	21			
26	Tamalpais & 3rd	36	23			34	7				168	1156	7
27	Lindaro & 2nd		55	180	28	238		28	1545	53			
28	Lindaro & 3rd	80	3			25	4				241	980	13
29	Cijos & 4th	14		20					315	1	46	355	
30	Lootens & 4th	5	32	20	20	65	25	24	276	7	15	330	24
31	Court & 4th								307			360	
32	Court & Fifth	4		4	31	19	288	282	342	30	40	312	21
33	Court & Mission	10		293					236	29	309	578	
34	Tamalpais & Fifth	3	2	7		4	2	1	327	12	1	398	6
35	Fifth Ave & E Tamalpais Ave	7	1	26				2	332			398	3
36	Ritter & 3rd	45										1189	
37	Lincoln & Ritter	25	186			350	20						
38	Nye & Fifth				17		14	40	337			359	15
39	Nye & Mission	1	30	24	8	3	19	20	506	3	25	867	2
40	Mission Ave & E Tamalpais Ave	1		5					473			607	
41	Tamalpais & Mission			9					464	6		608	
42	Tamalpais & 4th			30			17		297	41		405	12
43	4th St & E Tamalpais Ave			20					327			417	34

INT #	Intersection Name	Existing Baseline P.M. Peak Hour											
		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Hetherton & 2nd				332	785			1484	849			
2	Hetherton & 3rd					736	221				381	1262	
3	Hetherton & 4th				97	710	202		265	151	96	255	
4	Hetherton & Fifth				26	776	232		265	189	44	195	
5	Hetherton & Mission				228	963	399		419	48	23	217	
6	Irwin & 2nd		1278	643				718	1098				
7	Irwin & 3rd	817	1179									826	139
8	Irwin & 4th	89	1158	71				155	207			262	73
9	Irwin & Fifth	116	1256	14				185	106			123	93
10	Irwin & Mission	95	1400	39				363	284			145	269
11	Grand & 2nd		494	236	16	431		138	972	631			
12	Grand & 3rd	253	379			157	112				290	600	130
13	Grand & 4th	95	354	60	73	164	42	16	167	95	10	198	70
14	Grand & Fifth	165	275			179	51	20		100			
15	Grand & Mission	151	124	20	50	169	57	35	245	43	18	206	47
16	Lincoln & 2nd		221	160	77	155		187	1821	33			
17	Lincoln & 3rd	36	286			216	174				79	1205	55
18	Lincoln & 4th	23	286	32	35	280	57	35	339	33	77	306	47
19	Lincoln & Fifth	16	317	35	29	300	41	49	377	28	44	344	44
20	Lincoln & Mission	4	370	36	24	312	299	229	396	9	49	493	75
21	A & 2nd		294	11	112	66		99	1642	142			
22	A & 3rd	243	150			112	45				66	1290	64
23	A & 4th	41	165	48	32	86	13	31	277	30	14	329	35
24	A & Fifth	55		176					627	53	78	517	
25	Tamalpais & 2nd		44	232	85	129		39	2016	26			
26	Tamalpais & 3rd	53	30			28	27				186	1259	17
27	Lindaro & 2nd		88	268	86	138		38	1687	40			
28	Lindaro & 3rd	103	23			17	13				207	1304	30
29	Cijos & 4th	18		65					342	21	30	356	
30	Lootens & 4th	21	53	41	16	49	21	23	306	28	17	336	21
31	Court & 4th								357			378	
32	Court & Fifth	9	4	50	21	10	207	364	414	25	19	379	22
33	Court & Mission	17		373					263	13	225	570	
34	Tamalpais & Fifth	6	4	17	4	1	3	1	417	23	3	423	5
35	Fifth Ave & E Tamalpais Ave	5	9	16					438			426	1
36	Ritter & 3rd	126										1415	
37	Lincoln & Ritter	86	322		23	232	40						
38	Nye & Fifth				11		32	42	443			388	13
39	Nye & Mission	2	12	41	6	8	30	34	587	15	13	763	20
40	Mission Ave & E Tamalpais Ave	2		8					459			616	
41	Tamalpais & Mission			10					449	7	1	617	
42	Tamalpais & 4th			47			27		351	55		403	27
43	4th St & E Tamalpais Ave	2	1	18					398			428	29

INT #	Intersection Name	Year 2040 Baseline A.M. Peak Hour											
		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Hetherton & 2nd				314	908			1286	1145			
2	Hetherton & 3rd					816	409				406	1257	
3	Hetherton & 4th				107	915	198		266	158	152	355	
4	Hetherton & Fifth				40	987	191		240	176	57	269	
5	Hetherton & Mission				207	1114	467		478	69	35	230	
6	Irwin & 2nd		1566	420				611	989				
7	Irwin & 3rd	928	1249									735	69
8	Irwin & 4th	203	1042	73				169	204			304	68
9	Irwin & Fifth	160	1104	15				188	92			166	102
10	Irwin & Mission	100	1249	45				403	282			165	372
11	Grand & 2nd		427	248	19	461		118	711	580			
12	Grand & 3rd	214	331			203	67				277	523	142
13	Grand & 4th	120	290	63	36	168	53	25	174	78	24	199	139
14	Grand & Fifth	189	265			179	79	29		78			
15	Grand & Mission	152	119	23	49	179	82	28	256	43	36	303	31
16	Lincoln & 2nd		185	219	94	374		107	2053	40			
17	Lincoln & 3rd	17	220			355	166				137	1223	57
18	Lincoln & 4th	21	202	54	35	391	44	44	302	63	67	426	19
19	Lincoln & Fifth	9	227	29	34	372	45	48	323	36	62	375	20
20	Lincoln & Mission	2	257	36	73	374	425	169	425	24	53	599	46
21	A & 2nd		249	31	42	116		104	1919	222			
22	A & 3rd	204	149			129	27				29	1134	61
23	A & 4th	22	130	18	24	119	24	53	334	33	45	369	28
24	A & Fifth	77		134					616	33	134	560	
25	Tamalpais & 2nd				91	125			2340	26			
26	Tamalpais & 3rd										216	1417	9
27	Lindaro & 2nd		93	274	34	292		34	1892	66			
28	Lindaro & 3rd	124	3			31	5				295	1174	16
29	Cijos & 4th	17		24					385	1	56	435	
30	Lootens & 4th	6	39	24	24	80	31	29	338	9	18	405	29
31	Court & 4th								376			442	
32	Court & Fifth	5		5	36	22	331	324	392	34	46	358	24
33	Court & Mission	12		336					271	34	355	663	
34	Tamalpais & Fifth							1	385		1	457	7
35	Fifth Ave & E Tamalpais Ave	8	1	33				2	383			457	3
36	Ritter & 3rd	79										1406	
37	Lincoln & Ritter	55	237			468	24						
38	Nye & Fifth				20		16	46	387			412	17
39	Nye & Mission	1	34	28	9	4	22	23	581	3	29	995	2
40	Mission Ave & E Tamalpais Ave	1		5					542			697	
41	Tamalpais & Mission			8					534			698	
42	Tamalpais & 4th			9			1		391			511	
43	4th St & E Tamalpais Ave			24					400			511	42

INT #	Intersection Name	Year 2040 Baseline P.M. Peak Hour											
		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Hetherton & 2nd				351	830			1591	897			
2	Hetherton & 3rd					778	286				403	1383	
3	Hetherton & 4th				103	794	210		280	160	110	270	
4	Hetherton & Fifth				31	868	279		317	186	53	234	
5	Hetherton & Mission				230	1092	479		502	58	28	260	
6	Irwin & 2nd		1385	696				799	1143				
7	Irwin & 3rd	907	1277									879	150
8	Irwin & 4th	96	1254	77				159	224			284	79
9	Irwin & Fifth	153	1324	15				232	116			134	101
10	Irwin & Mission	130	1484	43				410	322			158	293
11	Grand & 2nd		535	256	17	467		149	1022	668			
12	Grand & 3rd	274	410			170	121				314	634	141
13	Grand & 4th	103	383	65	80	178	46	17	181	103	10	214	80
14	Grand & Fifth	180	300			195	55	22		109			
15	Grand & Mission	165	135	22	55	183	61	51	267	47	20	225	51
16	Lincoln & 2nd		265	332	104	225		197	1985	35			
17	Lincoln & 3rd	38	313			312	184				83	1238	110
18	Lincoln & 4th	24	365	34	37	354	60	37	332	61	81	324	46
19	Lincoln & Fifth	19	387	42	35	364	49	59	412	40	47	413	43
20	Lincoln & Mission	5	444	40	29	373	358	274	469	16	59	591	89
21	A & 2nd		310	12	118	70		105	1713	150			
22	A & 3rd	257	158			118	48				70	1363	68
23	A & 4th	43	174	51	34	91	31	33	292	31	15	347	37
24	A & Fifth	66		178					751	63	93	620	
25	Tamalpais & 2nd				70	128			2418	27			
26	Tamalpais & 3rd										198	1431	18
27	Lindaro & 2nd		109	365	91	146		40	1761	42			
28	Lindaro & 3rd	125	24			18	14				219	1362	32
29	Cijos & 4th	19		69					361	22	32	376	
30	Lootens & 4th	22	56	43	17	52	22	24	323	30	18	355	22
31	Court & 4th								377			399	
32	Court & Fifth	11	5	60	25	12	248	436	463	30	23	454	26
33	Court & Mission	20		447					315	15	270	682	
34	Tamalpais & Fifth							1	488		4	503	11
35	Fifth Ave & E Tamalpais Ave	6	11	15					488			512	1
36	Ritter & 3rd	153										1460	
37	Lincoln & Ritter	111	351		24	329	42						
38	Nye & Fifth				13		38	50	498			465	16
39	Nye & Mission	2	15	49	7	17	36	41	703	18	16	914	24
40	Mission Ave & E Tamalpais Ave	2		10					550			739	
41	Tamalpais & Mission			12					538		2	739	
42	Tamalpais & 4th			18					403			451	
43	4th St & E Tamalpais Ave	2	1	19					421			449	31

Appendix C: Baseline Pedestrian Volumes

Existing Baseline					
Intersection	**East X-Walk A.M. [P.M.]**	**South X-Walk A.M. [P.M.]**	**West X-Walk A.M. [P.M.]**	**North X-Walk A.M. [P.M.]**	**Total A.M. [P.M.]**
2nd & A	12 [12]	16 [27]	24 [30]	16 [18]	**68 [87]**
2nd & Grand	12 [16]	34 [52]	18 [39]	-	**64 [107]**
2nd & Irwin	10 [28]	-	-	31 [36]	**41 [64]**
2nd & Lincoln	-	62 [41]	15 [23]	19 [18]	**96 [82]**
2nd & Lindaro	17 [10]	43 [28]	5 [4]	15 [19]	**80 [61]**
2nd & Tamalpais	-	-	66 [78]	0 [0]	**66 [78]**
3rd & A	55 [50]	47 [58]	33 [54]	43 [50]	**178 [212]**
3rd & Grand	20 [28]	10 [25]	7 [40]	56 [49]	**93 [142]**
3rd & Hetherton	-	14 [35]	72 [37]	39 [33]	**125 [105]**
3rd & Irwin	11 [19]	18 [49]	-	0 [0]	**29 [68]**
3rd & Lincoln	22 [44]	22 [69]	25 [99]	39 [71]	**108 [283]**
3rd & Lindaro	16 [12]	22 [30]	-	-	**38 [42]**
3rd & Tamalpais	89 [105]	87 [105]	22 [18]	31 [48]	**229 [276]**
4th & A	2 [38]	10 [48]	39 [5]	34 [93]	**85 [184]**
4th & Cijos	4 [23]	38 [45]	12 [28]	-	**54 [96]**
4th & Grand	17 [23]	23 [43]	14 [32]	22 [18]	**76 [116]**
4th & Hetherton	5 [11]	34 [50]	24 [16]	21 [27]	**84 [104]**
4th & Irwin	10 [7]	25 [22]	7 [4]	14 [11]	**56 [44]**
4th & Lincoln	24 [39]	43 [79]	49 [132]	35 [62]	**151 [312]**
4th & Lootens	3 [18]	24 [105]	8 [25]	45 [125]	**80 [273]**
4th & Tamalpais	-	41 [76]	26 [46]	19 [40]	**86 [162]**
Fifth & A	5 [5]	7 [15]	14 [5]	-	**26 [25]**
Fifth & Court	7 [12]	9 [25]	18 [31]	17 [15]	**51 [83]**
Fifth & Hetherton	7 [1]	10 [25]	12 [14]	12 [4]	**41 [44]**
Fifth & Irwin	8 [2]	5 [6]	2 [9]	1 [5]	**16 [22]**
Fifth & Lincoln	9 [17]	6 [11]	27 [34]	6 [9]	**48 [71]**
Fifth & Tamalpais	-	9 [15]	9 [15]	9 [6]	**27 [36]**
Mission & Hetherton	0 [0]	11 [14]	10 [13]	5 [2]	**26 [29]**
Mission & Irwin	10 [3]	11 [13]	0 [4]	-	**21 [20]**
Mission & Lincoln	23 [33]	11 [9]	12 [15]	4 [6]	**50 [52]**
Mission & Tamalpais	0 [0]	14 [11]	2 [13]	1 [6]	**17 [30]**

Year 2040 Baseline					
Intersection	East X-Walk A.M. [P.M.]	South X-Walk A.M. [P.M.]	West X-Walk A.M. [P.M.]	North X-Walk A.M. [P.M.]	Total A.M. [P.M.]
2nd & A	15 [12]	20 [28]	30 [32]	20 [19]	84 [91]
2nd & Grand	13 [18]	36 [56]	19 [42]	-	68 [116]
2nd & Irwin	-	33 [39]	10 [30]	-	43 [69]
2nd & Lincoln	-	76 [43]	19 [24]	24 [19]	118 [86]
2nd & Lindaro	21 [10]	53 [30]	6 [4]	19 [20]	99 [64]
2nd & Tamalpais	-	-	81 [83]	-	81 [83]
3rd & A	67 [53]	58 [62]	41 [57]	53 [53]	218 [224]
3rd & Grand	21 [31]	10 [27]	7 [43]	59 [53]	97 [154]
3rd & Hetherton	17 [36]	-	88 [39]	48 [35]	153 [110]
3rd & Irwin	11 [21]	19 [53]	-	0	30 [121]
3rd & Lincoln	27 [0]	27 [73]	31 [104]	48 [75]	133 [253]
3rd & Lindaro	20 [12]	27 [32]	-	-	47 [44]
3rd & Tamalpais	109 [111]	107 [111]	28 [19]	38 [51]	281 [292]
4th & A	3 40]	13 [50]	48 [5]	42 [99]	105 [194]
4th & Cijos	5 [24]	47 [48]	15 [30]	-	67 [101]
4th & Grand	18 [25]	25 [47]	15 [35]	23 [19]	80 [125]
4th & Hetherton	6 [12]	42 [53]	30 [17]	26 [29]	103 [110]
4th & Irwin	11 [8]	26 [24]	7 [4]	15 [12]	59 [47]
4th & Lincoln	30 [41]	53 [84]	60 [140]	43 [66]	186 [330]
4th & Lootens	4 [13]	30 [111]	10 [26]	55 [132]	98 [288]
4th & Tamalpais	0 [0]	51 [81]	32 [49]	24 [42]	106 [171]
Fifth & A	6 [6]	8 [18]	17 [6]	-	31 [30]
Fifth & Court	8 [15]	11 [30]	21 [37]	20 [18]	60 [100]
Fifth & Hetherton	8 [1]	12 [30]	14 [17]	14 [5]	48 [53]
Fifth & Irwin	10 [2]	6 [6]	3 [10]	1 [5]	19 [23]
Fifth & Lincoln	11 [21]	7 [13]	31 [41]	7 [11]	56 [86]
Fifth & Tamalpais	0 [0]	11 [18]	11 [18]	11 [8]	32 [44]
Mission & Hetherton	-	13 [17]	12 [16]	6 [3]	31 [35]
Mission & Irwin	12 [3]	13 [14]	0 [4]	-	25 [21]
Mission & Lincoln	26 [27]	13 [11]	14 [18]	5 [7]	58 [63]
Mission & Tamalpais	-	17 [14]	3 [16]	1 [7]	20 [37]

Appendix D: San Rafael Transit Center Relocation Project Safety Analysis

Memorandum

To: Ray Santiago, Project Manager
Golden Gate Transit

From: Adam Dankberg, P.E.
Kimley-Horn and Associates, Inc.

Date: March 28, 2022

Subject: San Rafael Transit Center Relocation Project Safety Analysis

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This memorandum provides a safety analysis of the San Rafael Transit Center (SRTC) Relocation Project ("Project") alternatives. The Golden Gate Bridge, Highway, and Transportation District (GGBHTD) is currently undertaking the Project to identify a new location for the SRTC in Downtown San Rafael. A *Draft Environmental Impact Report (DEIR)* (ICF, August 2021) has been prepared in accordance with the provisions of the California Environmental Quality Act (CEQA). A detailed transportation analysis of transit, traffic, and pedestrian and bicycle conditions has also been prepared in *SRTC Transportation Summary Report* (Kimley-Horn, February 2021). Both documents provide details on transit center alternatives and traffic, pedestrian, and bicycle volumes (relevant sections of both documents are included as attachments). The safety analysis supports the transportation assessments presented in these documents and addresses the following:

- Pedestrian, bicycle, and vehicular safety around the existing SRTC using collision data provided by the City of San Rafael.
- Identification of pedestrian and bicycle treatments that will be built with each of the SRTC alternatives and how they relate to safety needs.
- A safety assessment for each of the SRTC alternatives that focuses on pedestrian-vehicle conflicts and circulation around the SRTC site.

Background

The existing SRTC (Bettini Transit Center) is located in the City of San Rafael on the block bounded by 2nd Street, Tamalpais Avenue, 3rd Street, and Hetherton Street. Golden Gate Transit (GGT) and Marin Transit (MT) operate local and regional bus service at the SRTC. Prior to the COVID-19 pandemic, there were over 9,000 daily boardings and alightings at the transit center each weekday. The Sonoma-Marin Area Rail Transit (SMART) Downtown San Rafael Station is located on the block immediately north of 3rd Street. The SMART rail tracks were recently extended to bisect the existing SRTC, which has impacted bus operations and passenger movements, creating the need for a new transit center facility. Through a community-driven process, several alternatives were developed and screened to identify potential new locations for the transit center. A new SRTC solution in Downtown San Rafael would address near-term

and long-term transit needs while improving the desirability and usability of transit for both local residents and regional commuters.

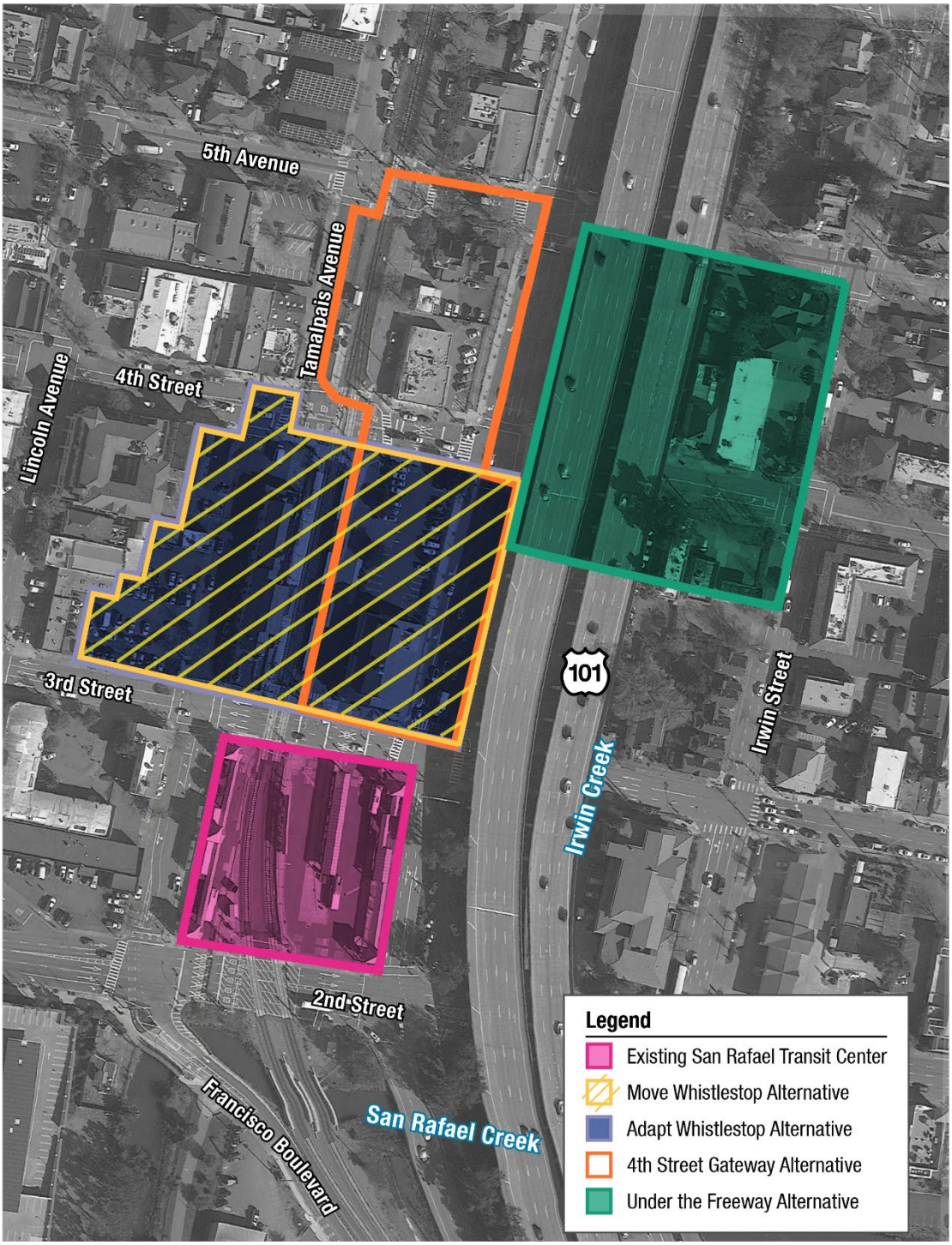
The Project objectives highlight the need for a well-connected and safe SRTC by "creating a more accessible transit facility for all users by reducing vehicular, rail, bicycle, and pedestrian conflicts and improving safety". The City of San Rafael has provided a dataset of collisions and collision rates for streets in the vicinity of the Project study area. This memorandum analyzes the City's collision data and provides an assessment on how each of the Project alternatives relate to safety objectives, especially for pedestrians and bicyclists, around the Project study area.

Project Alternatives

The DEIR analyzes five Project alternatives, including the No-Build Alternative. **Figure 1** shows the location of the alternatives, which include:

- **No-Build Alternative/Existing Transit Center Site:** the transit center would remain at its current location, on the block bound by 2nd Street, Tamalpais Avenue, 3rd Street, and Hetherton Street. The "interim" transit center configuration constructed as part of the SMART extension would remain.
- **Move Whistlestop (Preferred Alternative):** in this alternative, a portion of the Whistlestop building would be relocated to or rebuilt on the west side of West Tamalpais Avenue between 3rd and 4th Streets. As part of this relocation, West Tamalpais Avenue between 2nd and 4th Streets would be shifted east so that it is directly adjacent to the SMART tracks and more closely aligned with West Tamalpais Avenue north of 4th Street. This was designated as the "preferred alternative" in the Project DEIR.
- **Adapt Whistlestop:** this alternative co-locates the transit center on the same block as the existing SMART station, by utilizing area from west of West Tamalpais Avenue to 3rd Street, Hetherton Street, and 4th Street. West Tamalpais Avenue between 3rd Street and 4th Street would be limited to buses only, and curbside bays would be provided on both sides of the street.
- **4th Street Gateway:** this alternative utilizes the two blocks bounded by the SMART tracks, 3rd Street, Hetherton Street, and 5th Avenue. This alternative would include three curbside bays on the west side of Hetherton Street between 4th Street and 5th Avenue. To accommodate these curbside bays, southbound right-turns from Hetherton Street to 4th Street would be precluded. Other bus bays would be accessed via driveways on 3rd and 4th Streets and a driveway on Hetherton Street.
- **Under the Freeway:** this alternative utilizes the block bound by 4th Street, Hetherton Street, 5th Avenue, and Irwin Street, and the northern portion of the block bound by Hetherton Street, 3rd Street, 4th Street, and Irwin Street, generally located beneath US-101. Bus bays would be accessed via driveways on 4th Street, Irwin Street, and Hetherton Street.

Figure 1: SRTC Project Alternatives



Transportation Context

The study area for the SRTC safety analysis includes the blocks immediately surrounding the Project alternatives and includes the blocks bounded by 2nd Street, Irwin Street, 5th Avenue, and West Tamalpais Avenue. The SRTC is the largest regional transit hub in Marin County and has over 800 bus trips daily operating on 17 bus bays. SMART's Downtown station is located at 3rd Street between West and East Tamalpais Avenue.

The Project alternatives must address several key safety-related considerations within the SRTC study area:

- In 2017, approximately 50% of GGT and MT riders at the SRTC walk to/from the station, with 35% of transit riders transferring between GGT and MT bus routes[1]. This translates to several thousand walking trips generated in the immediate area surrounding the SRTC. Providing safe and convenient walking routes to/from all directions to/from the SRTC is critical. Short, convenient transfers between bus routes and between SMART and bus routes is also important to provide a well-integrated and effective transit system.
- In 2017, approximately 50% of transit riders are traveling to/from a destination in Downtown San Rafael, the highest concentration located west and north of the SRTC[2]. Promoting safe walking routes on 4th Street from the transit center area to the heart of downtown is particularly important.
- Hetherton and Irwin Streets at 2nd and 3rd Streets near the US-101 ramps have ADT traffic volumes in the 33,000-39,000 range and PM peak hour volumes in the 2,600-3,700 range. Intersections on Hetherton and Irwin at 4th Street and 5th Avenue have ADT traffic volumes in the 20,000-22,000 range and PM peak hour volumes in the 1,700-2,000 range. Reducing pedestrian-vehicle conflicts and improving safety at these highly utilized intersections is key to achieving Project objectives.

Table 1 presents the AM and PM peak hour pedestrian counts by crosswalk for the study intersections included in the safety analysis. These counts were collected in January 2020 and represent the peak hour for pedestrian activity, which can differ from the peak hour of traffic volume. The morning pedestrian peak hour is 7:15-8:15 AM, while the afternoon peak hour is 3:45-4:45 PM.

[1] *San Rafael Transit Center Transportation Summary Report* (Kimley-Horn, February 2021)
[2] *San Rafael Transit Center Relocation Study, Final Report* (Kimley-Horn, March 2017)

Table 1: Peak Hour Pedestrian Volumes by Crosswalk

Intersection	North X-Walk AM (PM)	East X-Walk AM (PM)	South X-Walk AM (PM)	West X-Walk AM (PM)	Total AM (PM)
2nd & Tamalpais	80 (97)	-	-	93 (103)	**173 (200)**
2nd & Hetherton	23 (29)	-	-	-	**23 (29)**
3rd & Tamalpais	34 (68)	91 (121)	90 (134)	22 (26)	**237 (349)**
3rd & Hetherton	67 (43)	-	18 (45)*	98 (69)	**184 (157)**
3rd & Irwin	-	20 (34)	23 (94)	-	**43 (128)**
4th & W Tamalpais	16 (45)	-	56 (66)	25 (58)	**97 (169)**
4th & Hetherton	21 (36)	7 (12)	33 (48)	28 (22)	**89 (118)**
4th & Irwin	11 (15)	9 (11)	20 (8)	7 (8)	**47 (42)**
5th & W Tamalpais	7 (9)	-	8 (18)	7 (21)	**22 (48)**
5th & Hetherton	11 (8)	12 (2)	11 (15)	12 (13)	**46 (38)**
5th & Irwin	1 (8)	4 (7)	4 (9)	4 (8)	**13 (32)**

** At 3rd & Hetherton, the south crosswalk was removed and the east crosswalk added after the counts were conducted in 2020*
Data source: Kimley-Horn, counts conducted in January 2020

The volumes show that the intersections of 3rd Street with Tamalpais Avenue and Hetherton Street, immediately adjacent to the existing transit center, have the highest pedestrian activity. This reflects the high level of pedestrian activity associated with the existing transit center, accessing both the SMART station and Downtown San Rafael. Note that at 3rd Street & Hetherton Street, the south crosswalk was removed and a new crosswalk installed at the east leg later in 2020 after the counts were completed.

Precise calculation of the trip distribution of pedestrians emanating from the existing transit center cannot be determined; however, a general assessment of pedestrian flows can be conducted based on existing crosswalk volumes since the existing SRTC is the largest pedestrian trip generator in the immediate area. These patterns can then be confirmed with on-board survey data of transit center users. As shown above in **Table 1**, 225 pedestrians cross Hetherton Street at 2nd, 3rd, and 4th Streets, whereas 440 pedestrians cross Tamalpais Avenue at those same streets in the PM peak hour (the higher hour of pedestrian activity). This indicates that by a ratio of roughly 2:1, pedestrians travel to/from the west from the transit center, consistent with the findings of the on-board survey results referenced earlier in this document. Additionally, 105 pedestrians cross 2nd Street at Tamalpais Avenue (there is no crosswalk across 2nd Street at Hetherton Street) and 220 pedestrians cross 3rd Street at Hetherton Street and Tamalpais Avenue. This indicates, by a ratio of roughly 2:1, pedestrians travel to/from the north from the transit center.

Collision Data Analysis

The City of San Rafael provided collision data from January 2015 to the end of September 2021 (6 years and 9 months) for locations in Downtown San Rafael. The dataset contains 921 total collisions, which include vehicle collisions with other motor vehicles (vehicle-vehicle), vehicles with pedestrians (vehicle-pedestrian), vehicles with bicyclists (vehicle-bicycle), and vehicles with other objects (vehicle-other). The

location for each collision is identified in the dataset by a latitude and longitude point expressed in decimal degrees. There is some inherent uncertainty in the precision of the collision location. Many of the collisions are mapped at the same exact location within an intersection, while others are located on roadway segments just outside of the intersection. At intersections and street segments immediately adjacent to the existing SRTC or one of the four Project build alternatives, there were 337 collisions. The data provides information on several categories:

- **Date, time, lighting, weather and road conditions**
- **Location:** the primary and secondary roadway where the collision occurred. This is typically shown as an intersection and represented by a point of latitude and longitude.
- **Collision type:** describes the type of collision, such as rear-end, sideswipe, hit object, or vehicle-pedestrian.
- **Collision severity:** describes if the collision results in property damage, injury (complaint of pain to severe injury), or a fatality.
- **Collision factor:** describes the reported cause of the collision and includes the following: improper turning, unsafe speed, right-of-way violation, pedestrian violation, improper passing, etc.
- **Parties involved:** does the collision involve another motor vehicle, pedestrian, bicycle, or an object.

Figure 2 and Figure 3 plot the location for collisions in the safety analysis study area for the entire dataset (January 2015 to September 2021). Figure 2 shows total collisions and Figure 3 shows pedestrian- and bicycle-involved collisions only. Collisions that occurred at the same location are clustered.

Figure 2: All Collisions

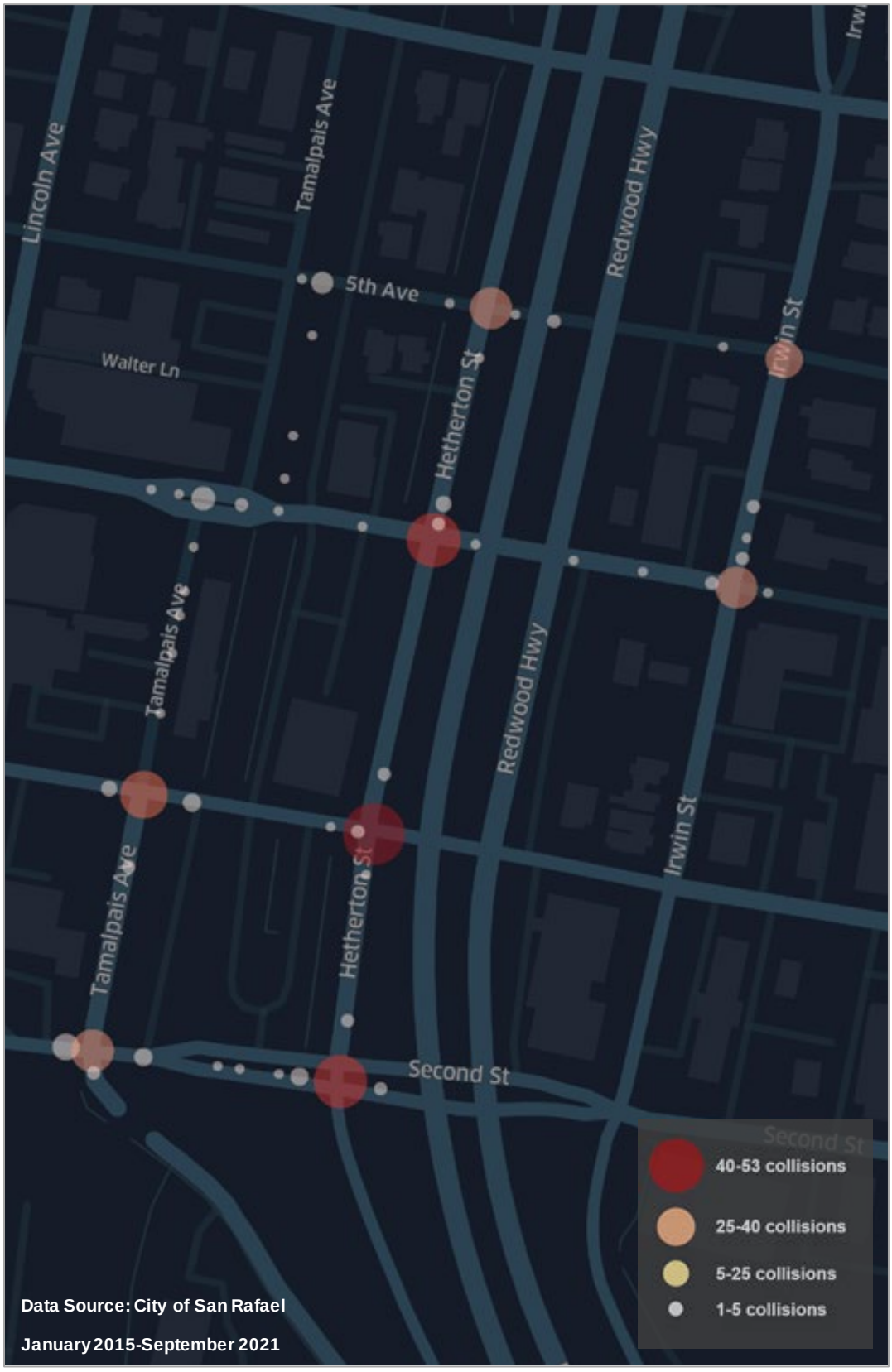


Figure 3: Pedestrian- & Bicycle-Involved Collisions

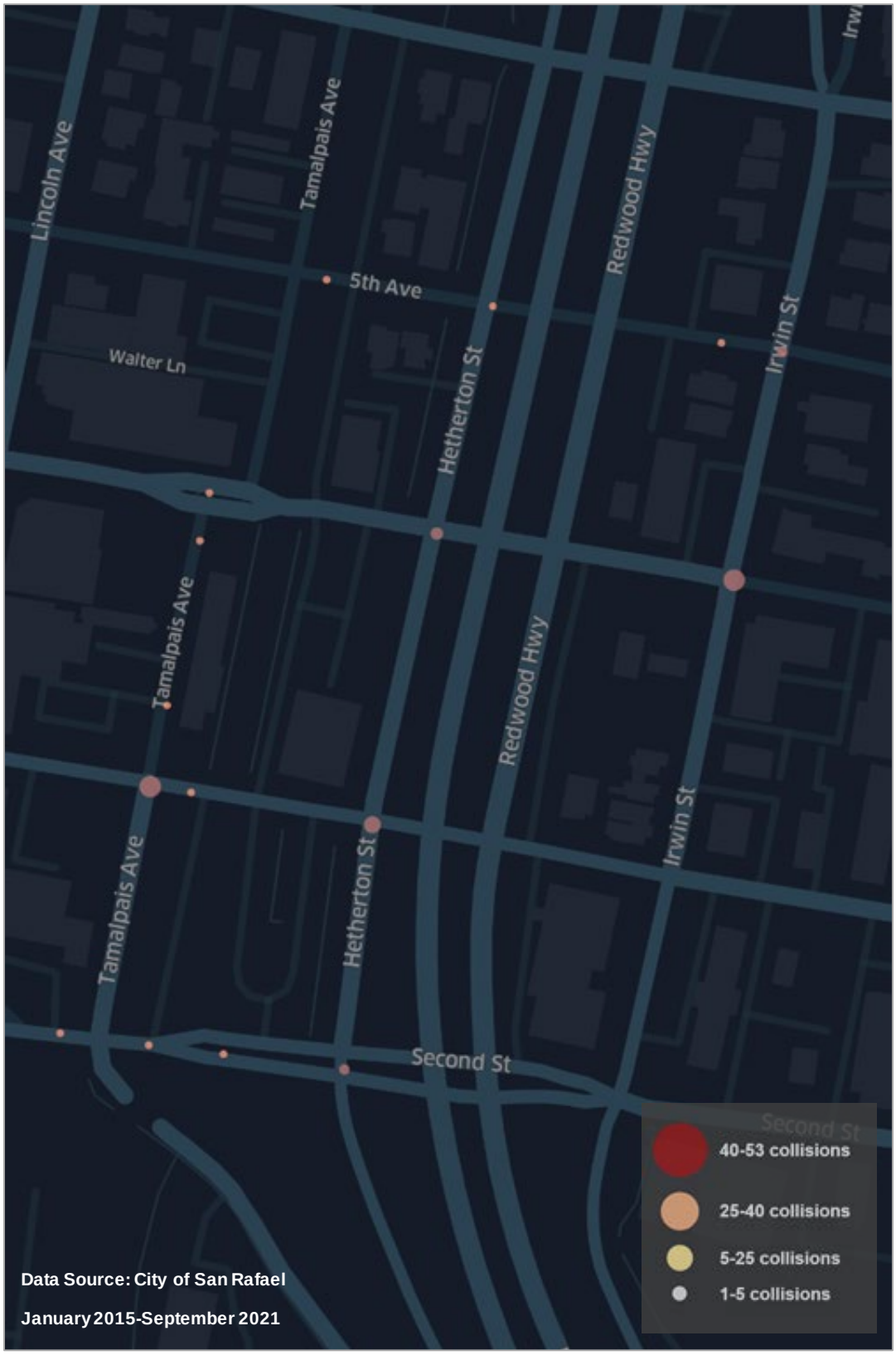


Table 2 summarizes the 46 pedestrian and bicycling collisions by severity from January 2015 to September 2021 for intersections in the vicinity of the Project alternatives.

Table 2: Pedestrian- and Bicycle-Involved Injury Collisions by Severity

Intersection	Complaint of Pain	Other Visible Injury	Severe Injury	Fatal	Total
2nd & Tamalpais		1		1	**2**
2nd & Hetherton		3			**3**
3rd & Tamalpais	2	8			**10**
3rd & Hetherton	4	3		1	**8**
3rd & Irwin	1	3			**4**
4th & Tamalpais	1	1			**2**
4th & Hetherton	3				**3**
4th & Irwin	2	7	1		**10**
5th & Tamalpais		1			**1**
5th & Hetherton					**0**
5th & Irwin		3			**3**
Total	**13**	**30**	**1**	**2**	**46**

Data Source: City of San Rafael, January 2015 to September 2021

The following summarizes findings for key intersections:

- **3rd Street & Hetherton Street**
  - This intersection is immediately adjacent to the existing SRTC and has the third highest number of existing pedestrian movements.
  - As noted earlier, the crosswalk on the south leg was removed and replaced with a new crosswalk on the east leg in 2020 because of safety concerns.
  - It can be challenging to identify the specific cause and location of collisions from these records because the collision location is not precisely identified. The one fatality recorded at this location, on June 8, 2016, occurred in the south crosswalk when a vehicle making a left-turn hit the pedestrian in the crosswalk when the pedestrian had the right-of-way. That crosswalk has since been removed.
  - Most of the other pedestrian injury collisions occurred with pedestrians in the crosswalk and the right-of-way and were struck by vehicles making a westbound left-turn in the south crosswalk (crosswalk has since been removed) or a southbound right-turn in the west crosswalk.
  - The number of collisions decreased significantly in 2020 compared to the previous five years. The removal of the south crosswalk in 2020 may have been one factor, along with a steep decrease in traffic and pedestrian volumes associated with the COVID-19 pandemic. There were no pedestrian- or bicycle-involved collisions in 2020 or the first 9 months of 2021.
- **3rd Street & Tamalpais Avenue**
  - Located immediately adjacent to the existing SRTC and has the highest number of existing pedestrian movements

  - Tied for the most pedestrian and bicycle collisions.
  - The majority of the collisions involved pedestrians who were in the crosswalk and had the right-of-way
  - Nine of the ten collisions involved a car making a left-turn from Tamalpais to westbound 3rd Street
  - In a few cases, pedestrians were at fault because they did not cross at a crosswalk or the automobile had the right-of-way
- **4th Street & Irwin Street**
  - Notable in that it did not among the higher number of pedestrian volumes within the study area and thus experiences a disproportionate amount of collisions relative to pedestrian volumes.
  - Tied for the most pedestrian and bicycle collisions.
  - The majority of the collisions involved pedestrians who were in the crosswalk and had the right-of-way
- **2nd Street & Tamalpais Avenue**
  - Pedestrian fatality occurred on 2nd Street just to the east of this intersection; however, the pedestrian was not crossing at the crosswalk and did not have the right-of-way

The City also provided the overall collision rates for intersections in Downtown San Rafael. **Table 3** summarizes the collision rate calculations based on vehicle volumes for a six-year period from September 1, 2015 to August 31, 2021. This analysis indicates that the intersections around the SRTC Project study area in Downtown San Rafael have collision rates higher than statewide averages.

Table 4 provides pedestrian- and bicycle-involved collision rates for the study intersections. These collision rates divide the number of pedestrian- and bicycle-involved collisions by the PM peak hour crosswalk volumes shown in Table 1. These rates are not traditional collision rate calculations but are used to assess how the frequency of pedestrian- and bicycle-involved collisions relate to the levels of pedestrian activity at each intersection.

The pedestrian and bicycle collision rates indicate that 4th Street & Irwin Street (0.24) has more than double the number of pedestrian- and bicycle-involved collisions relative to the amount of pedestrian activity of any other location in the study area. It is followed by 2nd Street & Hetherton Street (0.10) and 5th Avenue & Irwin Street (0.09). This indicates that these intersections are currently the most hazardous for pedestrians and bicyclists.

The pedestrian and bicycle collision history within the study area and the collision rates summarized highlight the need for the Project to fully consider safety for pedestrians and bicyclists accessing the station and transferring between transit modes.

Table 3: City of San Rafael's Collision Rate Calculations near the SRTC

Intersection	ADT[1]	# of Collisions 9/1/2016 - 8/31/2021	Total Collision Rate[2]	Avg Statewide Collision Rate[3]
2nd & Lincoln	36,595	36	**0.45**	0.24
2nd & Tamalpais - Francisco W	32,108	35	**0.50**	0.24
2nd & Hetherton	39,434	36	**0.42**	0.24
2nd & Irwin	38,900	48	**0.56**	0.24
2nd & Grand	29,881	34	**0.52**	0.24
3rd & Lincoln	26,555	33	**0.57**	0.24
3rd & Tamalpais	21,909	29	**0.60**	0.24
3rd & Hetherton	33,362	54	**0.74**	0.24
3rd & Irwin	38,101	29	**0.35**	0.24
3rd & Grand	25,283	59	**1.07**	0.24
4th & Lincoln	15,323	28	**0.83**	0.24
4th & Tamalpais	8,150	6	**0.34**	0.24
4th & Hetherton	20,017	35	**0.80**	0.24
4th & Irwin	22,231	25	**0.51**	0.24
4th & Grand	13,478	15	**0.51**	0.24

Notes:

1. Average daily traffic, provided by the City of San Rafael

2. Collision rates represent collisions per million entering vehicles using the following formula: $R = \frac{1{,}000{,}000 \times C}{365 \times N \times V}$

   R = Collision rate for the intersection expressed as collisions per million entering vehicles

   C = Total number of collisions near the study intersection during the study period. Fatal and injury (complaint of pain, other visible injury, and severe injury collisions) were evaluated in this analysis.

   N = Number of years of data which equates to 6 years

   V = Traffic volumes entering the intersection daily.

3. *2018 Crash Data on California State Highways* (Caltrans, October 2018), page 86, "Urban, Signals" intersection category.

Source: City of San Rafael, 2022

Table 4: Pedestrian- and Bicycle-Involved Collision Rates

Intersection	# of Pedestrian & Bicycle Collisions[1]	PM Peak Hour Pedestrian Volumes[2]	Pedestrian & Bicycle Collision Rate[3]
2nd & Tamalpais	2	200	0.01
2nd & Hetherton	3	29	0.10
3rd & Tamalpais	10	349	0.03
3rd & Hetherton	8	157	0.05
3rd & Irwin	4	128	0.03
4th & Tamalpais	2	169	0.01
4th & Hetherton	3	118	0.03
4th & Irwin	10	42	0.24
5th & Tamalpais	1	48	0.02
5th & Hetherton	0	38	0.00
5th & Irwin	3	32	0.09
Total Pedestrian & Bicycle Collisions	**46**	**200**	**0.01**

Notes:
1. Pedestrian and bicycle collisions for January 2015 to September 2021
2. January 2020 PM peak hour pedestrian volumes for all intersection crosswalks
3. Collision rate calculated as the total number of pedestrian and bicycle collisions divided by the PM peak hour pedestrian volume
Data Source: City of San Rafael (collision data), Kimley-Horn (count data and collision rate)

Planned Safety Improvements Across All Build Alternatives

Each of the Project Build alternatives include a series of safety-related improvements around the relocated SRTC. These improvements can be assessed using crash modification factors (CMF) for "countermeasures" published by the Federal Highway Administration's (FHWA) *Crash Modification Clearinghouse* (website: http://www.cmfclearinghouse.org/) and Caltrans' *Local Roadway Safety Manual (LRSM), A Manual for California's Local Road Owners, Version 1.5* (Caltrans, April 2020). These sources report CMFs for specific countermeasures, which indicate how the countermeasure would reduce the collision rate.

The following is a summary of the planned improvements and their potential benefits to transportation safety and mobility in the study area. If available, specific CMF IDs and collision reduction factors are reported.

- **Sidewalk Improvements** – Sidewalk improvements are incorporated into each of the Project alternatives, including sidewalk widening, where applicable, on Project blocks. The Project is currently planned to provide a 10 foot sidewalk width on sidewalks along Project blocks.
- **Install High-Visibility Crosswalks** – These are proposed for crosswalks on all Project-adjacent blocks in each Project alternative. The FHWA (CMF ID 4123) indicates a 40% reduction in vehicle-pedestrian crashes. Some intersections are already equipped with high-visibility crosswalks, but this improvement is applicable for several Project-adjacent intersections such as 3rd Street & Tamalpais Avenue, 4th Street & Tamalpais Avenue, and 4th Street & Hetherton Street.

- **Install Accessible Pedestrian Signal (APS)** – These improvements are proposed for signalized pedestrian crossings at Project-adjacent intersections under all Project alternatives where not already implemented.
- **Install Leading Pedestrian Interval (LPI) Signal Phasing** – LPIs are proposed for Project-adjacent signalized intersections where pedestrian conflicts exist and where they are not currently implemented, such as 4th Street & Hetherton Street. The FHWA (CMF IDs 1993, 9901, 9903, 9908, and several others) and Caltrans LSRM (S21PB) identify a number of studies that indicate up to 60% reduction in pedestrian crashes and up to 30% for all crashes.
- **Install Intersection Lighting** – Intersection lighting improvements are proposed for all Project alternatives at Project-adjacent locations where no lighting existed previously. The FHWA (CMF 4462 and 10993) and Caltrans LSRM (NS01) indicate a reduction in total nighttime crashes of up to 40%.

Project Alternatives Pedestrian Crossing Considerations

One of the primary goals of the Project is to provide improved pedestrian and bicycling access to SMART, GGT, and MT service at the SRTC, as well as provide convenient transfers between transit modes. The following is a summary of the planned safety-related improvements and modifications specific to each Project alternative. The findings from the pedestrian route analysis from the Transportation Summary Report have been incorporated into each Project alternative. The analysis evaluated walk times and the number of conflicting vehicle movements encountered from each alternative to three locations:

- **Downtown**: 4th Street & A Street
- **San Rafael High School**: the front of the school on 3rd Street between Union Street and Embarcadero Way
- **BioMarin campus**: a point on the campus fronting 2nd Street between Lincoln Avenue and Lindaro Street

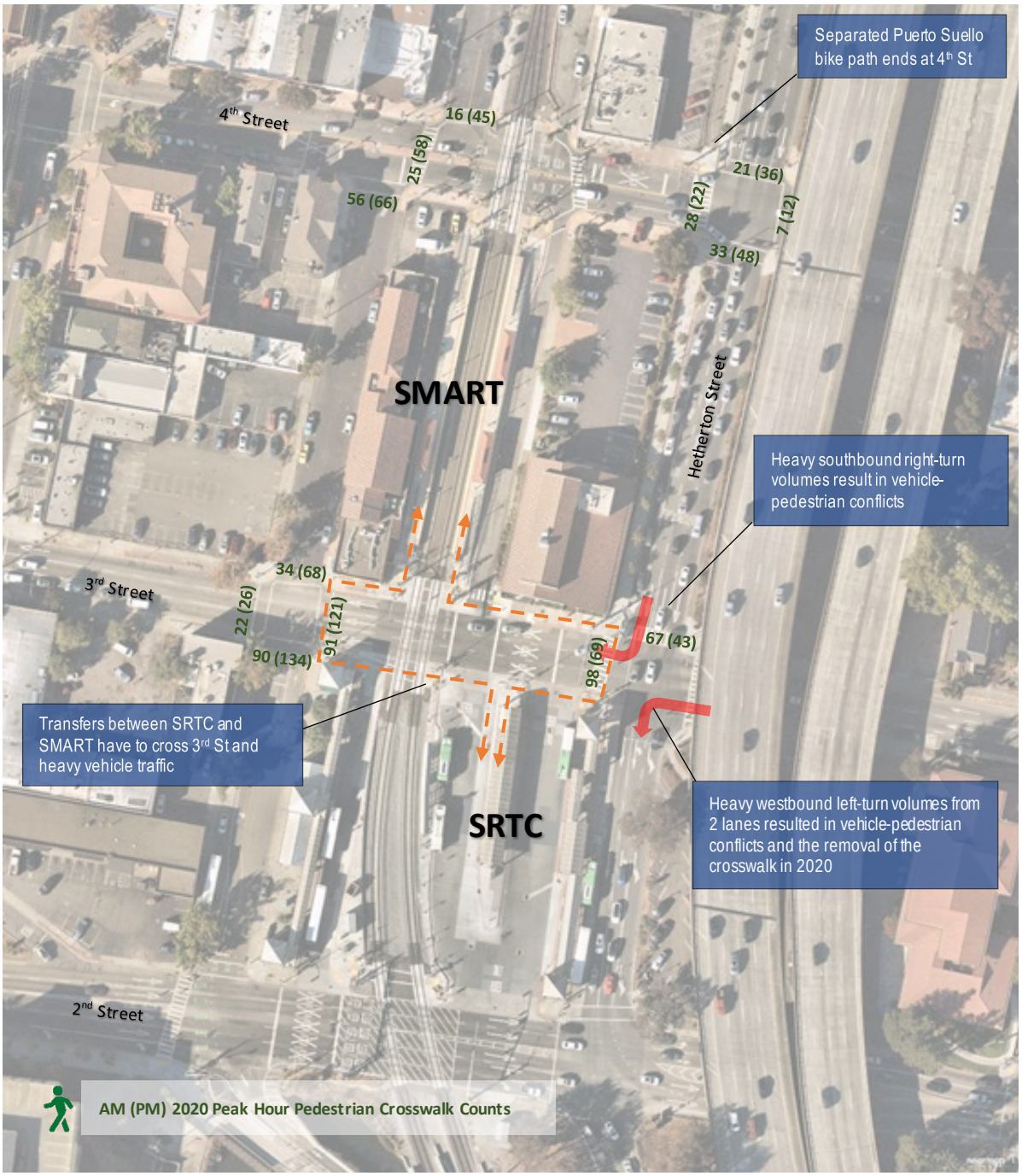
It is noted that relative walk times and conflicting vehicle movements between alternatives will remain consistent to other destinations in the vicinity of the three specific locations noted above. For example, the relative performance of each of the alternatives to Davidson Middle School would be the same as to BioMarin since the path of travel from each of the station alternatives to each of these two destinations would be identical outside of the immediate station alternative area.

For each alternative except the No Build, the walk times and conflicting volumes in the AM and PM peak hour are shown. The pedestrian connection analysis from the Transportation Summary Report is attached to this memorandum and summarized below.

No Build Alternative / Existing Transit Center Site

The No-Build Alternative would result in no significant changes to current pedestrian and bicycle infrastructure around the SRTC. **Figure 4** shows the existing SRTC, SMART station, and pedestrian crosswalk volumes at major crossings on 3rd and 4th Streets.

Figure 4: Existing SRTC-Area Circulation



The existing deficiencies of pedestrian and bicycle access, circulation, and safety around the SRTC and identified in the EIR would remain. Pedestrian access to the SRTC bus services requires pedestrians to walk along or cross 2nd or 3rd Street, which are the two highest volume streets in downtown. All passengers transferring to SMART have to cross 3rd Street, and many of the SRTC's passengers transferring between bus routes, which are nearly half of bus boardings, have to cross the SMART tracks

that run through the middle of the site. 3rd Street intersections with Tamalpais Avenue and Hetherton Street have two of the three highest number of pedestrian-involved collisions in the study area during the analysis period, representing a major barrier to transit center access.

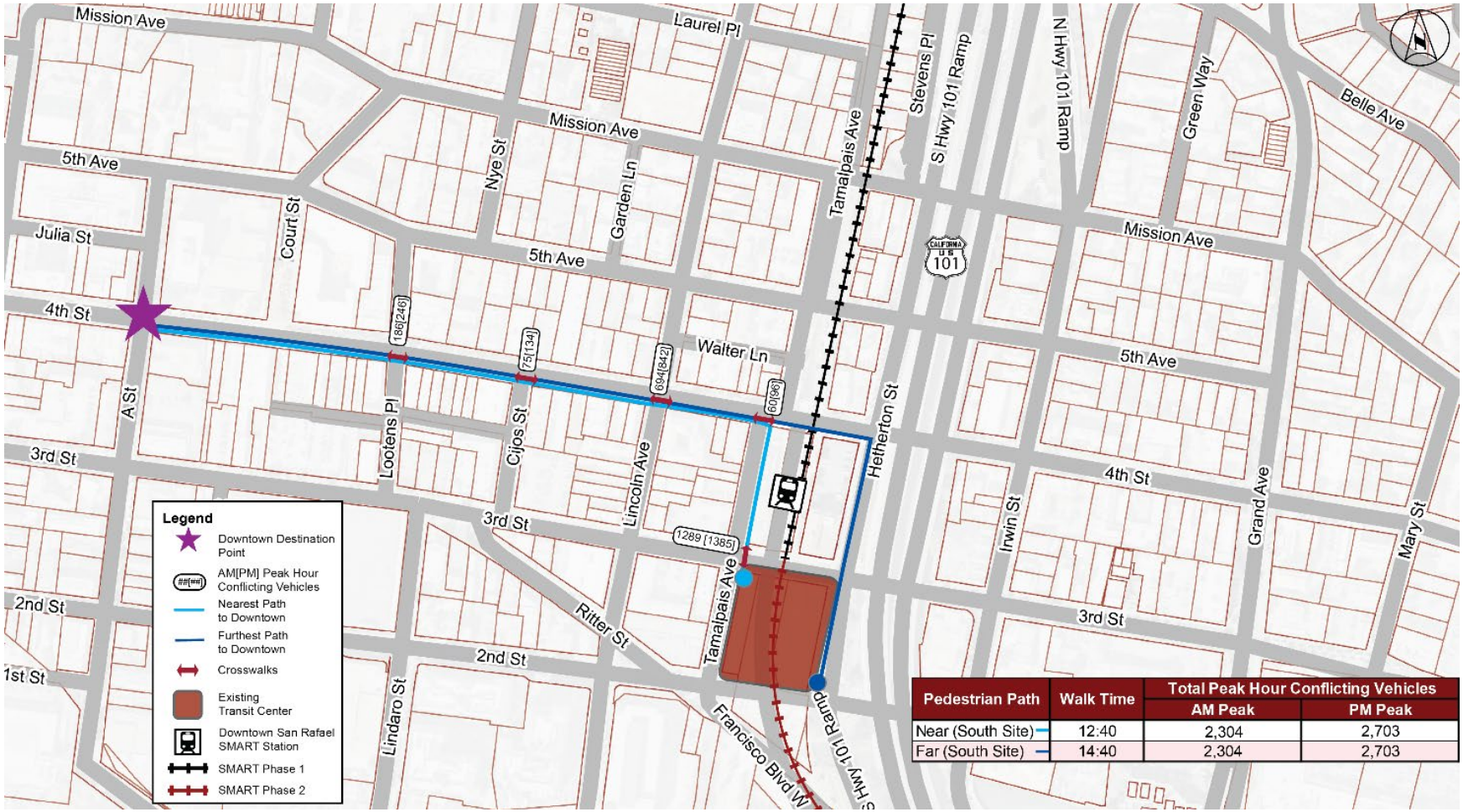
To evaluate the No-Build Alternative's connectivity to nearby destinations, the estimated walking time and the number of conflicting vehicles that pedestrians would encounter along each path were estimated.

Figure 5 shows the pedestrian connectivity analysis to/from Downtown for two points for the No-Build Alternative. The walk trip to 4th Street & A Street is approximately 13 to 15 minutes, with 2,300 to 2,700 conflicting vehicle movements depending on the peak hour.

Figure 6 presents the pedestrian connectivity analysis from the No-Build Alternative to San Rafael High School and BioMarin's campus. The walk trip to San Rafael High School takes 18 to 20 minutes with 4,700 to 5,160 vehicle conflicts depending on the peak hour. The walk trip to BioMarin takes 5.5 to 7.5 minutes with 2,700 to 3,050 vehicle conflicts.

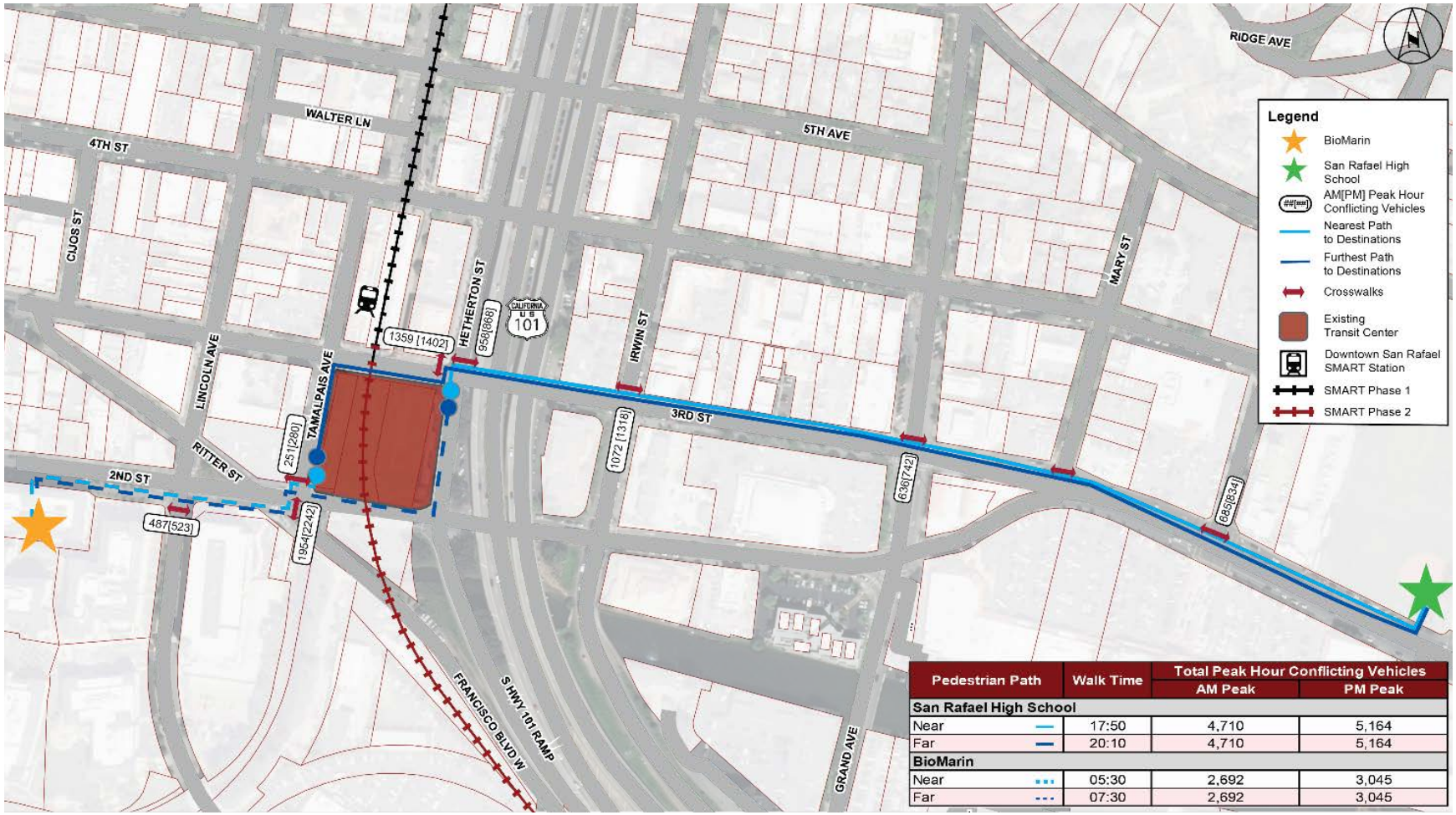
The pedestrian connectivity analysis is conducted for each of the SRTC alternatives described in the following sections.

Figure 5: No-Build Alternative – Pedestrian Connectivity Analysis to Downtown



Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
Near (South Site)	12:40	2,304	2,703
Far (South Site)	14:40	2,304	2,703

Figure 6: No-Build Alternative –Pedestrian Connectivity Analysis to San Rafael High School and BioMarin



Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
San Rafael High School			
Near	17:50	4,710	5,164
Far	20:10	4,710	5,164
BioMarin			
Near	05:30	2,692	3,045
Far	07:30	2,692	3,045

Move Whistlestop (Preferred Alternative)

Figure 7 presents the Move Whistlestop Alternative, which is the Preferred Alternative identified in the DEIR. Key safety-related elements around the SRTC site are noted.

In this alternative, a portion of the Whistlestop building would be relocated to or rebuilt on the west side of West Tamalpais Avenue between 3rd and 4th Streets. West Tamalpais Avenue between 2nd and 4th Streets would be shifted east so that it is directly adjacent to the SMART tracks and more closely aligned with West Tamalpais Avenue north of 4th Street. Better alignment will improve intersection safety and shorten crossings for pedestrians and bicyclists on 3rd and 4th Streets. The realignment of Tamalpais Avenue between 3rd and 4th Street and restricting access for some movements to bus-only would result in reduced auto conflicts at the Tamalpais Avenue at 3rd Street intersection, which was tied for the largest number of pedestrian- and bicycle-involved collisions in the study area.

The restriction of access to bus-only movements between 3rd and 4th Street on Tamalpais Avenue, East Tamalpais Avenue, and at the SRTC driveways would significantly reduce the number of pedestrian and auto conflicts that exist today. The total number of conflict points on the south side of 4th Street between Tamalpais Avenue and Hetherton Street will increase from three to four compared to the No-Build condition. However, the number of bus movements at the Project driveways will be substantially less than the existing traffic volumes for West Tamalpais Avenue, East Tamalpais Avenue and Citibank. All movements made from the proposed driveways will be restricted to right-turns only, eliminating a major hazard to crossing pedestrians from left-turning vehicles. Additionally, the driveways will be accessed exclusively by professional-trained bus drivers with a heightened awareness for pedestrians.

Table 5 compares the existing driveway volumes on the south side of 4th Street to the planned volumes associated with both the Move and Adapt Whistlestop Alternatives. This will remove up to 161 AM and 226 PM peak hour vehicle volumes at the driveways. The reduction in the number of conflicts will improve the safety and comfort of sidewalks on 4th Street, the City's primary pedestrian access corridor to downtown.

Figure 7: Move Whistlestop Alternative

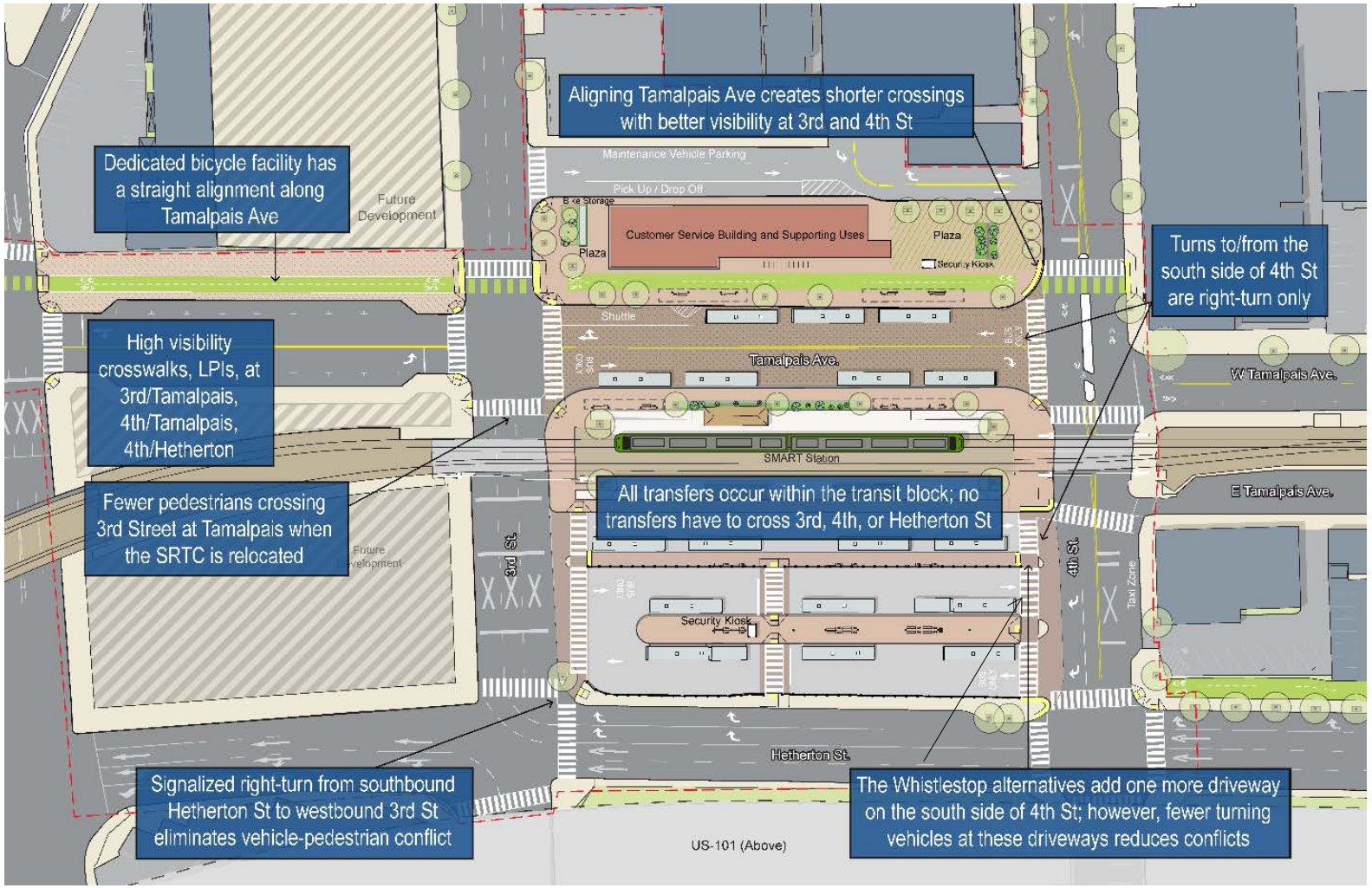


Table 5: Traffic Volumes Crossing Sidewalks on the South Side of 4th Street

Scenario	AM Peak Hour Volumes			PM Peak Hour Volumes		
	In	Out	Total	In	Out	Total
Existing Access on South Side of 4th Street at Citibank Driveway, East Tamalpais Ave, and West Tamalpais Ave	112	103	215	127	148	275
Proposed Access on South Side of 4th Street at Transit Center and Tamalpais Ave	12	42	54	12	37	49
Net Total	**-100**	**-61**	**-161**	**-115**	**-111**	**-226**

Data Sources: Existing peak hour volumes: January 2020 Counts and ITE Trip Generation, 11th Edition; With Project peak hour volumes: Kimley-Horn

The reduction of traffic volumes at key driveways on the south side of 4th Street, shown in **Table 5,** will also apply to the Adapt Whistlestop Alternative. The primary safety-related differences between the two Whistlestop Alternatives is related to the alignment of West Tamalpais Avenue. A better-aligned West Tamalpais Avenue, provided in the Move Whistlestop Alternative, allows for shorter and more visible crossings of 3rd Street and 4th Street for bicycles and pedestrians. The Move Whistlestop Alternative creates a contiguous intermodal station block where all transfers between SMART and bus services can be made with a short walk that does not have to cross a public street. This greatly simplifies wayfinding for pedestrians and allows pedestrians to have visibility from any bus bay to any other bus bay, simplifying the transfer process. A few transfers will have to cross West Tamalpais Avenue to access bus bays on the west side of the street. However, West Tamalpais Avenue will be bus-only and will be closed to auto traffic, which will make transfers safer and more convenient within the station block.

This alternative also allows for extending a protected bicycle facility along the west side of West Tamalpais Avenue between 2nd and 4th Streets. This facility will create a seamless bicycle connection between the new two-way cycle track on Francisco Boulevard south of 2nd Street, the adjacent Mahon Creek Path, and the station. This will also create a stronger connection to the Puerto Suello Hill Pathway that begins at the northwest corner of 4th Street & Hetherton Street. The high-quality bicycle connection along West Tamalpais Avenue to be implemented as part of this alternative is a critical component of the City's Bicycle and Pedestrian Master Plan (Updated 2018). The realignment of this segment of West Tamalpais Avenue also creates more direct bicycle and pedestrian crossings at 3rd and 4th Streets, which shortens the crossing distance and enhancing safety by improving sight distance and visibility at these crossings.

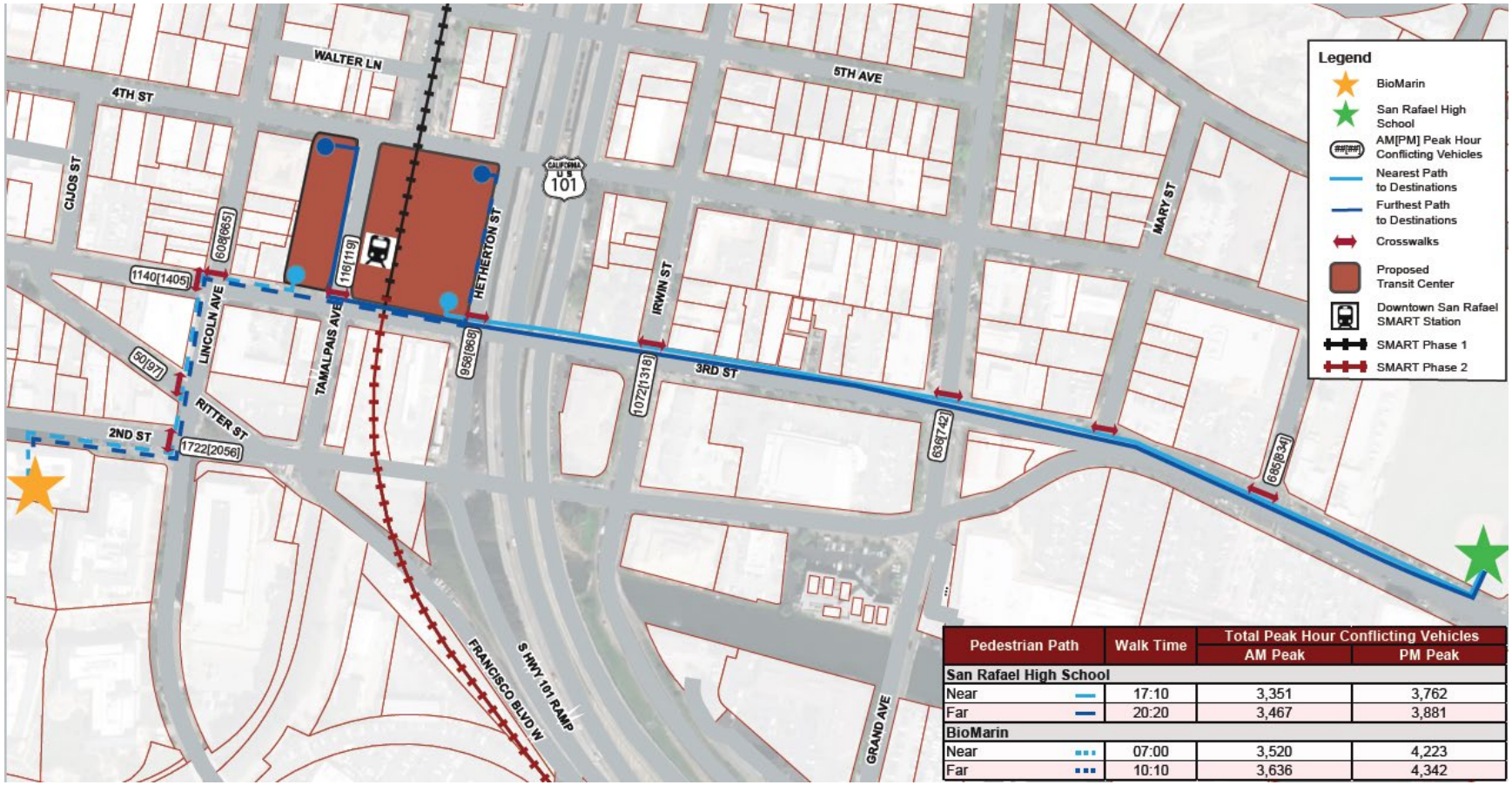
Figure 8 shows the pedestrian connectivity analysis to/from Downtown for two points on both the Move and Adapt Whistlestop Alternatives. The walk trip to 4th Street & A Street is approximately 9 to 12 minutes, with 1,000 to 1,360 conflicting vehicle movements depending on the peak hour.

Figure 9 shows the pedestrian connection analysis to/from San Rafael High School and BioMarin's campus. The walk trip to San Rafael High School takes 17 to 20 minutes with 3,350 to 3,880 vehicle conflicts (depending on the peak hour) at Hetherton, Irwin, and Grand. The walk trip BioMarin's campus is 7 to 10 minutes with 3,500 to 4,300 vehicle conflicts primarily at 3rd and 2nd Streets and Lincoln Avenue. This same analysis applies to the Adapt Whistlestop Alternative.

Figure 8: Move and Adapt Whistlestop Alternatives – Pedestrian Connectivity Analysis to Downtown

Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
Near (South Site)	09:20	955	1,222
Far (South Site)	12:00	1,034	1,360

Figure 9: Move and Adapt Whistlestop Alternatives – Pedestrian Connectivity Analysis to San Rafael High School and Bio-Marin Campus



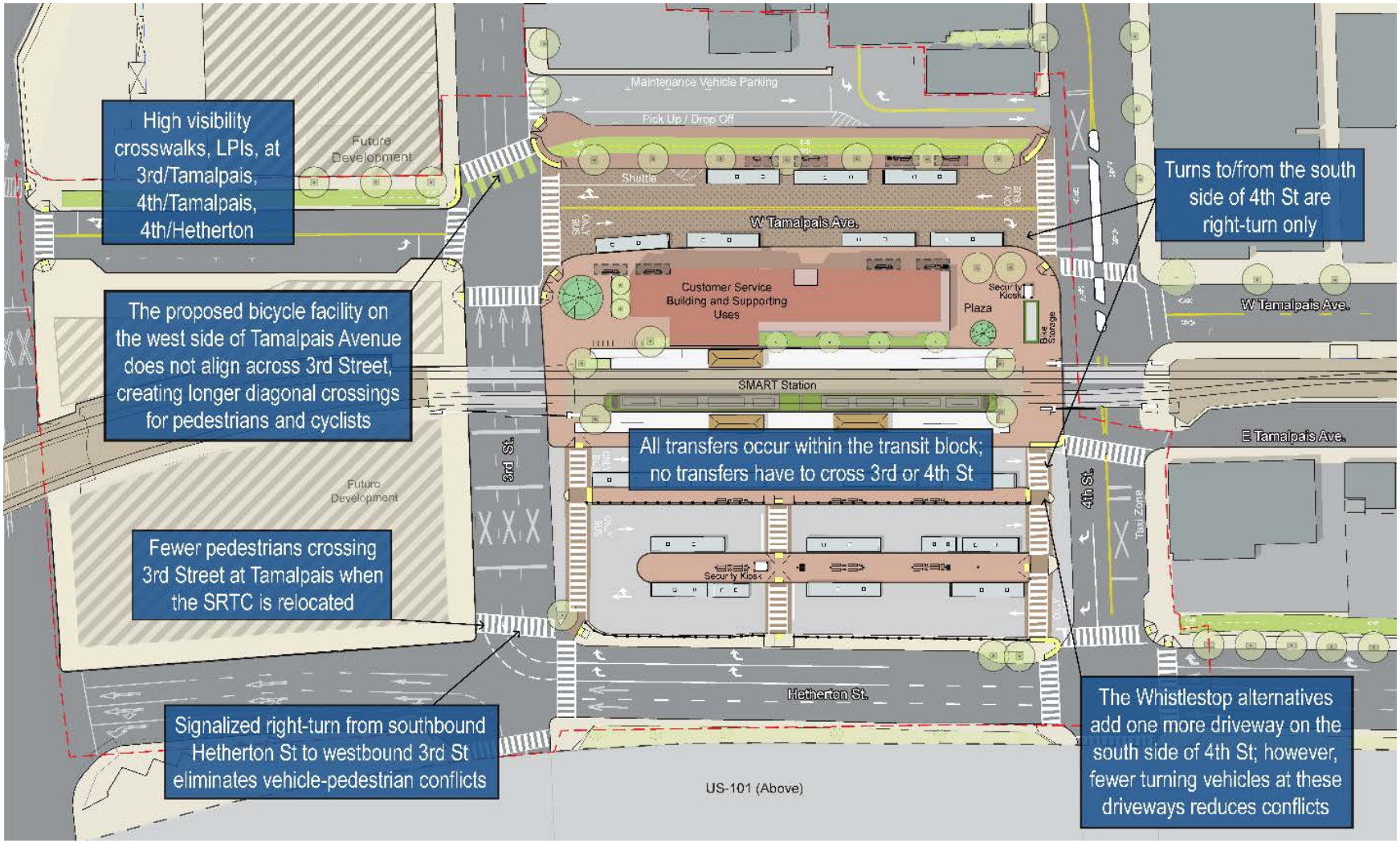
Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
San Rafael High School			
Near	17:10	3,351	3,762
Far	20:20	3,467	3,881
BioMarin			
Near	07:00	3,520	4,223
Far	10:10	3,636	4,342

Adapt Whistlestop

Figure 10 presents the concept plan for the Adapt Whistlestop Alternative and identifies some key safety-related components of the Project around the SRTC site. This alternative includes many of the same safety improvements as the Move Whistlestop Alternative. The Adapt Whistlestop Alternative creates a contiguous intermodal station block between Hetherton Street and Tamalpais Avenue. All connecting passengers can transfer between SMART and bus services without having to cross any auto-serving streets. Relative to the No-Build Alternative, this eliminates the need to cross 3rd Street at either Tamalpais Avenue or Hetherton Street, both locations with among the highest number of pedestrian- and bicycle-involved collisions, to travel between SMART and bus. Additionally, pedestrians will not need to cross 3rd Street to travel between the SRTC and downtown San Rafael, the predominate destination. This will greatly reduce the number of auto conflicts for pedestrians.

As with the Move Whistlestop Alternative, this alternative also allows for creating a critical bicycle facility connection along Tamalpais Avenue to connect the Mahon Creek Path, Francisco bikeway, and the Puerto Suello Path. This alternative maintains West Tamalpais Avenue's existing alignment, resulting in intersection offsets at these locations, increasing crossing distances relative to the Move Whistlestop Alternative.

Figure 10: Adapt Whistlestop Alternative



4th Street Gateway

Figure 11 presents the concept plan for the 4th Street Gateway Alternative and identifies some key safety-related elements around the SRTC site. The 4th Street Gateway Alternative creates more convenient transfers for passengers connecting between SMART, GGT, and MT relative to the No-Build. Some transfers between SMART and bus can occur without having to cross 4th Street. Approximately 95 passengers per weekday day will need to cross 4th Street to make a transfer. While the requirement to cross a street is undesirable, relative to other alternatives, it is noted that 4th Street has lower traffic volumes than 3rd Street or Hetherton Street. This alternative shifts the transit center away from 2nd and 3rd Streets, towards 4th Street and 5th Avenue, both more pedestrian-friendly streets. The intersections of 4th Street with Tamalpais Avenue and Hetherton Street have a much lower number of pedestrian- and bicycle-involved collisions than the same cross-streets at 3rd Street. The alternative includes signalized double right-turn lanes from southbound Hetherton Street to 3rd Street. Signalizing the right-turn movements as part of a separate phase from the west leg pedestrian phase will eliminate conflicts between right turning vehicles and pedestrians crossing the west leg of the intersection.

Most crosswalks within the transit center blocks would require crossing two directions of bus traffic, as do crosswalks on the perimeter of the transit center. A new driveway along Hetherton Street south of 5th Avenue would introduce a new pedestrian crossing conflict on that block that does not exist today. The crosswalk along the 4th Street access to the northern transit center block would be very long as a result of bus turning movement requirements.

Figure 12 presents the pedestrian connectivity analysis for the 4th Street Gateway Alternative to Downtown. The walk times are between 10 and 12 minutes with 900 to 1,320 conflicting vehicles depending on the peak hour.

Figure 13 presents the pedestrian connectivity analysis from the 4th Street Gateway Alternative to San Rafael High School and BioMarin's campus. The walk trip to San Rafael High School takes 17 to 20 minutes with 3,350 to 4,700 vehicle conflicts. The walk trip to BioMarin takes 8.5 to 12 minutes with 3,600 to 5,100 vehicle conflicts depending on the peak hour.

Figure 11: 4th Street Gateway Alternative

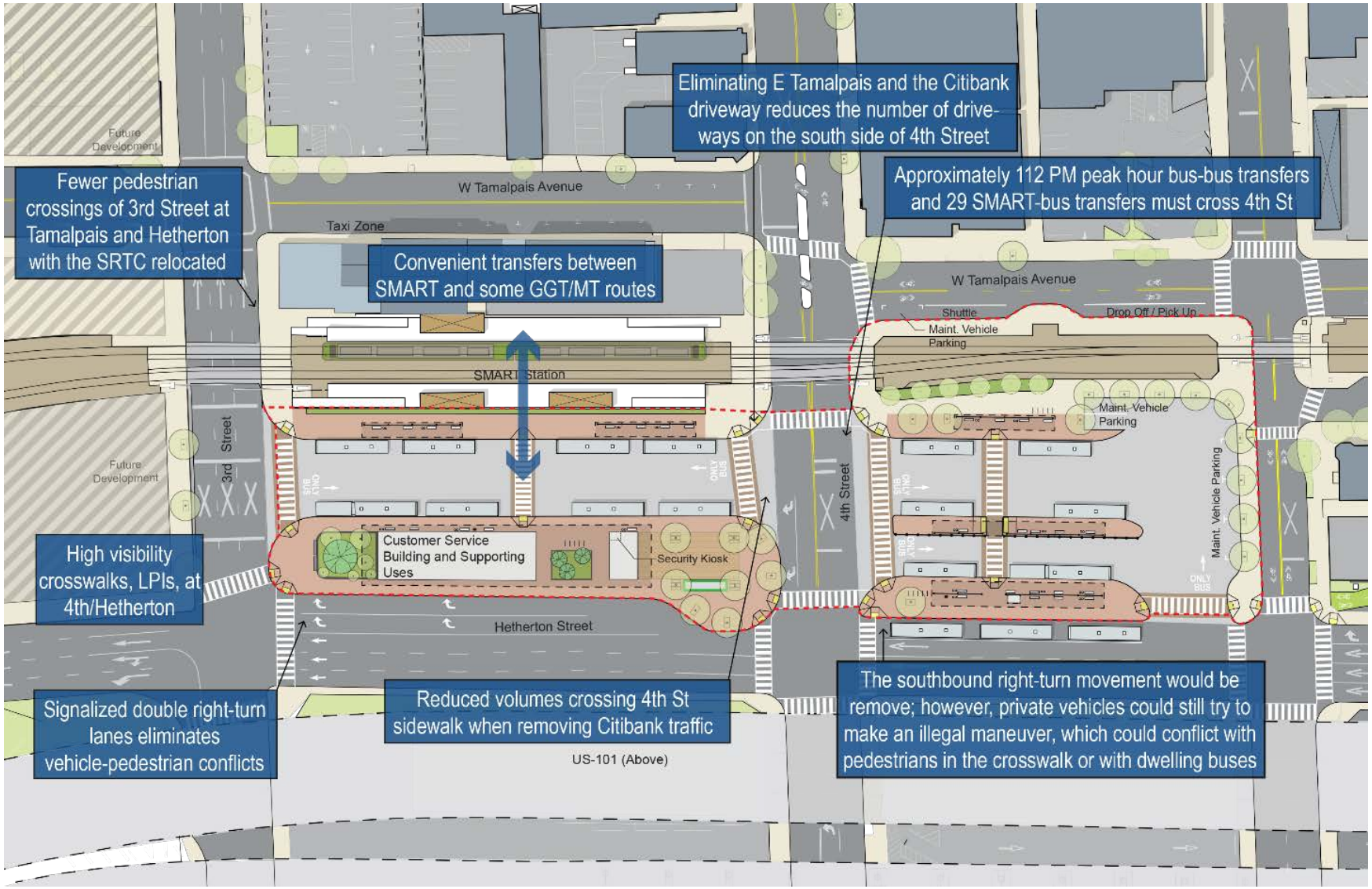
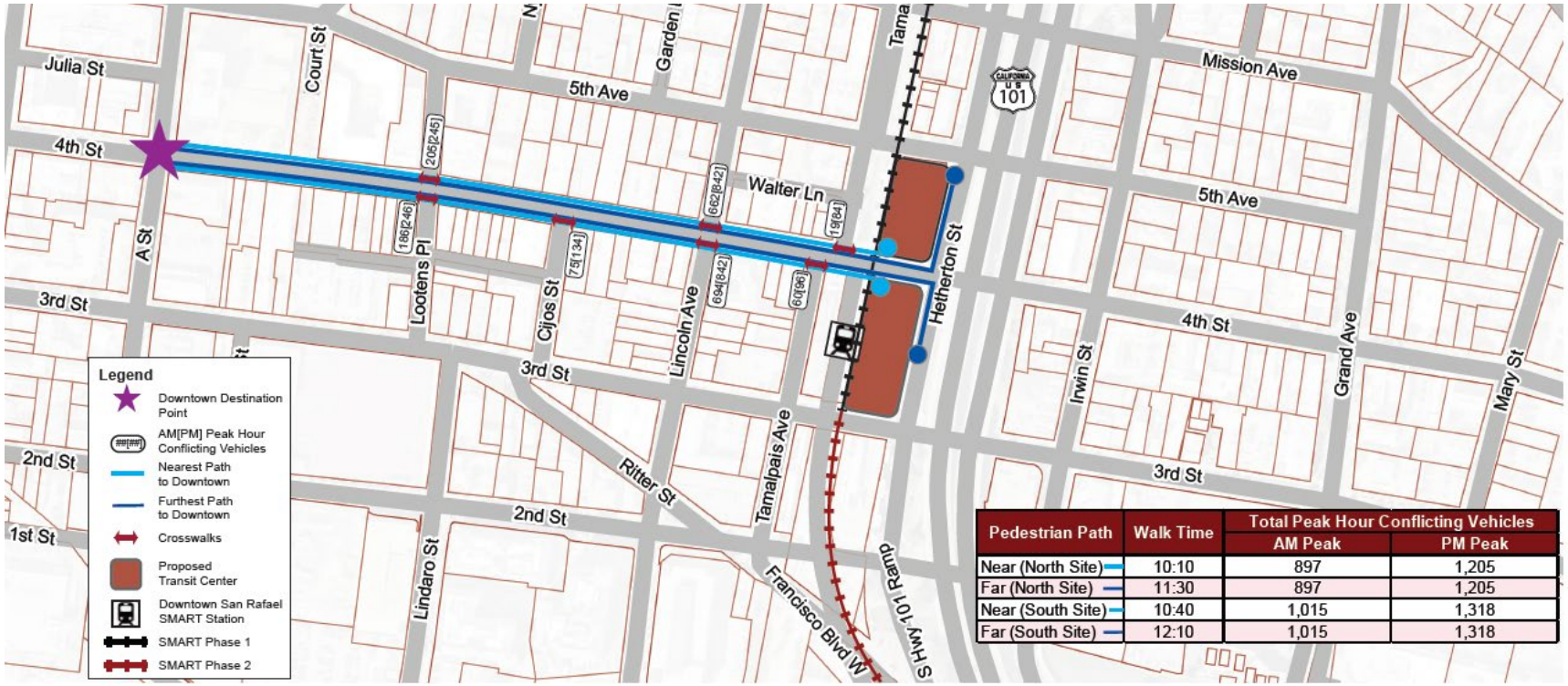
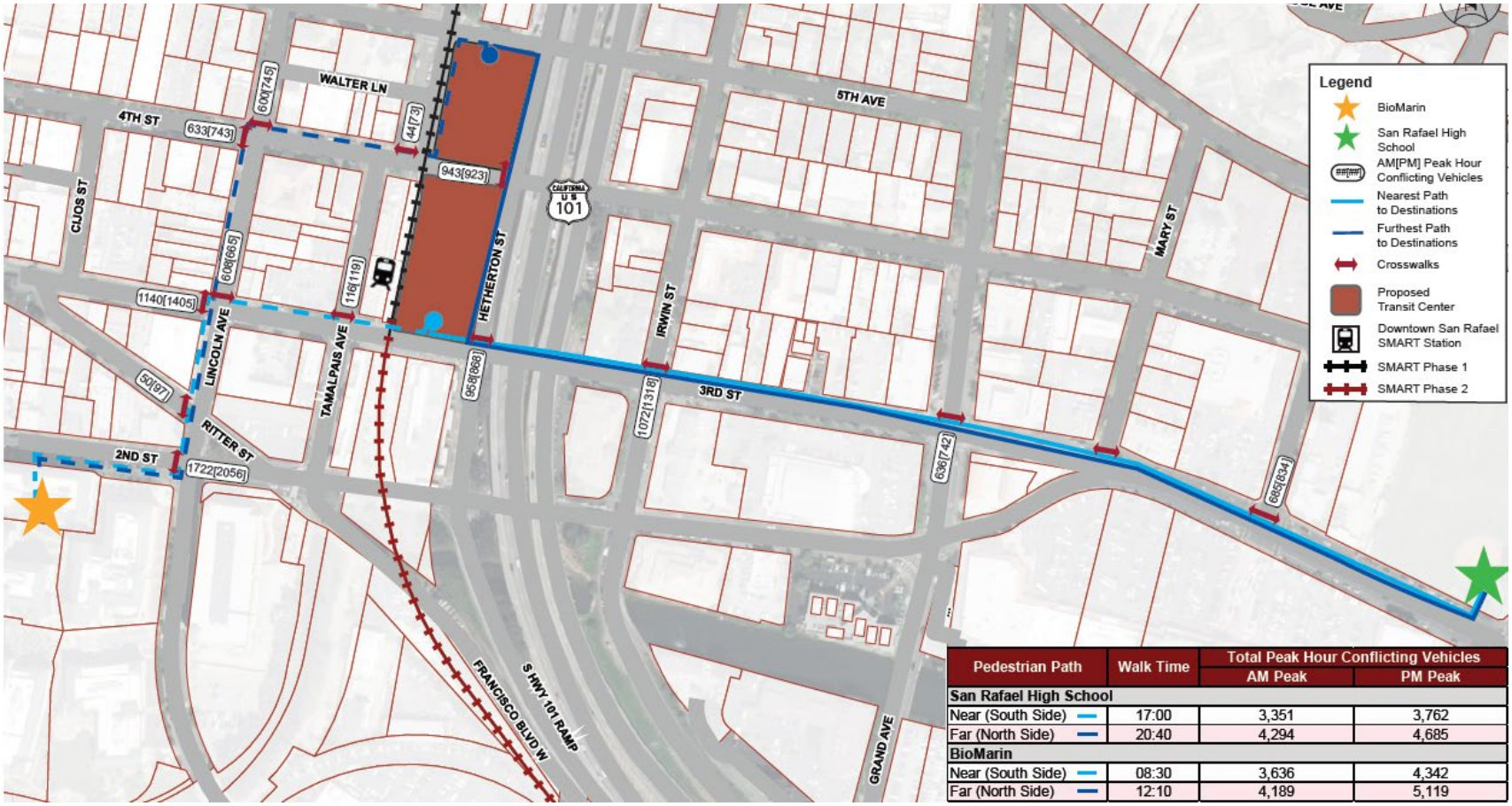


Figure 12: 4th Street Gateway - Pedestrian Connectivity Analysis to Downtown



Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
Near (North Site)	10:10	897	1,205
Far (North Site)	11:30	897	1,205
Near (South Site)	10:40	1,015	1,318
Far (South Site)	12:10	1,015	1,318

Figure 13: 4th Street Gateway – Pedestrian Connectivity Analysis to San Rafael High School and BioMarin Campus



Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
San Rafael High School			
Near (South Side)	17:00	3,351	3,762
Far (North Side)	20:40	4,294	4,685
BioMarin			
Near (South Side)	08:30	3,636	4,342
Far (North Side)	12:10	4,189	5,119

Under the Freeway

Figure 14 presents the concept plan for the Under the Freeway Alternative and identifies some key safety-related elements around the SRTC site.

The Under the Freeway Alternative locates the SRTC bus bays under or adjacent to US-101 and is bounded by 5th Avenue, Hetherton Street, and Irwin Street and extends south of 4th Street. Most buses would access the SRTC bus bays from Irwin Street and Hetherton Street. Within the bus transit center area, there are a large number of structural columns that support the US-101 freeway viaducts. These columns can create site distance issues for pedestrians crossing bus drive aisles within the transit center. This alternative will include wider sidewalks around the Project site and other pedestrian amenities such as high visibility crosswalks and enhanced pedestrian lighting.

This alternative requires most passengers transferring between SMART and bus services to cross multiple crosswalks at Hetherton Street & 4th Street or Hetherton & 5th Avenue to connect between the SRTC and SMART. The provision of bus bays on both sides of 4th Street will require some bus transfers to cross 4th Street at either Hetherton or Irwin Streets. In addition, the heaviest pedestrian flows from the SRTC are to destinations in Downtown west of the site. This will require pedestrians traveling from the SRTC to/from Downtown to cross Hetherton Street, which they will not have to do in the other Project alternatives.

Figure 15 presents the pedestrian connectivity analysis for the Under the Freeway Alternative to Downtown. The walk trip would vary from 11.5 to 14 minutes depending on the start point at the SRTC site. The number of conflicting vehicles is the highest of the alternatives, with 1,800 to 2,370 (depending on peak hour) conflicting vehicle movements for pedestrians walking along these paths. The higher number of conflicts is due to pedestrians having to cross Hetherton Street, which they would not have to do in the other alternatives.

Figure 16 presents the pedestrian connectivity analysis for San Rafael High School and BioMarin. The walk trip to San Rafael High School would take 15.5 to 19 minutes with 2,400 to 3,500 vehicle conflicts. The number of vehicle conflicts is lower in this alternative than the others because pedestrians do not have to cross Hetherton Street. The walk trip to BioMarin would take 11.5 to 15 minutes with 4,500 to over 6,000 vehicle conflicts. This pedestrian route has the highest number of conflicts of all of the alternatives and destinations because pedestrians have to cross most of the highest volume streets (Hetherton, 4th, 3rd, and 2nd Streets) to reach the campus.

Figure 14: Under the Freeway Alternative

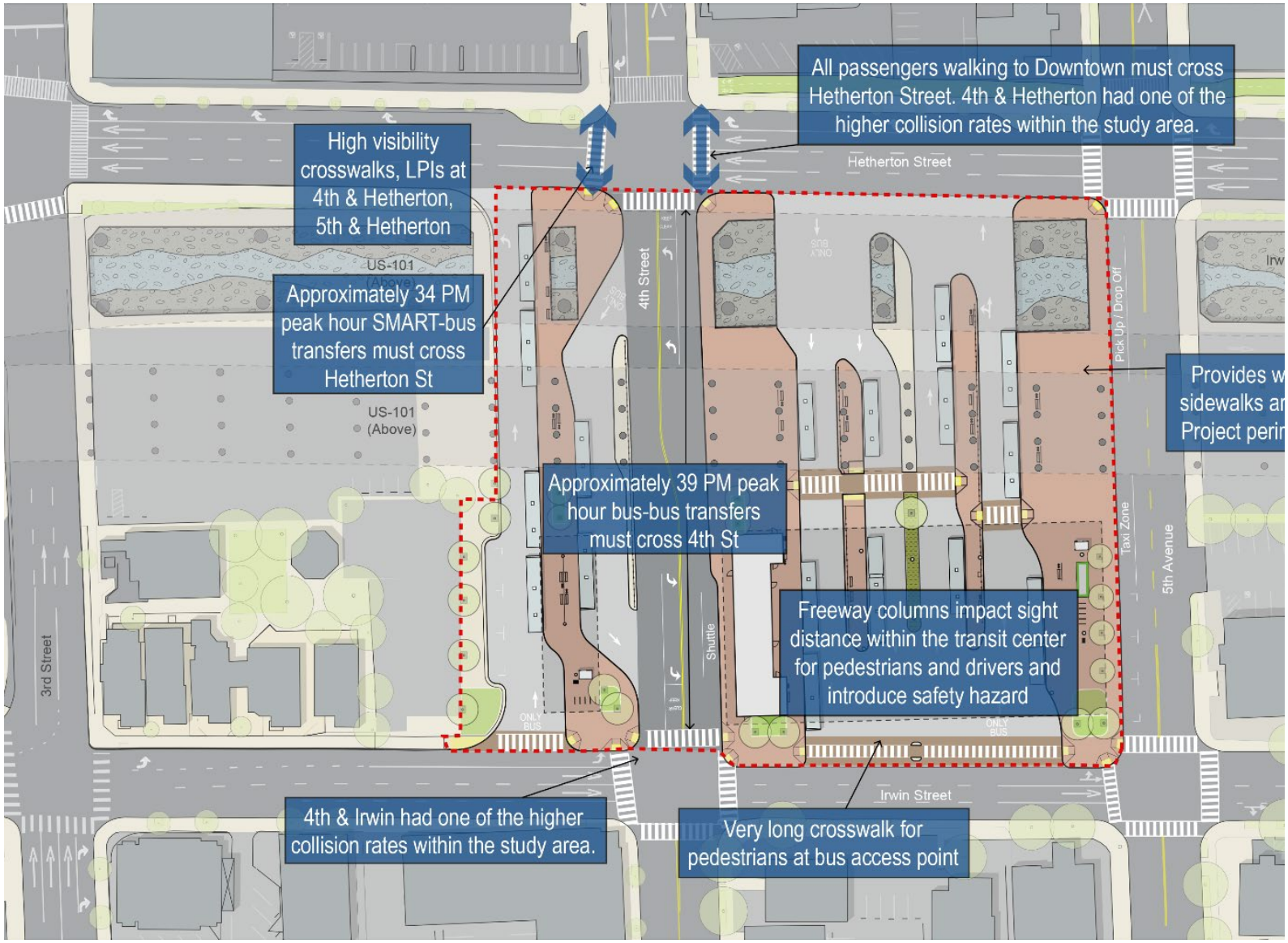
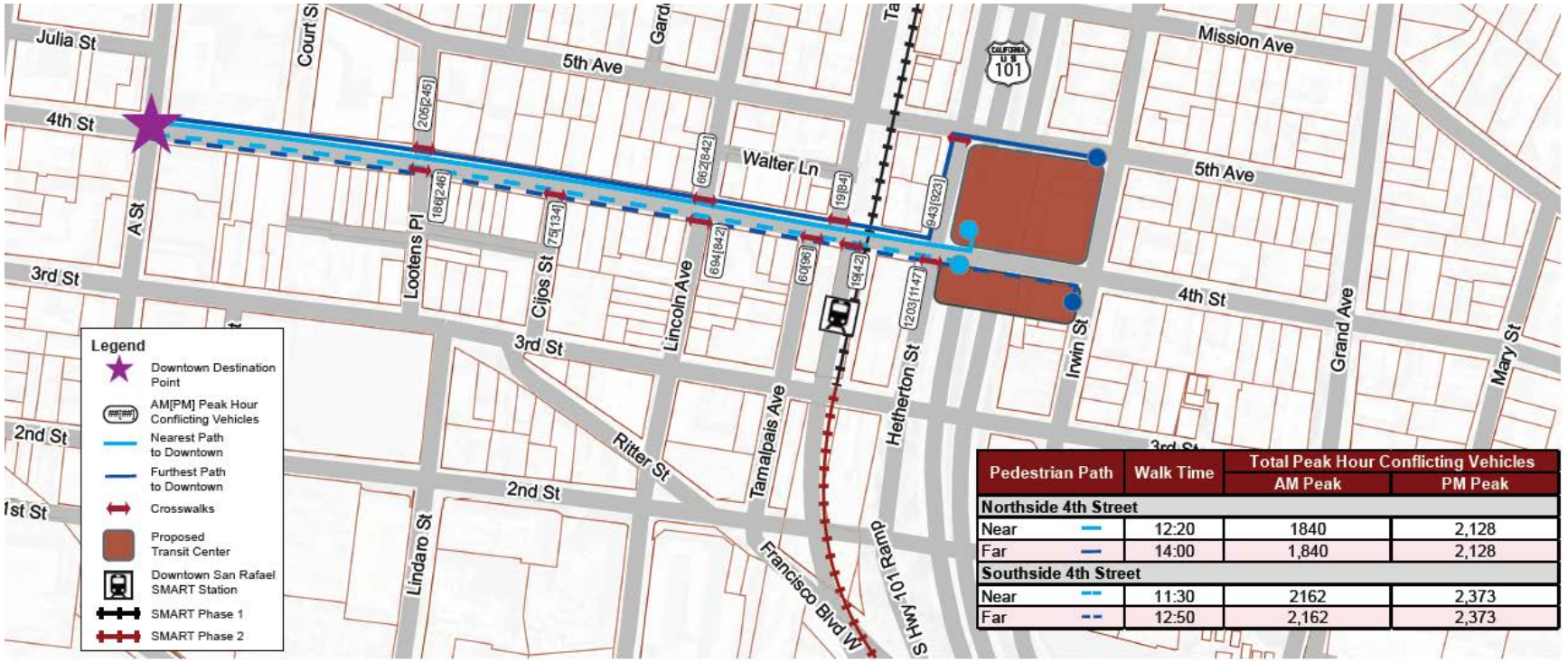
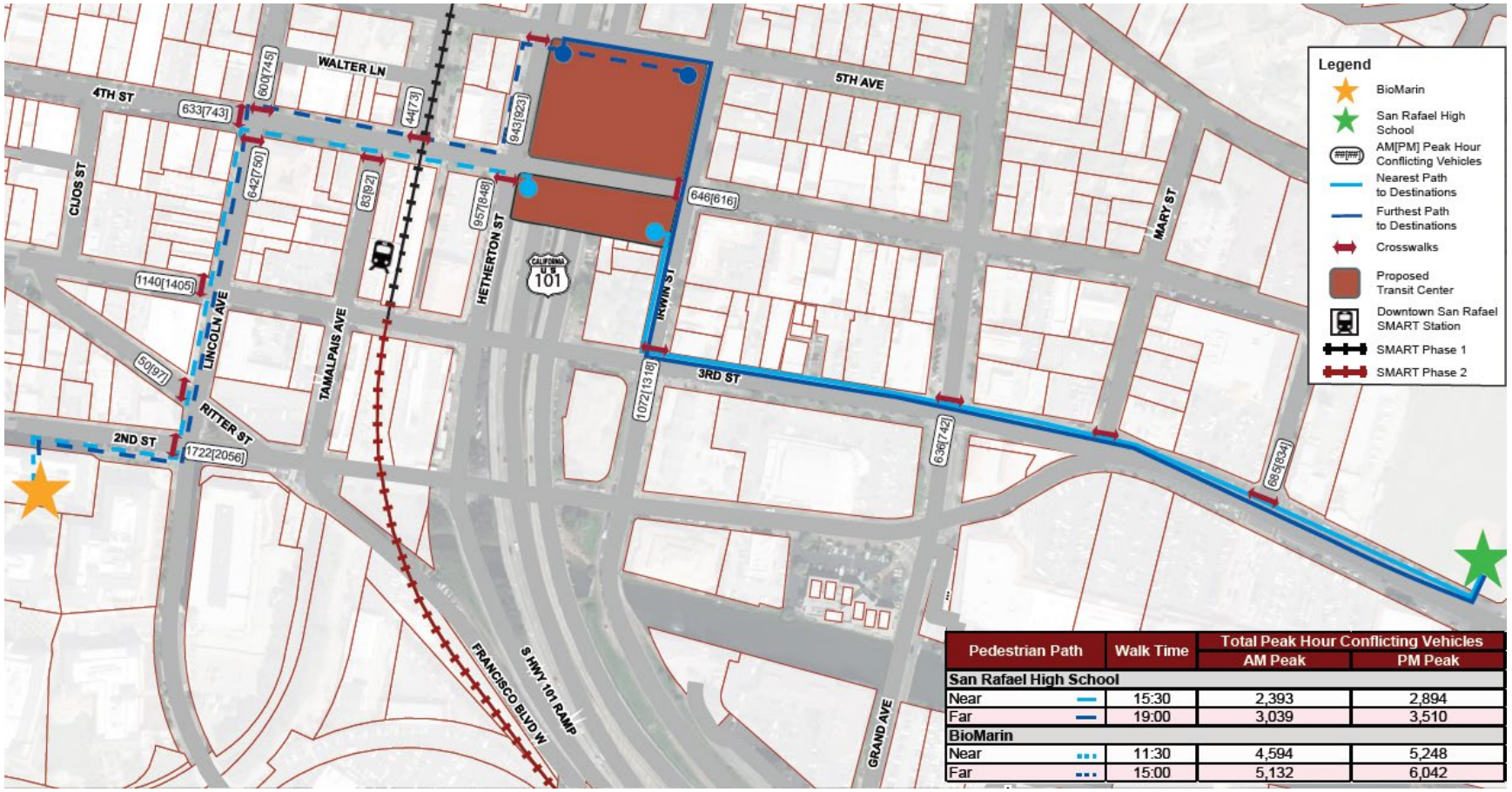


Figure 15: Under the Freeway Alternative – Pedestrian Connectivity Analysis to Downtown



Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
Northside 4th Street			
Near	12:20	1840	2,128
Far	14:00	1,840	2,128
Southside 4th Street			
Near	11:30	2162	2,373
Far	12:50	2,162	2,373

Figure 16: Under the Freeway Alternative – Pedestrian Connectivity Analysis to San Rafael High School and BioMarin



Pedestrian Path	Walk Time	Total Peak Hour Conflicting Vehicles	
		AM Peak	PM Peak
San Rafael High School			
Near	15:30	2,393	2,894
Far	19:00	3,039	3,510
BioMarin			
Near	11:30	4,594	5,248
Far	15:00	5,132	6,042

Summary of Pedestrian Paths Analysis

The pedestrian paths analysis contained above is summarized in the tables below. **Table 6** and **Table 7** depict the pedestrian volumes and conflicts associated with transfers between transit services. As shown in the tables, while the No-Build places all of the buses on the same block, the requirement to cross 3rd Street results in a significant barrier to pedestrians. The Move Whistlestop and Adapt Whistlestop Alternatives provide all transit services on the same block and thus no auto-pedestrian conflicts occur. While the transfer distances and times are similar between the Build alternatives, both 4th Street Gateway and Under the Freeway introduce significant conflicts for pedestrians transferring between transit modes.

Table 6: Bus to Bus Transfer Paths Comparison Summary

Alternative	AM Peak Hour			PM Peak Hour			Longest Bus to Bus Transfer Distance (ft)	Longest Bus to Bus Transfer Time
	Transfer Volume Across Street	Conflicting Vehicles	Conflict Quotient[1]	Transfer Volume Across Street	Conflicting Vehicles	Conflict Quotient[1]		
No-Build	0	0	0	0	0	0	450	2:10
Move/Adapt Whistlestop	0	0	0	0	0	0	625	3:40
4th Street Gateway	93	631	58,683	112	616	68,992	625	3:40
Under the Freeway	32	713	22,816	39	718	28,002	625	3:40

Note:
[1]Conflict quotient is the number of conflicting vehicles multiplied by the number of transferring pedestrians

Table 7: SMART – Bus Transfer Paths Comparison Summary

Alternative	Peak Hour Transfer Volume	Conflicting Vehicle Volume	Conflict Quotient[1]
No-Build	34	1,483	50,422
Move/Adapt Whistlestop	0	0	0
4th Street Gateway	29	616	17,864
Under the Freeway	34	713	24,242

Note:
[1]Conflict quotient is the number of conflicting vehicles multiplied by the number of transferring pedestrians

Table 8, **Table 9,** and **Table 10** summarize the findings of the pedestrian paths analysis to nearby destinations. As noted earlier in this document, pedestrian activity to/from the transit center is heavily focused on downtown destinations located to the north and west of the existing SRTC. Pedestrian volumes are higher accessing destinations to the north and west of the existing transit center than destinations east and south of the existing transit center by a roughly 2:1 margin. As shown in Table 8,

the Move Whistlestop, Adapt Whistlestop, and 4th Street Gateway Alternatives provide the fastest walk times to downtown and with approximately half as many conflicting auto volumes as the Under the Freeway Alternative and the No-Build Alternative.

While pedestrian movements to BioMarin and other destinations to the south of 2nd Street and San Rafael High school and other destinations to the east of Irwin Street are not as frequent as movements to downtown San Rafael, it is still informative to compare pedestrian paths of travel to these destinations. As shown in **Table 9** and **Table 10**, the No-Build, Move Whistlestop and Adapt Whistlestop Alternatives provide the best connection to BioMarin and other locations to the south of 2nd Street, while Under the Freeway provides the best connection to San Rafael High School and the No-Build Alternative provides the worst connection.

Table 8: Pedestrian Access Paths to Downtown Summary

Alternative,	Pedestrian Path	Walk Distance (mi)	Walk Time[1]	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.38	12:40	2,304	2,703
	Far	0.45	14:40	2,304	2,703
Move/Adapt Whistlestop	Near	0.29	09:20	955	1,222
	Far	0.37	12:00	1,034	1,360
4th Street Gateway	Near (N)	0.33	10:10	897	1,205
	Far (S)	0.38	12:10	1,015	1,318
Under the Freeway	Near (S)	0.35	11:30	2,162	2,373
	Far (N)	0.45	14:00	1,840	2,128

Note:
[1]Walk times provided in minutes:seconds format

Table 9: Pedestrian Access Paths to San Rafael High School Summary

Alternative	Pedestrian Path	Walk Distance (mi)	Walk Time[1]	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.44	17:50	4,710	5,164
	Far	0.53	20:10	4,710	5,164
Move/Adapt Whistlestop	Near	0.55	17:10	3,351	3,762
	Far	0.65	20:20	3,467	3,881
4th Street Gateway	Near (S)	0.54	17:00	3,351	3,762
	Far (N)	0.66	20:40	4,294	4,685
Under the Freeway	Near	0.51	15:30	2,393	2,894
	Far	0.62	19:00	3,039	3,510

Note:
[1]Walk times provided in minutes:seconds format

Table 10: Pedestrian Access Paths to BioMarin Summary

Alternative	Pedestrian Path	Walk Distance (mi)	Walk Time[1]	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.14	05:30	2,692	3,045
	Far	0.22	07:30	2,692	3,045
Move/Adapt Whistlestop	Near	0.18	07:10	3,520	4,223
	Far	0.27	10:10	3,636	4,342
4th Street Gateway	Near (S)	0.21	08:30	3,636	4,342
	Far (N)	0.32	12:10	4,189	5,119
Under the Freeway	Near	0.30	11:30	4,594	5,248
	Far	0.41	15:00	5,132	6,042

Note:
[1]Walk times provided in minutes:seconds format

Conclusions

The collision analysis provided by the City identifies that intersections around the SRTC and SMART station collision rates that are higher than statewide averages. This emphasizes the importance, as identified in the Project objectives, of improving the safety of pedestrian and bicycle access to the SRTC as part of the Project.

All of the Project alternatives incorporate a series of pedestrian and bicycle safety improvements at intersections such as high visibility crosswalks, LPIs, and enhanced lighting. These measures have been shown by FHWA and Caltrans studies to reduce collision rates with pedestrians and bicyclists.

One of the primary challenges with pedestrian and bicycle access to the existing transit center is that it is bordered on three sides with high-volume roadways. All of the Build alternatives seek to reduce the number of vehicle-pedestrian conflicts, particularly along high-volume pedestrian routes and at locations with high collision propensity. Data shows that pedestrian trips to/from the transit center are predominately oriented towards Downtown San Rafael to the north and west. By relocating the SRTC to blocks north of 3rd Street, pedestrian crossings of 3rd Street will be greatly reduced, reducing the number of pedestrian-vehicle conflicts, particularly at intersections with a history of pedestrian- and bicycle-involved collisions and fatalities.

Analysis of pedestrian paths of travel indicate that the Move Whistlestop Alternative (Preferred Alternative) is the most effective at reducing or eliminating pedestrian conflicts for both transfers between transit modes and between the transit center and Downtown San Rafael. Move Whistlestop and Adapt Whistlestop are the only alternatives where users transferring between transit modes do not experience any auto conflicts. Those alternatives, along with 4th Street Gateway, also result in the shortest walk time and substantially fewer vehicle-pedestrian conflicts for movements to Downtown San Rafael, the predominate destination for transit riders, than both the Under the Freeway and No-Build Alternatives.

The Move and Adapt Whistlestop Alternatives keep all transfer activity within the intermodal station block and passengers do not have to cross any streets, further enhancing pedestrian safety and reducing

conflicts. Crosswalks within the transit center would have good visibility and would include crossing a single-direction bus lane. Outside of the limits of the transit center itself, these alternatives also include removing the vehicle-pedestrian conflict through signalization between the southbound right-turn movement at Hetherton Street & 3rd Street and the west leg pedestrian movement, a location that has a history of severe pedestrian injuries.

A primary path of travel into Downtown San Rafael, as identified in the City's Bicycle and Pedestrian Master Plan, is 4th Street. With both Adapt and Move Whistlestop Alternatives, an additional driveway would be added relative to No-Build conditions along the south side of 4th Street east of the SMART tracks; however, the number of vehicle conflicts for pedestrians along the south side of 4th Street would be greatly reduced relative to the No-Build and all conflicts would be bus right-turns (current conditions allow auto left-turns and right-turns from East Tamalpais Avenue and the Citibank driveway). Therefore, safety for 4th Street pedestrians, including both transit center users and other pedestrians, would be greatly improved with the Preferred Project alternative as well as the Adapt Whistlestop Alternative.

The Move and Adapt Whistlestop Alternatives also incorporate dedicated bicycle facilities along West Tamalpais Avenue between 2nd and 4th Streets, connecting to the Mahon Creek Path and the new protected bicycle facility on Francisco Boulevard, which will provide safer bicycle conditions to/from the SRTC. By re-aligning West Tamalpais Avenue, crossing distances across 3rd Street and 4th Street will be shortened and visibility improved, benefitting bicycle and pedestrian safety for this movement.

The 4th Street Gateway Alternative requires some passengers to cross 4th Street to transfer between transit services, which is a lower volume street than 3rd Streets, but still introduces some conflicts. This alternative reduces the number of driveway and vehicle conflicts on the south side of 4th Street, but introduces a larger pedestrian crossing on the north side of 4th Street across the transit center driveway that increases pedestrian exposure.

While the Under the Freeway Alternative also shifts the transit center north of 3rd Street, reducing the number of vehicle conflicts for pedestrians traveling north into downtown, it shifts the transit center east of Hetherton Street, adding a new barrier with significant vehicle-pedestrian conflicts. It requires passengers transferring between SMART and bus accessing downtown San Rafael to cross Hetherton Street at 4th Street or 5th Avenue, which are high traffic volume intersections. Additionally many transfers would also have to cross 4th Street to transfer between buses or between bus and SMART. The 4th Street & Hetherton Street intersection has the highest existing total collision rate amongst intersections within the study area, while 4th Street & Irwin Street has the highest number of existing pedestrian and bicycle collisions. The 4th Street & Irwin Street intersection also has more than double the existing rate of pedestrian- and bicycle-involved collisions as any other intersection in the study area. Increasing pedestrian activity at this intersection with this alternative may introduce new safety hazards. The Under the Freeway Alternative would also introduce a very long driveway along Irwin Street, increasing pedestrian exposure and adding a barrier to pedestrian movements along Irwin Street. Additionally, crosswalks within the transit center would have constrained visibility due to the presence of columns supporting the US 101 viaduct.

In summary, all alternatives provide a number of advantages relative to the No-Build Alternative. This includes a reduction in vehicle-auto conflicts for most users and the implementation of pedestrian safety treatments. Of the Build alternatives, the Move Whistlestop (Preferred Alternative) and Adapt

Whistlestop Alternatives provide the greatest benefit to pedestrian and bicycle safety by achieving the greatest reduction in pedestrian-vehicle conflicts, placing the transit center closest to the primary destination of downtown San Rafael, locating all transit services within the same block to limit conflicts for transferring passengers, and providing a high-quality bicycle facility to close a critical gap in the City's bicycle network.