CITY OF MORGAN HILL

DEVELOPMENT SERVICES CENTER

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June 22, 2020

Boris Lipkin, Northern California Regional Director
Dave Shpak, Deputy Project Manager of San Jose to Merced
California High Speed Rail Authority
100 Paseo De San Antonio, #206
San Jose, CA 95113

RE: SAN JOSE TO MERCED PROJECT SECTION DRAFT EIR/EIS

Dear Mr. Lipkin,

The City appreciates the opportunity to comment on the EIR/EIS and participate in the planning process for the San Jose to Merced Section. On behalf of our residents and businesses, we appreciate the time extension to 60-days, given the volume and complexity of the project and EIR/EIS, and the challenges posed while the City and public are operating under the COVID-19 shelter in place order.

Please consider and address the following comments and issues:

I. City is a Responsible Agency

The City understands that it will be a responsible agency, with varying levels of involvement depending on which Alternative is selected. Responsible agencies are listed in Chapter 9, Section 9.4.7, Pages 9-9, 9-10, but the City of Morgan Hill is not identified as a responsible agency. Please revise to include the City as a responsible agency. Upon the HSR Authority's selection of an Alternative for implementation, the City expects to be required to undertake certain actions and decisions that will be required to rely upon the EIR/EIS. These actions include but are not limited to cooperative agreements, rights of entry, land transactions, and maintenance agreements.

II. City's Preferred Alternative

The City continues to prefer an alignment that remains entirely within the U.S. Highway 101 right of way. Each of the four proposed alignments would have significant environmental, economic, and social impacts on the City of Morgan Hill, and mitigations measures proposed by the HSR Authority are inadequate to resolve those issues.

III. HSR Selected Alternative

All proposed alternatives for the HSR project have major implications for Morgan Hill residents and businesses, and the City bears the brunt of significant and widespread construction and operational impacts, and economic losses. But, unlike San Jose or Gilroy, Morgan Hill does not benefit from the opportunities that come from a station. With that in mind, the City requests that the HSR Authority select the Alternative with the least impacts on the City.

As is demonstrated by the Draft EIR/EIS and proposed project plans, Alternative 2 would have the most impacts, and would be devastating to Morgan Hill. On that basis, Alternative 2 should be rejected.

If Alternative 4 (Preferred Alternative) is ultimately selected for implementation, then the City requests inclusion of grade separations at Tilton Avenue, East Dunne Avenue, and Tennant Avenue, which have been conceptually evaluated for feasibility by consultants hired by the City (see attachment A). In particular, the grade crossings at E. Dunne Avenue and Tennant Avenue have the highest average daily trips in the entire segment (and are behind only Peninsula Avenue in Burlingame for the entire Caltrain corridor). The City requests an opportunity to engage with HSR staff to further develop and refine these grade separations so they can be included in Alternative 4. As discussed further below in more detail, grade separations at these crossings are the appropriate and necessary solutions to several environmental impacts specifically, but not limited to safety response times, circulation, and noise as disclosed in the EIR/EIS for which vague and unconvincing mitigation measures have been offered.

IV. Downtown Morgan Hill Caltrain Station Refinements

The UPRR/Downtown Alternatives (Alts. 2, 4) require modifications to the Downtown Caltrain Station. The station improvements as currently proposed are inadequate, and do not appear to meet the requirements of the Americans With Disabilities Act. The City has developed conceptual refinements to improve the experience of pedestrians and bicyclists while preserving parking to the extent possible (Attachment B). The following should be taken into consideration with the redesign of the station:

- Maximizes natural light –Consider open (uncovered) underpass when possible.
- Add stair access in addition to ramps at each access point.
- Width of walkways need to accommodate both pedestrians and cyclists (at a minimum of 16-feet wide for ramps and 20 for covered underpass).
- Add elevator for central ramp per Caltrain Design Criteria adopted in 2007 for grade changes that exceed 10-feet or more.
- Consider design that utilizes one centrally located platform for the Caltrain station.
- Create design features that provide a sense of place, with landscaping, night time lighting for ambiance in addition to safety.
- Incorporate infrastructure for telecommunications, seating, charging stations, and other features needed for a station.
- Replace impacted parking spaces at a 1:1 ratio.

- Develop a MOU for the on-going maintenance of the station by Caltrain or HSR.

V. Economic Concerns

The project will result in significant economic losses to the City due to acquisition of property, and loss of business from construction impacts. Under Alternatives 2 and 4, the City's Community and Cultural Center will be affected during construction. Alternative 2 would result in the permanent loss of 182 residential and 41 commercial properties. Alternative 3 would require the acquisition of residential properties, and will severely affect our local Honda Dealership, which is a major source of revenue for the City. These lost revenues directly impact the City's ability to provide services. The loss of revenue at the Community and Cultural Center would impact our ability to maintain this important community park and gathering space. A significant loss of general fund revenue will impact our ability to provide adequate police, fire and other City services.

Of the four proposed alternatives, only Alternative 4 provides some benefit to Morgan Hill by facilitating the electrification of Caltrain through Morgan Hill.

VI. Specific Environmental Issues

The following comments pertain to specific environmental sections of the EIR/EIS.

Sections 3.2 Transportation and 3.11 Safety

- Roadway Crossings - The City requests a table showing the complete list of all roadways within Morgan Hill crossed by HSR and whether they are at-grade or grade-separated under each of the four alternatives.

- Table 3.2-14 lists the many roadways that will be closed or modified by the project. The Draft EIR/EIS provides no analysis of the impacts of traffic being redistributed to other roadways. The only "analysis" is the following statement on page 3.2-50: "Permanent roadway closures and roadway modifications associated with project construction would cause shifts in travel patterns. Decreased capacity at key intersections and roadways, particularly on Monterey Road, would cause trips to shift from surface streets to freeways or other parallel roadway facilities."

  The anticipated redistribution of traffic onto other roadways must be disclosed, and the related environmental effects clearly disclosed, and mitigated where necessary.

- Tables 1 and 7-10 in Appendix 3.2-A present existing levels of service. No information is provided as to what year these data represent. The use of data more than a year old must be justified.

- Pages 3.2-62 – 3.2-64 state that the project would result in adverse impacts at numerous intersections in the Diridon Approach, Monterey Corridor, and Morgan Hill-Gilroy Subsections, summarized as follows:

	2029				2040			
	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**
Diridon	14	14	14	9	26	26	26	11
Monterey	23	23	23	5	25	26	25	5
Morgan Hill-Gilroy	9	12	4	13	8	13	2	15

  However, MM-TR-MM#1 on pages 3.2-94 – 3.2-95 provides no details on how these impacts will be mitigated. The City requests a detailed explanation of all proposed improvements to reduce identified impacts in Morgan Hill.

- The EIR/EIS does not explain the basis for using a 30-second increase in emergency vehicle response time as the threshold for significance. Please provide a rationale for that threshold of increase in delay. Has that threshold been used elsewhere in the HSR system?

  The preferred alternative (Alternative 4) states that Morgan Hill would experience significant delays in safety response times. A 30-second delay in response time would be extremely detrimental to the already constrained Effective Response Force (ERF) expectations. Citygate Associates, LLC, a public sector consultant agency, conducted a Fire Services Hazard – Risk Assessment and Standard of Coverage Assessment for Morgan Hill in 2019 (see attachment C). The report identifies emergency response times to be achieved for Morgan Hill and emphasizes strategies to maximize staffing and coverage to achieve those response times. A 30-second delay would adversely impact emergency response time. Construction of a new fire station would have to include the cost associated with station operations, including staffing and equipment.
  The City of Morgan Hill Police Department Public Safety Master Plan identifies *5 minute response time for a Priority 1* call (present imminent danger to life/in-progress crime/major loss of property) and *8 minutes for a Priority 2* call (injury/property damage/suspect still in area). Police Department response time goals are set by individual agencies and do not adhere to county or state standards.

  During 2019 our average response for *Priority 1 calls was 3 minutes 25 seconds* and *Priority 2 was 4 minutes 31 seconds*. Therefore, a potential 30-second increase would significantly impede the City of Morgan Hill's ability to adequately respond to emergencies.

- SS-MM-#4 (begins on page 3.11-81): MM provides no concrete mitigation. The EIR/EIS states "*Prior to operations, to mitigate fire station/first responder emergency access*

impacts related to added travel time from increased gate down time at at-grade crossings, the Authority would conduct monitoring and make a fair-share contribution to implement phased emergency vehicle priority treatment strategies." Conducting future monitoring is an inadequate mitigation strategy under CEQA for emergency response times, as it concedes excessive delay could occur. Further, in this context it will come at the expense of life and property if emergency response is delayed. The effectiveness of this mitigation measure is in doubt, and the project would be improved with the addition of grade separations at several key intersections (Tilton, E. Dunne, and Tennant) that would allow emergency vehicles to cross the HSR tracks under Alternative 4 without delay.

- The EIR/EIS needs to clearly identify the total trains (both directions) in the year 2040 peak hour between San Jose and Gilroy. Include HSR, Caltrain, Amtrak, and freight as well as account for gate-down time caused by maintenance of the tracks. Without this information, the CHSRA cannot appropriately account for the cumulative impacts to intersections and safety response times.

The City of Morgan Hill further requests the following:

- The EIR should explain all project impacts to study intersections in detail and describe what the proposed mitigations would be.

- The analysis should note the new planned intersection at Dunne Avenue and Depot Street/Church Avenue per the 2030 General Plan and approved project.

- At future grade separations, the analysis should consider a road design speed lower than 45 mph to enable the underpasses to be shorter and not affect as many properties.

- The closure of Depot Street at Main Avenue under Alternative 2 would not align with Morgan Hill circulation goals, and would create additional unmitigated impacts.

- The closure of Saint Agatha Lane under Alternative 2 should be noted in the EIR.

- The HSR bridge over Monterey Road should be built to accommodate future widening of Monterey Road under Alternative 2 as per the *Morgan Hill 2035 General Plan* and incorporate a complete street design with sidewalks and bicycle paths.

- The City requests a grade separation at Dunne Avenue to address potential queuing issues, project impacts along Main Avenue, and emergency response time delays due to increased gate-down time under Alternative 4. Dunne Avenue is in close proximity to the Caltrain station, and has the highest traffic volume of any grade crossing in the

Project area. See attachment A developed by the City to show the conceptual feasibility of grade separating Dunne Avenue under Alternative 4.

- The City requests a grade separation at Tennant Avenue to address potential queuing issues and emergency response time delays due to increased gate-down time under Alternative 4. Tennant Avenue is the primary east-west route used by our Police Department, so increased gate-down time will significantly impact public safety response times.

- The City requests a grade separation at Tilton Avenue to mitigate the project impact at Monterey Road and Tilton Avenue under Alternative 4. Included in this separation should be the realignment of Burnett Avenue with Tilton to ensure the functioning of that arterial roadway with the grade separation. This mitigation should be prioritized over the Madrone Avenue grade separation identified, because the Tilton and Burnett roadway segments are existing arterial roadways within the City.

- Under Alternative 2, grade separation should be considered and evaluated at Tilton not Madrone. Tilton is an existing arterial roadway within the City, while the Madrone Grade Separation is only a component of future planning.

- Under Alternatives 2 and 4, the City requests mitigation through the expansion of the adjacent freeway in alignment with the State of California's US 101 South Comprehensive Corridor Plan for Caltrans District 4, specifically the construction of the improvements identified in the plan as "US 101 Express Lanes: Cochrane Rd. to Masten Ave.".

Please find the attached memorandum from Hexagon (Attachment D) for more comments related to Traffic/Circulation issues.

Chapter 3.4 Noise & Vibration

The ongoing operational noise impacts of the project under all alternative alignments is a primary concern of the City. Specific issues the City requests to be addressed include:

- Eleven noise monitoring locations were identified as being applicable to the City of Morgan Hill. Of these, only eight are actually in the City: N101 through N108. Two are problematic for assessing the existing levels: N100 and N109. Location N100 indicated considerably higher levels than the others, 81 dBA Ldn, compared to the range of 68 to 73 Ldn for the other measurement locations. N100 is approximately 3.7 miles from the City of Morgan Hill northwest boundary. Location N109, which was southeast of the city boundary and east of US 101, indicated considerably lower levels, 57 dBA, compared to the range. From the Noise and Vibration Technical Report, it cannot be determined if these data effected the estimation of the existing levels within the City of Morgan Hill. In

order to determine this, the City requests the results of existing noise level modeling done within Morgan Hill.

- Please state whether "moderate" impacts listed in Section 3.4 are considered less-than-significant impacts under CEQA and, therefore, mitigation is not required.

- Please provide a table similar to Table 3.4-17 that shows impacts assuming Quiet Zones are in place.

- The EIR should provide a discussion specific to the issues with train horn blasts sounding as each of the 176 HSR trains per day pass through intersections at-grade in Downtown Morgan Hill with Alternative 4. Given the need to sound the horn prior to crossing each at-grade intersection, and the speeds at which the trains are moving, the horns will be sounded nearly continuously as they pass through intersections a matter of seconds apart. This will apparently be unprecedented for any segment HSR has studied so far—to have so many at-grade crossings in a densely populated Downtown area and the need to sound horns at each crossing. The cumulative effect of this increased noise should be described over the course of a day on affected residences and businesses. Given the noise barriers are not present at intersections, this noise will escape into the adjacent neighborhood and business district. The EIR/EIS does not adequately disclose conditions under Alternative 4, assuming no Quiet Zone is in place and train horns will sound at each at-grade crossing. The cumulative impact of all trains blasting their horn, including Amtrak, UPRR and Caltrain should be incorporated into the analysis.

- Alt. 4 Noise operational impacts will be intolerable with train horn blasts at all at-grade crossings unless designated a Quiet Zone. The City requests a commitment from HSR for whatever technical support and financial support is needed for the City to submit an application for Quiet Zone with CPUC.

- The incorporation of several grade separations (Tilton, E. Dunne, Tennant) will also substantially reduce the need to sound train horns through the City.

- For operational noise, the primary mitigation strategy is the use of sound walls at various locations for Alternative 2 and 4. These reduce the number of moderate impacts of Alternative 2 to zero and the number of severe impacts to 26 in Morgan Hill. For Alternative 4, the moderate impacts are also zero and with only two severe impacts. There is insufficient detail to determine if the impacts in Alternatives 2 and 4 could be lowered by increasing wall height, using absorptive facings, or more novel barrier designs. The City requests this additional detail be provided in the Final EIR. For Alternative 4, the two severe impacts are eliminated with the use of a quiet zone. It

should be noted that the feasibility and reasonableness of these barriers have only been initially evaluated and that these need to be re-evaluated in more detail before they are actually included in the project. The City requests a commitment from HSR to demonstrate the feasibility of these barriers prior to approving Alternative 4.

- Figure 3.4-41 shows ten noise barriers (heights of 10-14 feet) in the Morgan Hill area under Alternative 4. However, Figure 3.4-44 shows only four noise barriers (10-foot heights) in the Morgan Hill area under Alternative 4 with Quiet Zones in place. The City's understanding is that these "potential barriers" are not the same as the "proposed barriers" of Figure 3.4-41 and the City is responsible for initiating the quiet zones. Are the quiet zones in addition to the NV-MM#3 measure? The City requests HSR provide more information for the City to understand what actual mitigations are being proposed.

- Will HSR use track ballast containing shredded rubber tires (as does VTA light rail) to reduce vibration impacts? Explain what ballast assumptions were factored into the vibration analysis.

- In Table 1 of Attachment E of this letter, operational vibration impacts are noted in Alternatives 2 and 4. Mitigations are to be designed and implemented during the final design. The City of Morgan Hill requests the location of these impacts and specific mitigation would be applied. In several places in the documents, the EIR/EIS implies further analysis will be done for vibration as well as noise. The timing and extent of these evaluations must be clarified to the City.

Please find the attached memorandum from I&R (Attachment E) for more comments related to Noise issues.

Chapter 3.16 Aesthetics and Visual Quality

Given the EIR/EIS evaluates nearly 90 miles of HSR alignments, the analysis of aesthetics is at a very high level, and in Morgan Hill only two 'landscape units' and four 'Key View Points' (KVPs) are identified. The long-term visual impacts of the project under all alternative alignments is a primary concern of the City. Specific issues the City requests to be addressed include:

- **Walnut Grove Neighborhood Impacts**. Under Alternatives 1 and 3, the aerial structure would rise to heights of more than 60 feet above grade to pass over roads and interchanges and would be taller than surrounding homes, offices, and other buildings in the area. Alternatives 1 and 3 would traverse a residential neighborhood west of US 101 between the East Main Street overcrossing and East Dunne Avenue interchange, passing immediately adjacent to homes for about 0.5 mile. The height, length, and concrete construction of the aerial structure would contrast with the scale and materials

of the existing residential structures as illustrated on Figure 3.16-33, KVP 17, at Walnut Grove Drive in Morgan Hill.

KVP 17—Alternatives 1 and 3 Simulation

The aerial structure would remove half a block of homes and landscaping from the streetscape, affecting highly sensitive residential viewers and diminishing the residential character of the view, reducing the visual quality at KVP 17 from moderate to low. The EIR claims, however, the change in visual quality at this KVP is not typical of the changes to the visual quality for the US 101 Landscape Unit because residential views are present in less than 5 percent of the landscape unit, and therefore the impact is not significant. The City disagrees with this assessment, the limited extent of this impact when viewed over the 90-mile project area does not reduce the project's impact within that specific viewshed. For the localized area of the Walnut Grove neighborhood, the impact is clearly significant as demonstrated in the simulation showing the viaduct's hulking presence.

For Alternatives 1 and 3, the EIR claims the impact under CEQA would be less than significant because the introduction of aerial infrastructure would not substantially degrade the existing visual quality in the US 101 Landscape Unit. Although visual quality would decrease, the majority of viewers would be travelers with moderate viewer sensitivity who would not respond to the change in existing visual character or quality of the site and its surroundings. Therefore, the EIR claims the project does not require mitigation. Yet, the EIR, Pg. 3.16-159, acknowledges impacts would be greater where the HSR is on viaduct and the scale of the infrastructure dominates the existing landscape, which would certainly be true for the Walnut Grove neighborhood west of US 101. Therefore, mitigation appears warranted.

The City disputes the EIR's conclusion as it pertains to the neighborhood along US 101 and requests design enhancements and additional landscaping that would be helpful in reducing the visual effects of the aerial viaduct on this neighborhood, which will be substantial, as the EIR concedes the visual impact by acknowledging the residential character will be 'low' as a result of the viaduct. The neighborhood west of 101 would be substantially affected visually, losing views of the Diablo range. The City disagrees with this conclusion as it pertains to Morgan Hill. To help mitigate the impacts to that neighborhood, the EIR should consider a landscaped neighborhood park that connects to City trails and construct the pedestrian overpass at Diana Avenue consistent with the Bikeways, Trails, Parks and Recreation Master Plan for the City of Morgan Hill. See attachment B developed by the City to show the conceptual of what that could look like. Additionally, for travelers passing through the City on US101, this structure will be a substantial part of their visual experience and feeling about the City, so it should be as attractive as possible if built. It should also be noted that the viaduct blocks potential consumers views from 101 to commercial businesses and should be addressed in the EIR as a loss to that property and prepare the proper mitigation.

- **Monterey Road Alternative 2 Embankment Impacts**. Under Alternative 2, the fill for the approaches where grade separations would pass over the HSR and UPRR would block views from adjacent property. The scale and size of roadway overcrossings would dominate and block some views. The addition of HSR to the east of the UPRR right-of-way would expand the rail corridor into some natural areas, requiring the removal of significant trees.

  EIR Figure 3.16-35, illustrates a view of Alternative 2 along Monterey Road in northern Morgan Hill at the KVP identified as 'Peebles Avenue'. All of the Keesling's Shade Trees have been removed for the HSR. The embankment for the HSR blocks views to the west, including views towards El Toro Peak. Inexplicably, the EIR claims the removal of buildings and trees and the introduction of the embankment for HSR would somehow *improve* the visual character of this area, claiming the visual quality increases to 'moderate'. The City disagrees with this conclusion given views west will be blocked by the solid embankment, and significant heritage trees are removed. Those are changes that degrade the local visual environment.

KVP 19—Alternative 2 Simulation

- The City requests additional measures to improve the visual quality of the embankment. The Keesling Trees, in particular, are a recognized visual resource along Monterey Road that links the City with Coyote Valley. The EIR should recognize this and their loss needs to be mitigated by relocation or replacement of trees in same size and species. Berm design should include landscaping and design embellishments to improve the aesthetic appeal of the HSR infrastructure, **Caltrain Station Embankment 2 Impacts**. At the Morgan Hill Caltrain Station KVP, Figure 3.16-36, KVP 20, illustrates a simulation of Alternative 2 through Morgan Hill. In the image, both the UPRR/Caltrain and high-speed railways would be elevated on a low retained berm. In some cases, the berm is up to 8 feet tall. The HSR would incorporate local design elements in landscaping and design embellishments to improve the aesthetic appeal of the HSR infrastructure (AVQ-IAMF#1). The view across the tracks would be blocked by the retaining wall, limiting views of the trees on the far side of the railway corridor, but still allowing distant views to the Diablo Range. Vines would climb the retaining wall, slightly softening its appearance. The EIR claims the retail viewers walking around the Downtown would experience a decline in visual quality from 'moderately high' to 'moderate' under Alternative 2 at the Morgan Hill Caltrain Station KVP 20.

KVP 20—Alternative 2 Simulation

The retaining wall/embankment on which the HSR Alternative 2 would operate would be a significant visual change through the City. The City disagrees with the EIR/EIR's conclusion as it pertains to the Alternative 2 raised tracks through Morgan Hill, which create a significant visual barrier visible from Downtown streets, running through the City for several miles. The City requests design enhancements and landscaping that would be helpful in reducing the visual effects of the embankment beyond the planting of vines.

- **Alternative 4 Impacts**. The City concurs Alternative 4 has less impact on the visual character of the City than Alternative 2 given the tracks are at-grade, and the Keesling's Shade Trees would remain, separating the roadway from the rails, and there would be no changes to Monterey Road.

  Within the Caltrain Corridor portions of Alternative 4, noise barriers would be installed within the fenced areas of the existing Caltrain right-of-way, which is often shielded from view by fencing or landscaping. Per Mitigation Measure AVQ-MM#7, as part of the final design and construction management plan, the Authority would work with local jurisdictions to develop the appropriate noise barrier style and treatments for visually sensitive areas, to reduce the visual effect of barriers on adjacent land uses.

KVP 20—Alternative 4 Simulation

The City expects to work with the HSR Authority to develop appropriate noise barrier style and treatments. The CHSRA should work with the City on the design prior to preparation of construction documents. The EIR should address when this mitigation is to be completed.

- **Permanent Direct Impacts on Nighttime Light Levels from Trains.** Where HSR trains run elevated on viaducts adjacent to residential areas, the spillover of light from passing trains and maintenance equipment would increase nighttime light levels. Trains operating at night would contribute a regular and repeated source of light. Train lights would be directed toward the guideway. Nighttime maintenance activities along the alignment would introduce lighting from slow-moving maintenance vehicles. In residential areas, the HSR light sources would increase nighttime light levels.

  While contributing little to overall light levels, the moving lights would be evident where existing light levels are moderate to low and highly sensitive residential viewers are present. Alternatives 1 and 3, running on viaduct from west of US 101 in Morgan Hill, would have more light spillover into residential areas, resulting in more impacts from increased light levels than Alternatives 2 and 4, which would run at grade along the UPRR tracks where trains already are operating, and have train light spillover contained by existing vegetation and noise barriers. Alternative 4 would operate in blended service with Caltrain in urbanized areas, with lights from HSR similar to lights from existing passenger and freight service, resulting in the least impact of the four alternatives. The EIR concludes Alternatives 1, 2 and 3 would have a significant and unavoidable impact under CEQA because the spillover from HSR trains operating on elevated viaducts and embankments would create a new source of substantial light, increasing nighttime light levels in residential areas, and could be an annoyance to viewers. Mitigation measures to address this impact are identified in Section 3.16.9, CEQA Significance Conclusions. Section 3.16.7, Mitigation Measures, describes these measures in detail.

Alternative 4 would have a less-than-significant impact for lighting because HSR would operate in blended service with Caltrain through residential areas. The lights from HSR trains would be similar to the existing light from UPRR and Caltrain operations. Existing landscaping and noise barriers would contain light, resulting in no change to nighttime light levels and no effect on residential viewers.

Chapter 3.17 Cultural Resources

Specific issues the City requests to be addressed include:

- **Villa Mira Monte,** 17860 Monterey Rd. Alternative 2 would include the following project components within and east of the existing rail right-of-way that forms the northeastern boundary of the legal parcel containing Villa Mira Monte: temporary construction easement (TCE) adjacent to the rear (east) of the legal parcel, which is the resource boundary; underground sewer utility relocation 40 feet from the resource; HSR right-of-way (ballasted track on retained fill, approximately 20 feet above grade, with additional 27-foot-tall OCS poles) 65 feet east of the resource boundary; and staging area 215 feet east of the resource. Under Alternative 2, no project components would occur within the historical resource boundary. While the HSR embankment would be visible from Villa Mira Monte, it would not hinder the resource's ability to convey its era of construction, associations with Diana and Hiram Morgan Hill, and distinctive and refined architectural style. The impact would be less than significant under CEQA for Alternative 2. The City disagrees with this statement. The size and nature of the HSR improvements are not appropriately considered in comparison to this resource and its current uses. Appropriate mitigation measures should be identified and agreed upon with the City of Morgan Hill and the Morgan Hill Historical Society, including the addition of walls, landscaping and/or other features consistent with maintaining the site's historical significance.

  Under Alternative 4, the HSR right-of-way would be blended with the Caltrain tracks in the existing Caltrain right-of-way, which passes along the northeastern boundary of the legal parcel containing Villa Mira Monte. OCS poles 27 feet tall would be installed within the Caltrain and HSR right-of-way. The Caltrain right-of-way runs adjacent to the resource's eastern boundary. An area designated for temporary HSR access adjacent to the HSR right-of-way would extend approximately 20 feet into the resource boundary. However, the HSR access area would be in an area of the site that is currently undeveloped and is separated from the primary building by a distance of approximately 245 feet, such that it would not alter any of the resource's character-defining features. Sanitary sewer infrastructure would be relocated on the far side of the HSR right-of-way from the resource, approximately 60 feet northeast of the parcel containing Villa Mira Monte.

Under Alternative 4, the introduction of the HSR right-of-way and OCS poles within the existing Caltrain right-of-way, as well as the use of a limited and currently vacant portion of the resource for temporary HSR access, would represent a minor change in the characteristics and setting of Villa Mira Monte. The EIR/EIS concludes that the impact would be less than significant for Alternative 4. The City disagrees with this statement. The size and nature of the HSR improvements are not appropriately considered in comparison to this resource and its current uses. Appropriate mitigation measures should be identified and agreed upon with the City of Morgan Hill and the Morgan Hill Historical Society, including the addition of walls, landscaping and/or other features consistent with maintaining the site's historical significance.

Under all four alternatives, project construction activities would occur a minimum of 245 feet from the northeastern boundary of the legal parcel that contains Villa Mira Monte. Under all four alternatives, there would be no construction activities within 50 feet of the Villa Mira Monte; thus, the Draft EIR/EIS states that there would be no increased vibration that could cause substantial adverse change to this resource such that it would no longer qualify for the NRHP/CRHR. More information is needed to support this conclusion.

Villa Mira Monte is a historic asset within the City of Morgan Hill and serves as a museum and an event center. The house is a wooden structure that will be severely impacted by noise and vibration from the project. A structural analysis should be prepared to identify necessary mitigations to noise and vibration impacts.

Further, event center operations fund the maintenance of the site. Even if the Project does not directly impact the historic character of the property, impacts that reduce or eliminate the revenues needed to maintain the historic character of the site could result in the loss of this historic resource.

- **Cribari Winery,** 18980 Monterey Rd. Under Alternative 2, Monterey Road would be moved east in order to accommodate the HSR right-of-way (ballasted track on retained fill) within the current footprint of Monterey Road; a portion of the circa 1920 building on the parcel and the associated water tower would be within the path of the shifted Monterey Road right-of-way. As a result of the project under Alternative 2, the resource would be demolished, therefore, the impact under CEQA would be significant and unavoidable. With regard to construction vibration, under Alternative 2, the winery and water tower would be demolished, eliminating the possibility of having vibration impacts. The City requests that the feasibility of relocation of significant structures including the water tower be fully investigated prior to any decision to demolish this

resource in connection with Alternative 2, consistent with "CUL-IAMF#4: Relocation of Project Features when Possible"

Chapter 3.19 Cumulative Impacts

Please provide a table showing the total number of daily trains between San Jose and Gilroy in 2040. Please include HSR, Caltrain, freight, and Amtrak as well as impacts from gate down time by required maintenance of tracks. Page 3.19-15 notes the proposed reintroduction of Coast Daylight Amtrak service of up to four trains daily and a growth in freight of 4% annually. This affects noise, daily circulation, and safety response times.

Chapter 4 Section 4(f) Public Facilities

Potentially Affected 4(f) properties in Morgan Hill

There are five properties identified as 4(f) facilities in Morgan Hill potentially affected by the HSR alignments. The EIR/EIS makes no apparent mention of the new Railroad Park located adjacent (west side) to the UPRR tracks with access off of Depot Street in Downtown Morgan Hill. This park resource would be significantly impacted under Alternatives 2 and 4. Please update the EIR/EIS's discussion of impacts to 4(f) facilities by including analysis of Railroad Park.

- **Morgan Hill Community and Cultural Center**. The 8.67-acre Morgan Hill Community and Cultural Center is located at 17000 Monterey Road in Morgan Hill. It is a multiuse community center featuring a community playhouse, multiuse rooms, and an outdoor amphitheater. The community playhouse, located on the western corner of the legal parcel, is housed within the Church of Christ, which has been determined eligible for listing in the NRHP.

  The impact under CEQA would be significant for Alternatives 2 and 4 at the Morgan Hill Community and Cultural Center. Construction noise would impair use of this resource for daycare and school operations, social gatherings, meetings, concerts, and other community center uses. Operational activities would also result in permanent effects from noise on Morgan Hill Community and Cultural Center under Alternative 2 and 4.

  At the Morgan Hill Community and Cultural Center, a small portion of the parking lot adjacent to Depot Street and along West Dunne Avenue as well as some landscaped areas along West Dunne Avenue would be permanently acquired under Alternative 2 for roadway right-of-way. The loss of this parking is a significant issue for the cultural center and must be offset by the HSR.

- **Villa Mira Monte.** The impact under CEQA would be significant for Alternatives 2 and 4 at the gardens at Villa Mira Monte. Construction noise would impair use of this resource. The Authority would implement NV-MM#1 to minimize the impact of construction noise and PR-MM#6 to minimize construction noise during special events at Villa Mira Monte. Accordingly, the EIR/EIS concludes this construction noise impact would not be of a severity that the protected activities, features, or attributes that

qualify the center for protection under Section 4(f) would be substantially impaired. Therefore, a Section 4(f) use would not result at Villa Mira Monte. The EIR should also disclose the impacts on the use of this resource with the sounding of train horn blasts under Alternative 4, taking into account the number of trains throughout the day and frequency, as the horns would be sounded near the property as trains approach the Main Avenue at-grade crossing. The house is a historic wooden structure that will be severely impacted by noise and vibration from the project. A structural analysis should be prepared to identify necessary mitigations to noise and vibration impacts.

- **Madrone Underpass**. Alternative 4 would require demolition of the structure, resulting in a **significant** impact to a 4(f) facility. The HSR right-of-way would be placed on approximately 15-foot-high ballasted fill within the existing Caltrain right-of-way, which passes over the Madrone Underpass. To accommodate the new HSR right-of-way in this location, the Madone Underpass would be demolished and replaced by a new box girder overpass structure. The City requests markers and signage be included with the new overpass structure to commemorate the lost historic structure.

- **Sanchez Park.** Changes to the noise environment related to train operations would occur, including increased noise from horn sounding with Alternative 4. However, the EIR claims operation of Alternative 4 on embankment in these existing transportation corridors would not introduce substantial additional sources of train noise because train sounds already occur in this area. Since the park is currently near the railroad right-of-way, it is anticipated that increased noise resulting from HSR operations would have limited effect on the protected activities of Sanchez Park. Accordingly, the EIR concludes operational visual and noise impacts would not be of a severity that the protected activities, features, or attributes that qualify Sanchez Park for protection under Section 4(f) would be substantially impaired, and no constructive use would occur under Alternative 4. However, the City believes the substantial increase in train activity with up to 176 daily HSR trains would be disruptive to park users when trains are required to sound their horns at at-grade crossings. The EIR should disclose the impacts on the use of this 4(f) resource with the sounding of train horn blasts under Alternative 4, taking into account the number of trains throughout the day and frequency.

Chapter 3.6 Public Utilities and Energy

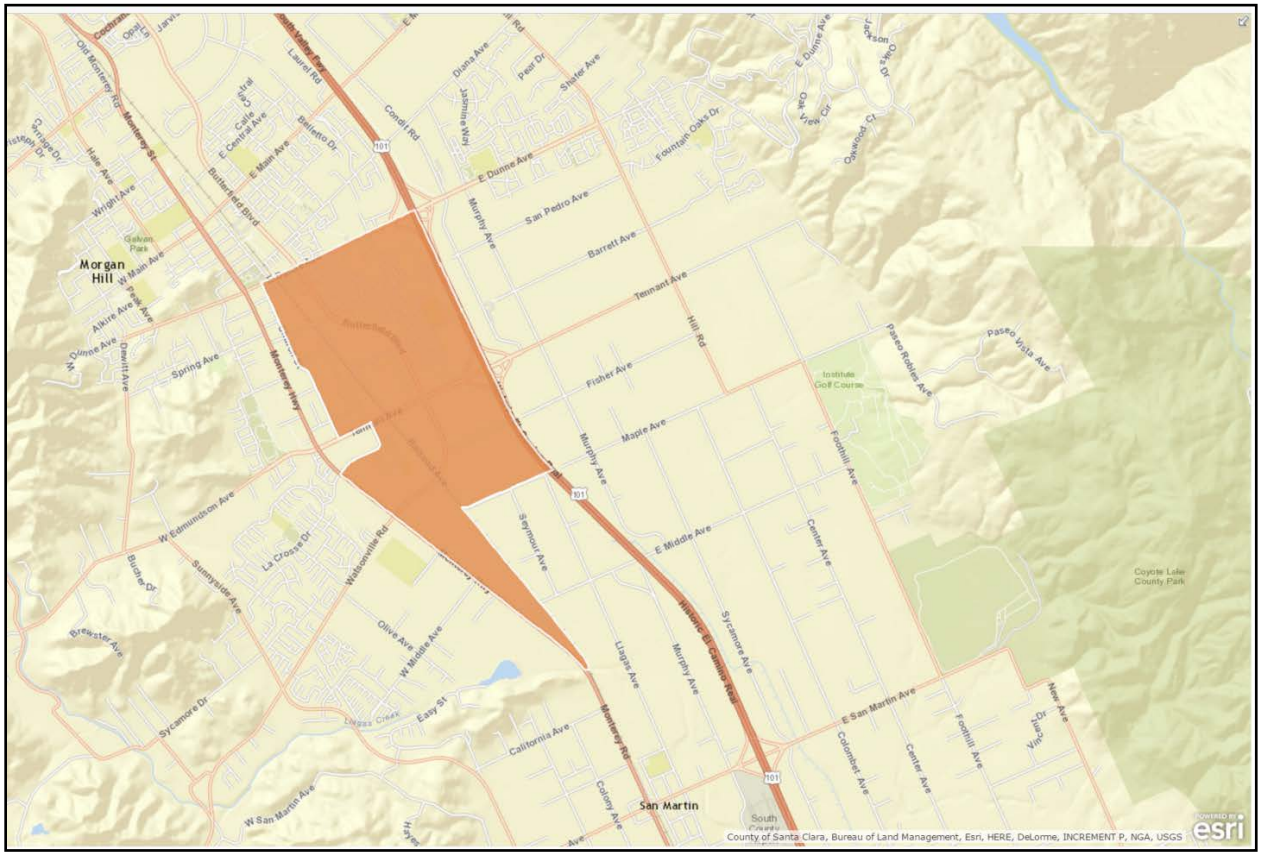
The City prepared comments to the Authority outlining water, sewer, and other utilities of significance that run along the Alternatives through Morgan Hill during the review of the PEPD drawings. The EIR should address the overall impact on the City's utility systems of such relocation and removal of utilities. The City believes the Hydrology and Water Resources section does not address the impacts on the City water supply and the potential removal and/or relocation of one of the City's groundwater wells. See attachment F for mapping of City facilities. The EIR should disclose these impacts to allow for review of appropriate mitigation.

The City requests the HSR provide a list of those locations in Morgan Hill where businesses and residences will be acquired, as that information was not readily apparent among the various documents posted at the HSR website.

The City met with the Authority to understand what projects qualify for mitigation of disproportionate effects to minority and/or low-income communities along the four alignments in Morgan Hill. The Draft EIR/EIS concurs with MTC and the County of Santa Clara Bureau of Land Management that the majority of the properties adjacent to the Alternatives are identified as part of the Community of Concern.

Communities of Concern 2017

This dataset represents the tracts selected as Communities of Concern for the 2017 Regional Transportation Plan. The dataset was developed using ACS 2010-2014 Data for Eight Variables Considered for MTC Communities of Concern.



County of Santa Clara, Bureau of Land Management, Esri, HERE, DeLorme, INCREMENT P, NGA, USGS

The City finds the following requests qualify and should be incorporated within the EIR as mitigation. If the Authority finds that one of the following does not apply, we would like a response as to why it does not qualify.

Potential enhancements to mitigate impacts	CHSRA Role	Benefits
1. Multimodal intersection improvements (bicycle /pedestrian improvements, Monterey Road – East Main to East Dunne, Cochrane/Monterey, East Main/Butterfield)	Fund Planning Studies; Funding	Circulation, traffic, connectivity
2. Pedestrian Overcrossings along new bridge at Monterey Road overpass	Funding	Circulation, traffic, connectivity
3. Multimodal intersection improvements (bicycle / pedestrian improvements, San Pedro Ave/ Butterfield Road, Dunne Ave.	Funding	Circulation, traffic, connectivity
4. Safe routes to schools (especially across Monterey)	Funding	Connectivity, safety
5. Funding for pedestrian underpass and station access planning for Caltrain station.	Funding	Connectivity
6. Bike lanes and trails (Burnett Ave., Tilton Ave., E. Main Ave., Butterfield Blvd., Monterey Road, Dunne Ave, under alignment (Alts. 1 and 3 only), Tennant Ave.)	Funding	Connectivity, recreation
7. Complete Streets, landscaping improvements along railway corridor and adjacent	Funding	Aesthetics, safety
8. Aesthetic treatments for viaduct (Alts. 1 & 3)	Funding	Aesthetics
9. In-language and ADA-compliant signage	Funding	Aesthetics, safety
10. Quiet zones (all at grade crossings).	Fund studies/Physical	Noise reduction
11. New High School Site Acquisition	Fund Planning Studies, Funding	Support education for Environmental Justice populations

12. Recycled water and internet access on Tennant Avenue	Funding	Water conservation, education, internet access to the census tract area that indicates low income population
13. Preferential hiring program	Support Creation/ Funding	Economic uplift
14. Sidewalks, curbs, and gutters along Railroad Avenue	Funding	Circulation, traffic, safety
15. Enhancements to affected basin on east side of tracks.	Funding	Water conservation and mitigation
16. Provide pedestrian connectivity by creation of trails to fill in gaps or enhance affected trails adjacent to tracks.	Funding	Circulation, traffic, safety
17. Sidewalk connections on Tennant just east of the tracks.	Funding	Circulation, traffic, safety
18. Purchase affected property north of the mobile home park and building out as a public park.	Funding	Aesthetics, Safety
19. Fix landscaping and develop park space adjacent to the trestle and fire station.	Funding	Aesthetics, Safety

GENERAL COMMENTS

The following are requirements of the City's Municipal Code and should be taken into consideration for the EIR as it relates to Morgan Hill.

1. All trees to be removed shall be replaced at a 2:1 planting ratio.
2. Fencing: Barbed wire, razor wire, chain link, and electric fences are prohibited within Morgan Hill. Materials for proposed fencing where a sound wall is proposed should provide a neighborhood friendly fence such as wood or tubular steel.

Thank you for your consideration of these comments and concerns. We appreciate the HSR

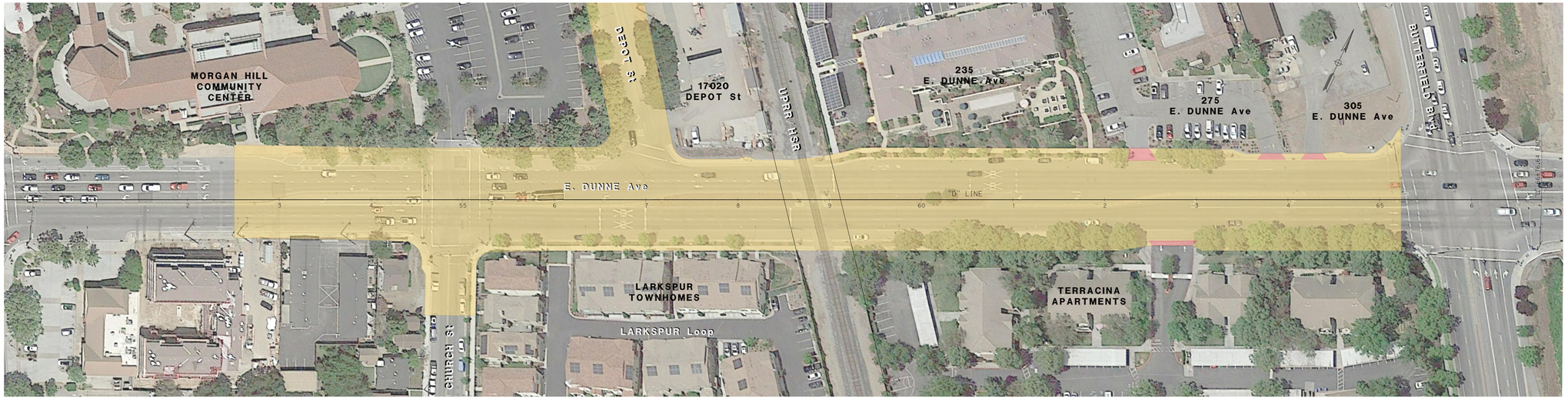
staff's willingness to clarify the project design and objectives, and to discuss and resolve issues to achieve a project that completes the HSR Authority's mandate while minimizing impacts on the communities that will have to co-exist with the operating rail system long-term.

Sincerely,

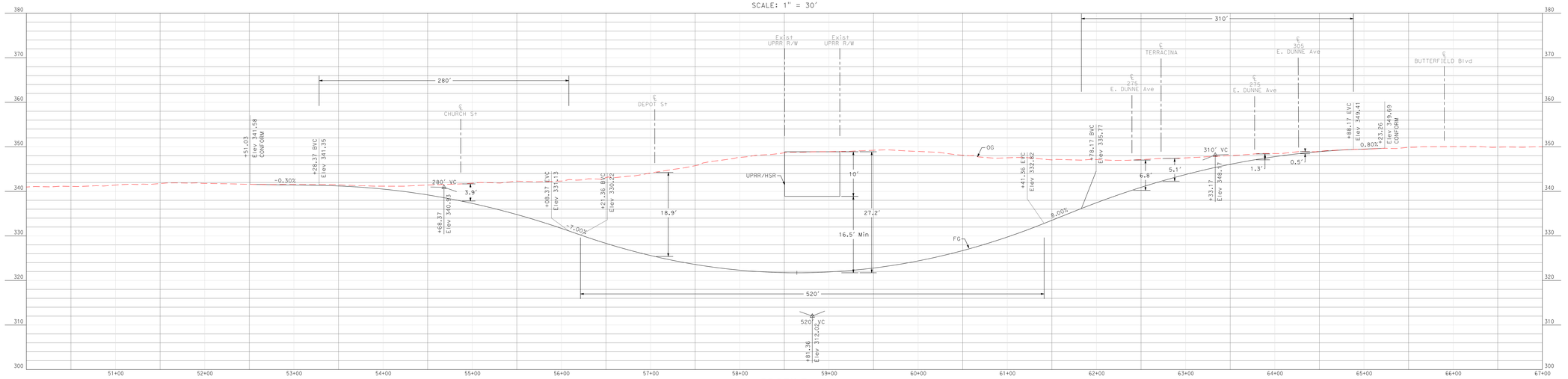
Christina Turner, CPA
City Manager
City of Morgan Hill

cc: City Attorney
Mayor
City Council

Attachment A:
Conceptual Grade Exhibits



PLAN
SCALE: 1" = 30'



PROFILE
E DUNNE Ave
"D" LINE
SCALE: Horiz 1" = 30'
Vert 1" = 6'

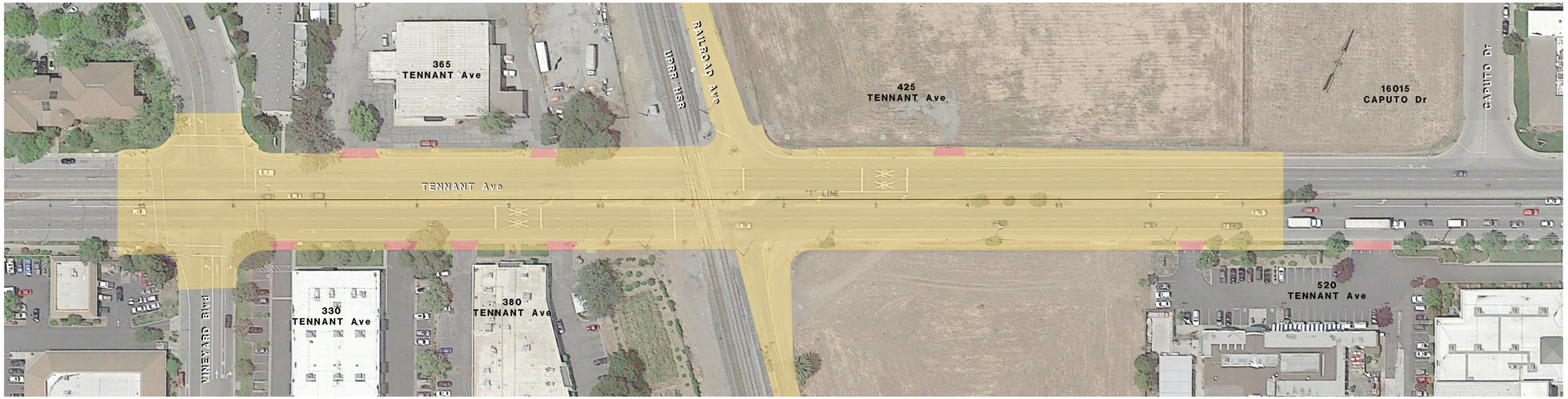
DESIGN SPEED = 40 MPH

05/ 20/ 2020

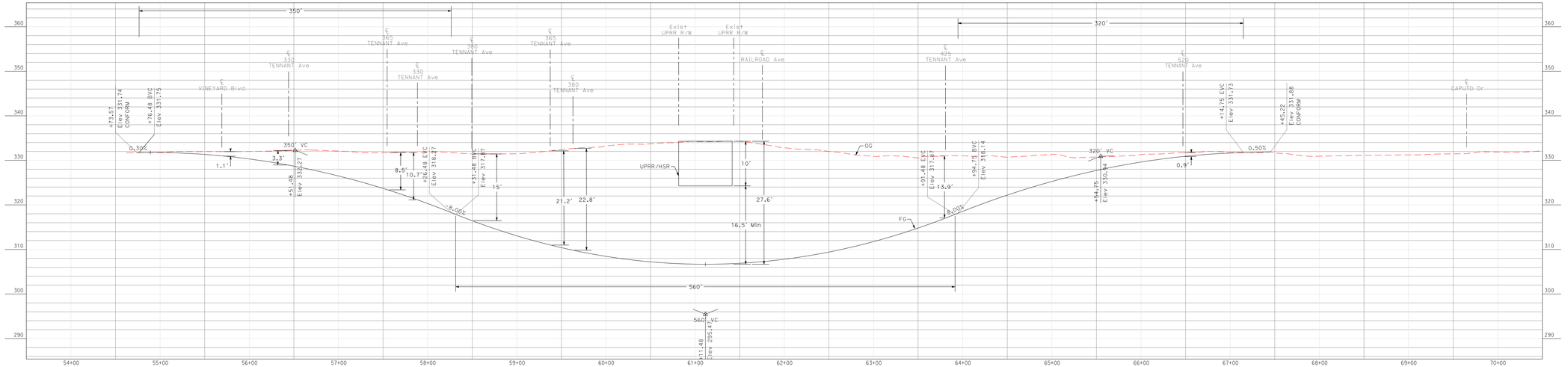
BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS

E. DUNNE AVENUE CROSSING - ALT 4 UNDERCROSSING

CITY OF MORGAN HILL



PLAN
SCALE: 1" = 30'



PROFILE
TENNANT Ave
"T" LINE
SCALE: Horiz 1" = 30'
Vert 1" = 6'

DESIGN SPEED = 40 MPH

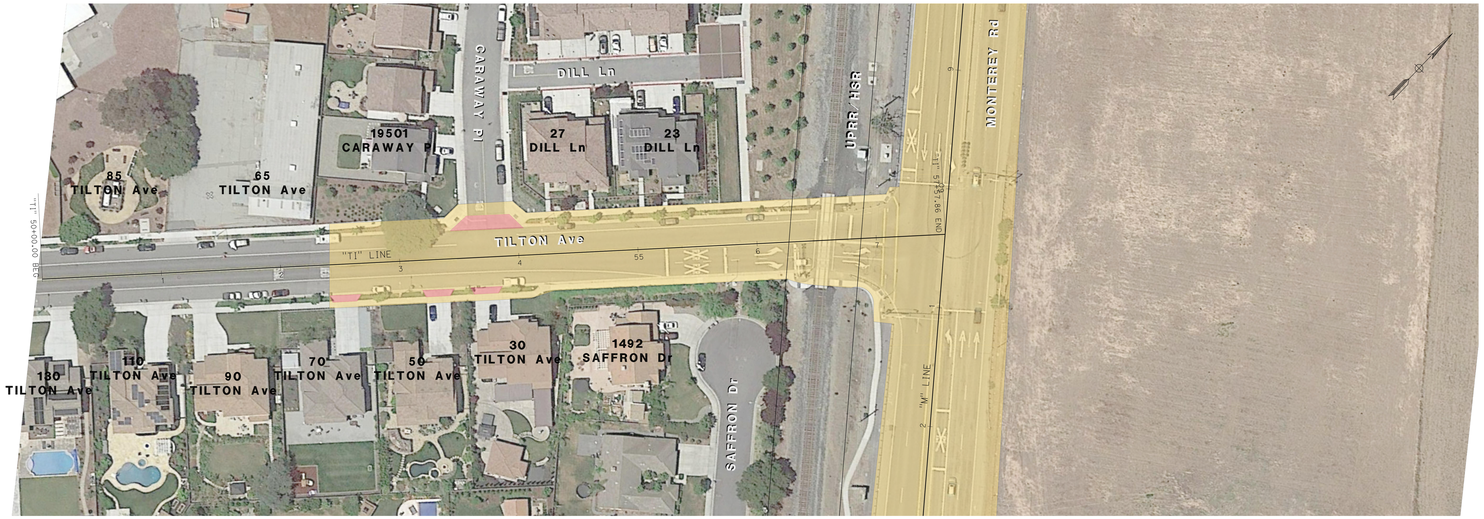
05/20/2020

K:\2020\2007R4_Morgan_Hill_ENGINEER\EXHIBITS\000-Plan_and_Profile-ALT_Morgan Hill - Tennant_Crossing.dwg 20 May 2020 dvdalsan

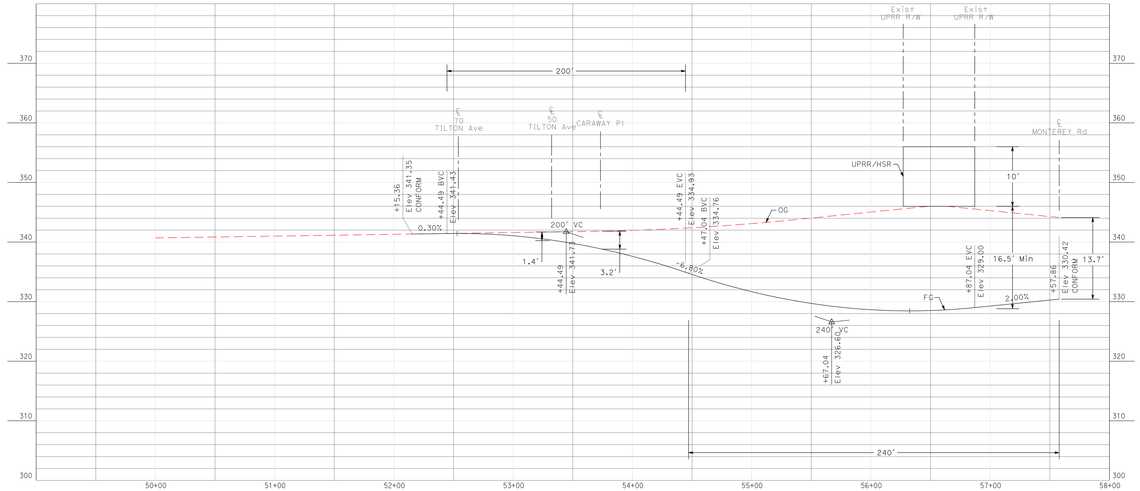
BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS

TENNANT AVENUE CROSSING - ALT 4 UNDERCROSSING

CITY OF MORGAN HILL



PLAN
SCALE: 1" = 30'



PROFILE
TILTON Ave
"TI" LINE
SCALE: Horiz 1" = 30'
Vert 1" = 6'

DESIGN SPEED = 40 MPH

06/02/2020

BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS

TILTON AVENUE CROSSING - ALT 4 UNDERCROSSING

CITY OF MORGAN HILL

Attachment B:
Conceptual Station Design and Urban Design Memo

MORGAN HILL HSR

Draft EIR/EIS Technical/Engineering Review Support

Urban Design

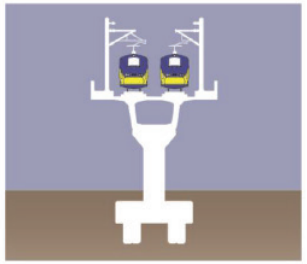
June 1, 2020

Perkins&Will

Table of Contents

DEIR/EIS Alternatives

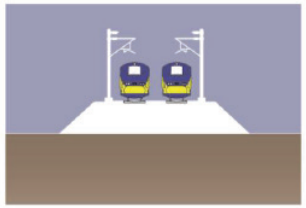
Viaduct



Two high-speed rail tracks on an aerial structure

Alt 1 or 3 in Morgan Hill

Embankment



Two high-speed rail tracks on an earthen embankment

Dedicated At-Grade

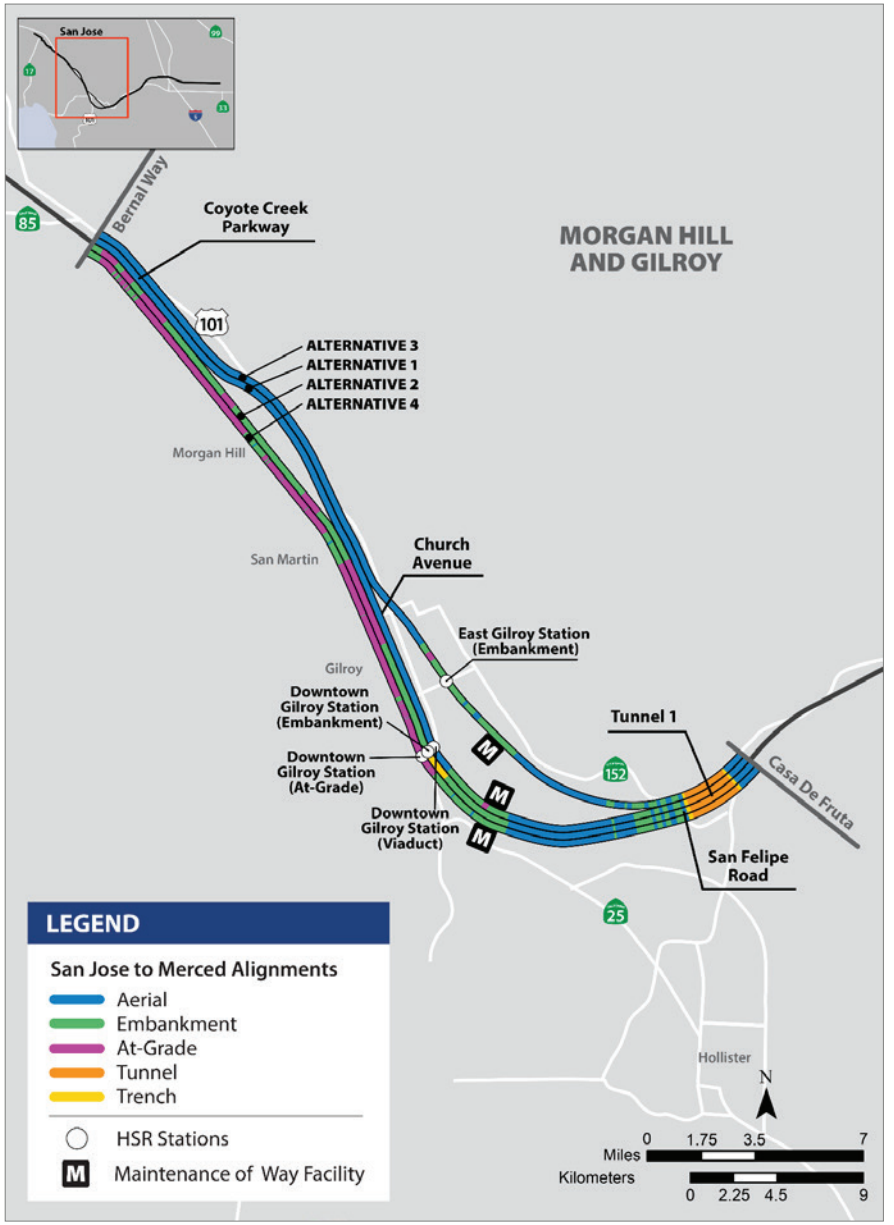
Two high-speed rail tracks at ground level adjacent to existing freight tracks

Alt 2 in Morgan Hill

Blended At-Grade

Two electrified, blended passenger tracks (with Caltrain) and one non-electrified freight track at ground level

Alt 4 in Morgan Hill



Source: Authority 2019a

JUNE 2019

DEIR/EIS Alternatives

Alternative 4 (blended, at-grade) vs. Alternative 2 (dedicated, on embankment)

Physical impact by HSR ROW

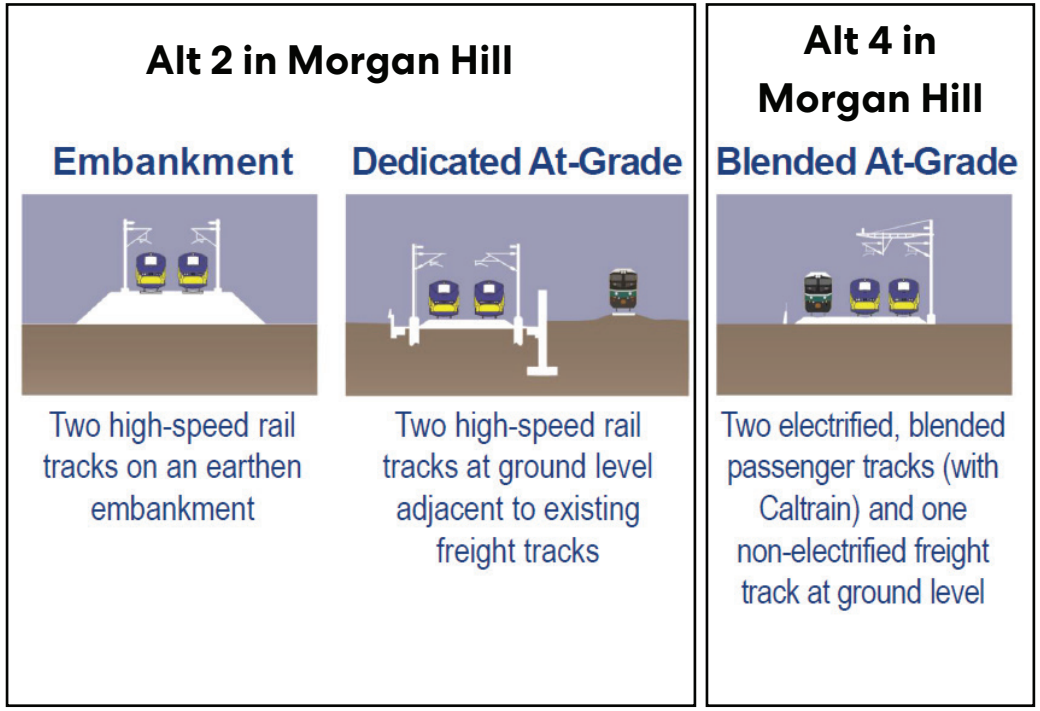
+ Alt 4 has less impacts on adjacent properties and buildings
- Alt 2 has a greater visual impact given the height of the tracks and fences

Impact on crossings & adjacent roadways

+ Alt 2 proposes below-grade crossings through Morgan Hill
- Alt 4 proposes at-grade crossings
+ Alt 4 has the flexibility to maintain some at-grade crossings while allowing for grade separation at strategic locations
- Alt 2 may exclude any potential at-grade or above-grade crossings. It also leads to the closure of Depot St. at Main Ave.

Caltrain Station improvement

+ Alt 4 proposes new platforms and an underpass
- Alt 2 does not propose any improvement to the station platform
- Alt 2 proposed underpass does not directly serve the station platform



DEIR/EIS Alternatives

Alternative 1 or 3

Pros:

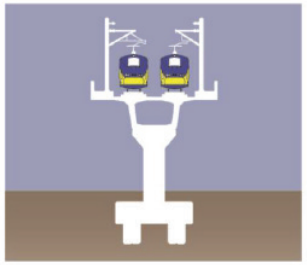
+ No direct impact on downtown properties and character
+ No direct impact on streets

Cons:

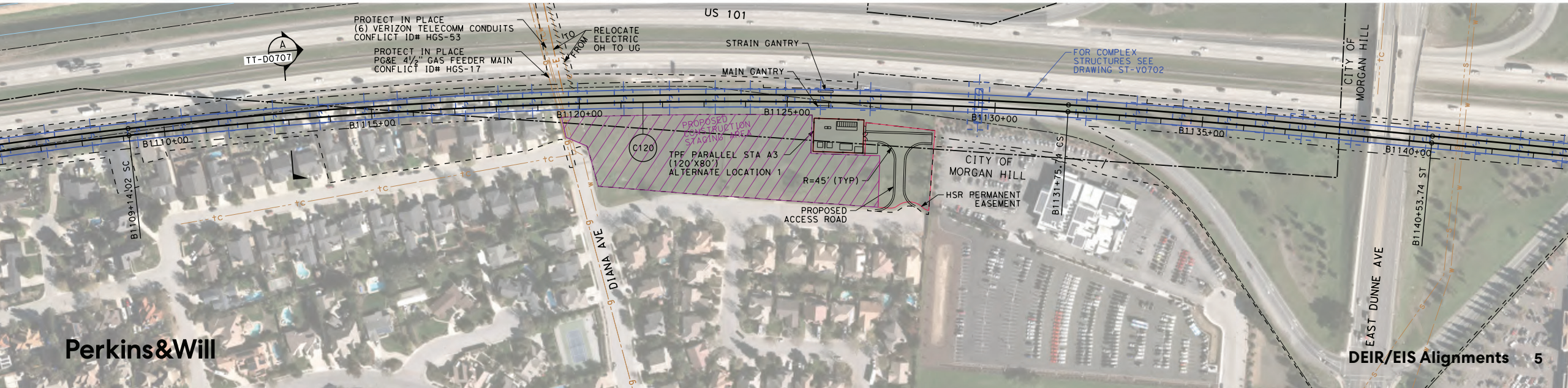
- Creates property & building impacts on residential community near US 101
- Viaduct creates a negative impact on the character of the residential neighborhood

Alt 1 or 3 in Morgan Hill

Viaduct



Two high-speed rail tracks on an aerial structure



Strategy Framework

Monterey Underpass

Integrate sidewalk and bike lanes into proposed roadway

E Main Avenue

Maintain an at-grade crossing to minimize impacts on adjacent properties and Depot Street

Caltrain Station Access

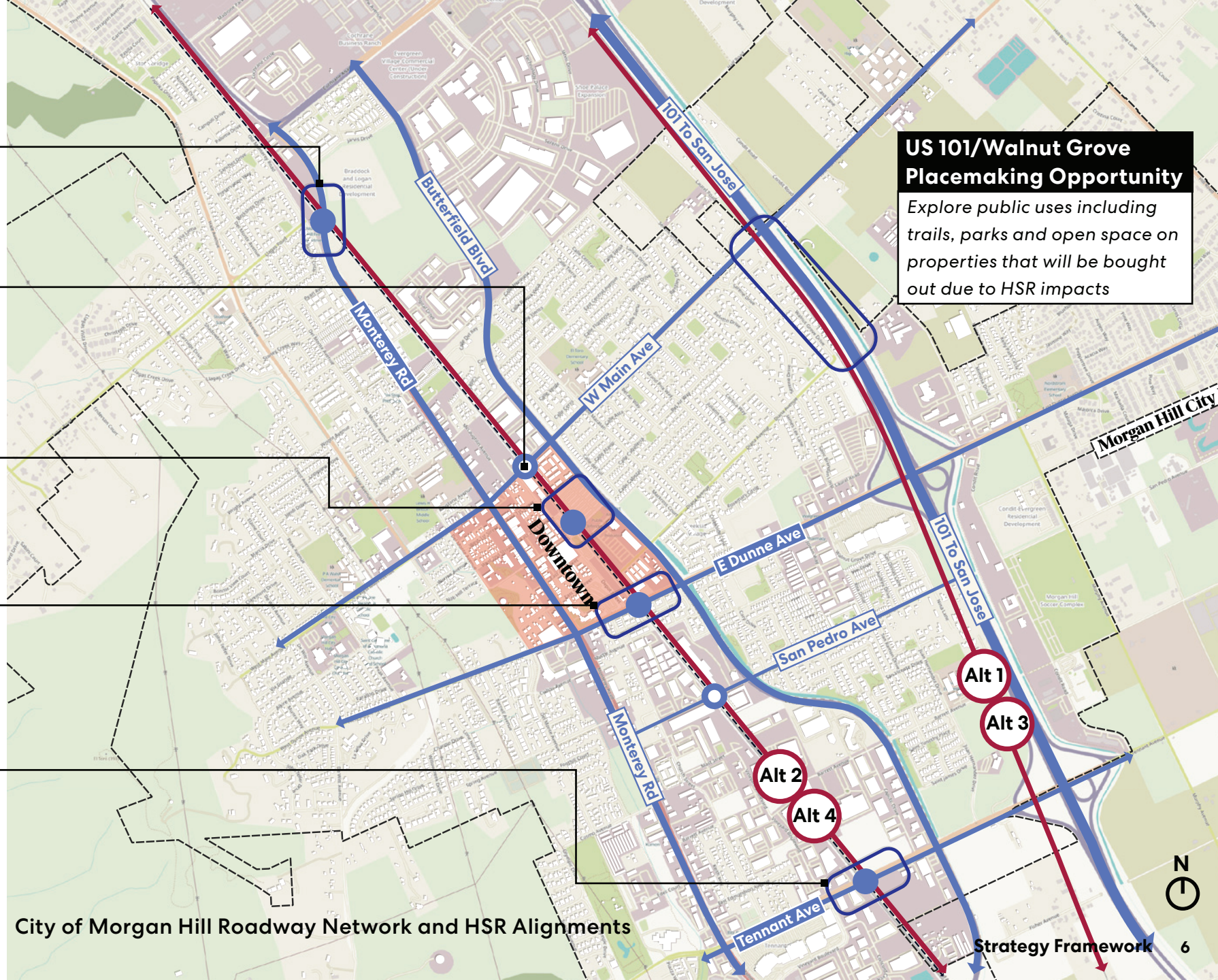
Improve pedestrian underpass to enhance multimodal connectivity

Dunne Avenue Grade Separation

Potential below-grade roadway crossing with pedestrian and bicycle infrastructure

Tennant Avenue Grade Separation

Potential below-grade roadway crossing with pedestrian and bicycle infrastructure

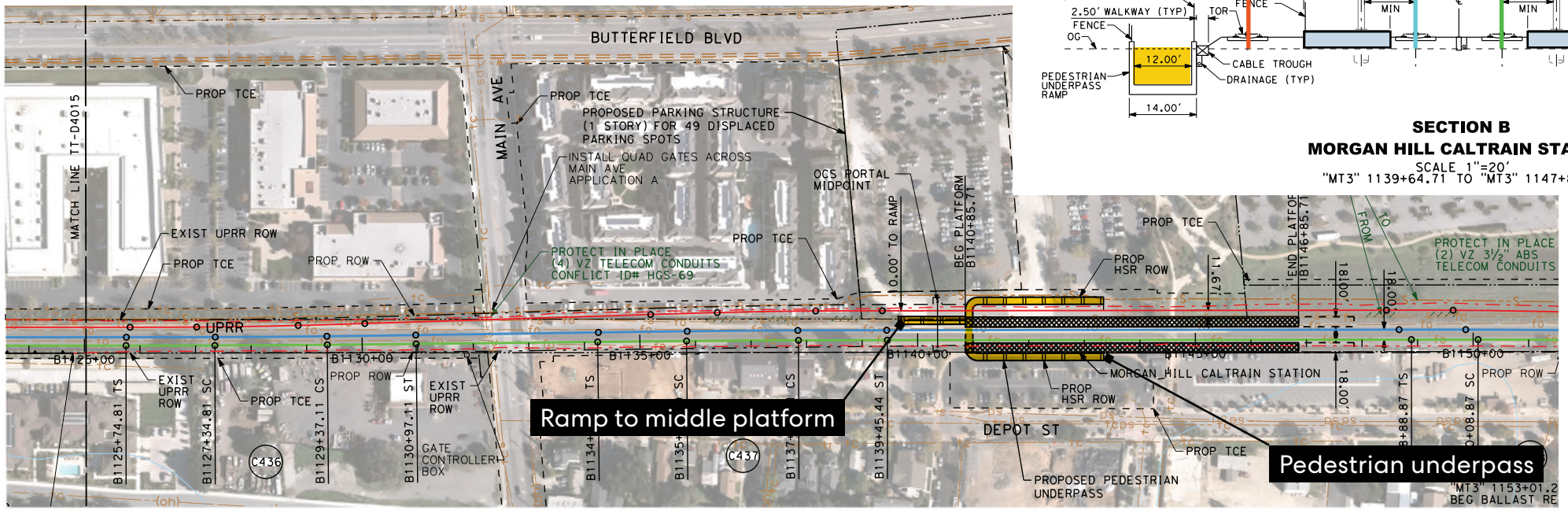


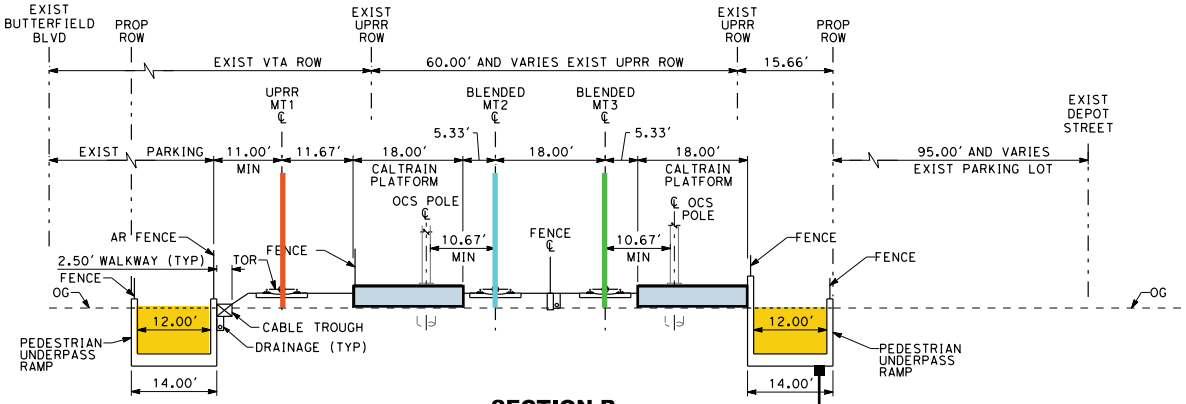
City of Morgan Hill Roadway Network and HSR Alignments

Perkins&Will

CALTRAIN STATION ACCESS

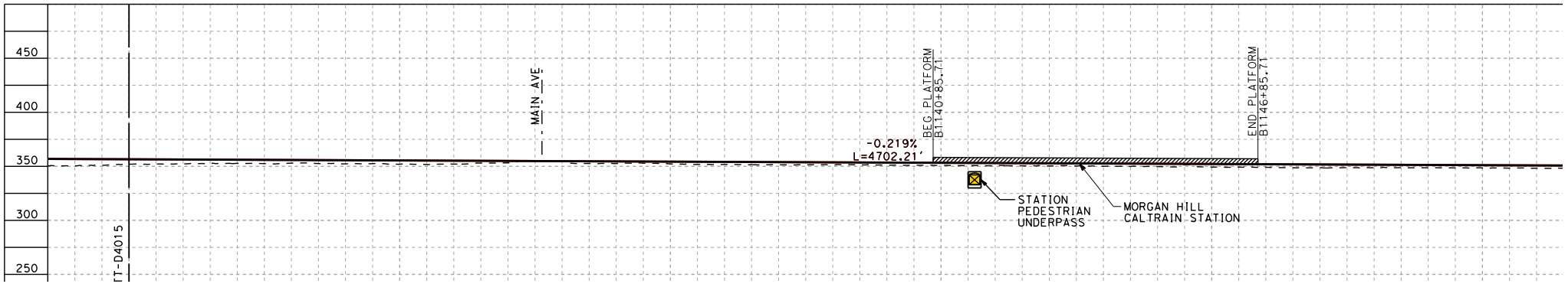
DEIR/EIS Proposed in Alternative 4





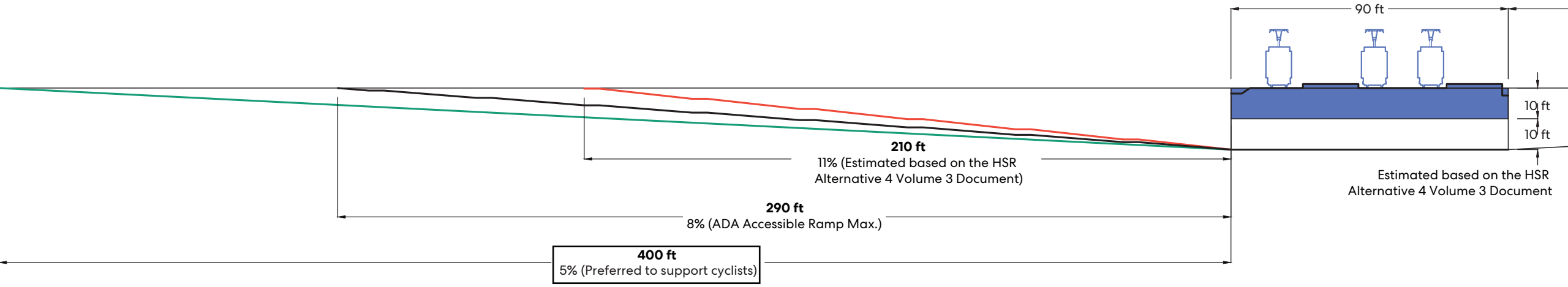
SECTION B
MORGAN HILL CALTRAIN STATION
SCALE 1"=20'
"MT3" 1139+64.71 TO "MT3" 1147+85.71

Pedestrian underpass



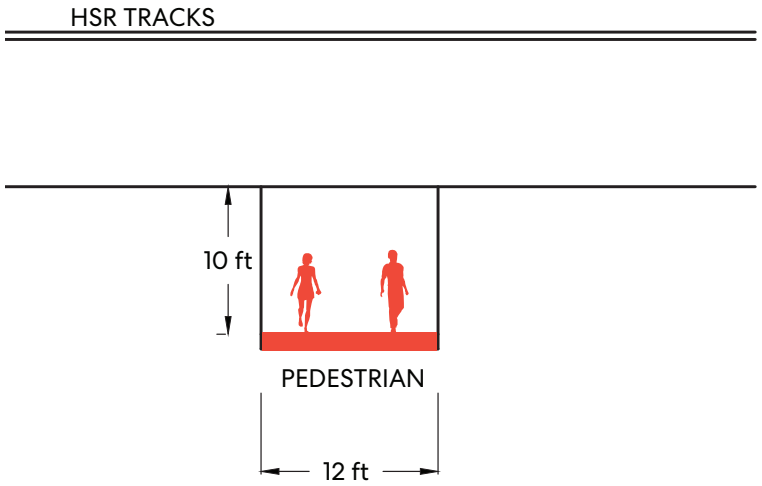
Accessible Slopes

Conceptual diagram, transition slopes not considered



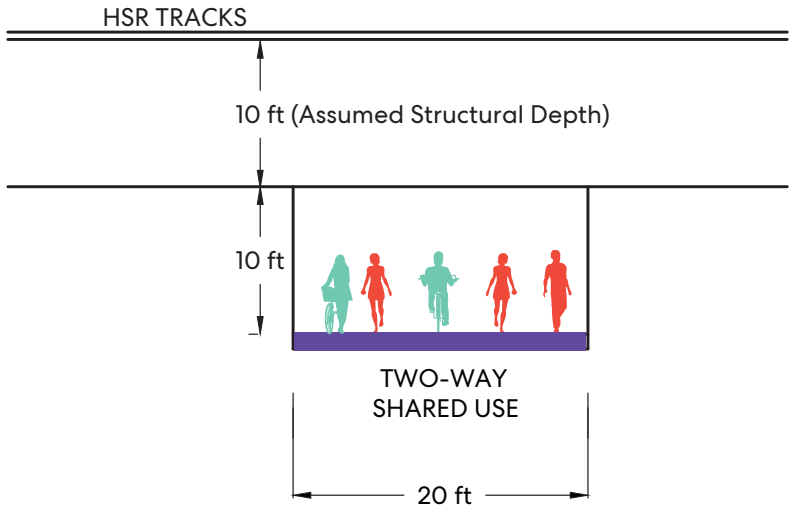
Underpass Width

HSR Alternative 4 Proposed

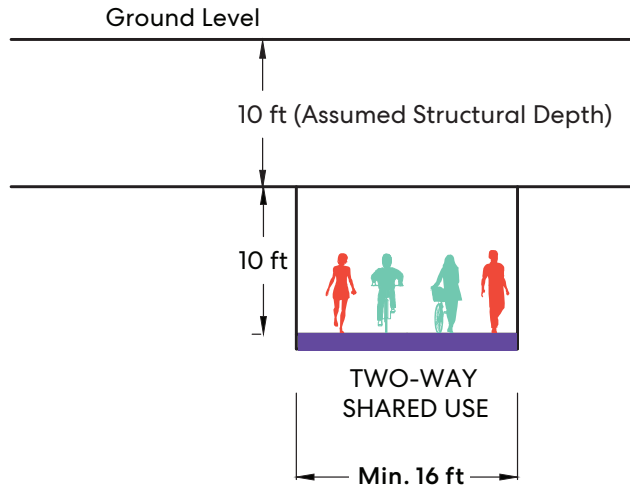


City Preferred Options

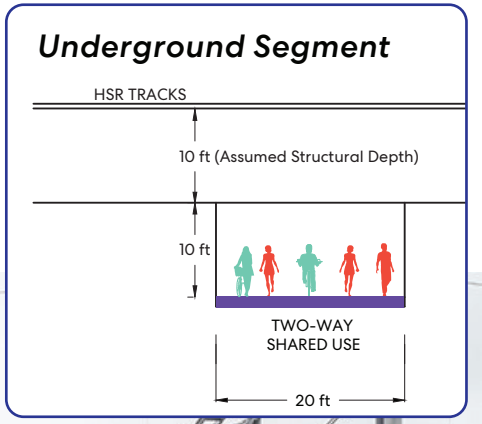
Underground Segment

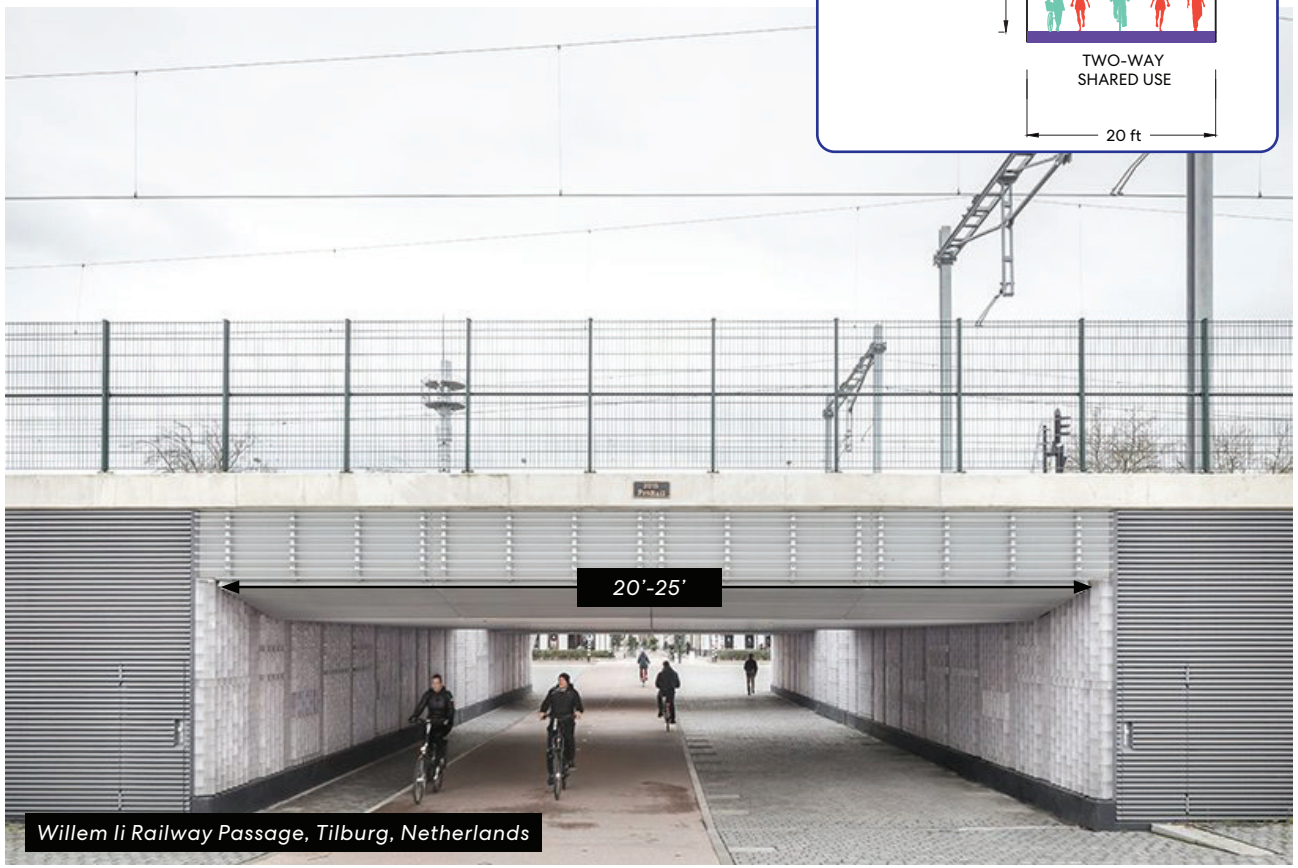


Access Ramps

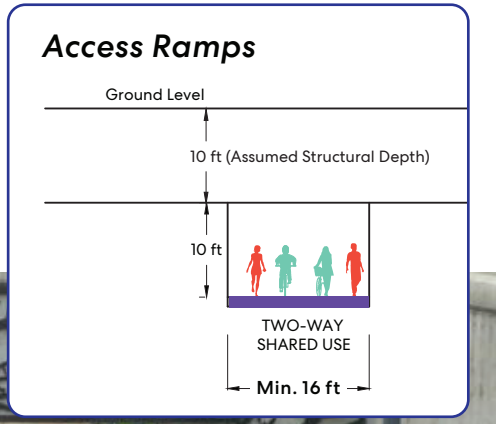


Examples of Underpass Width



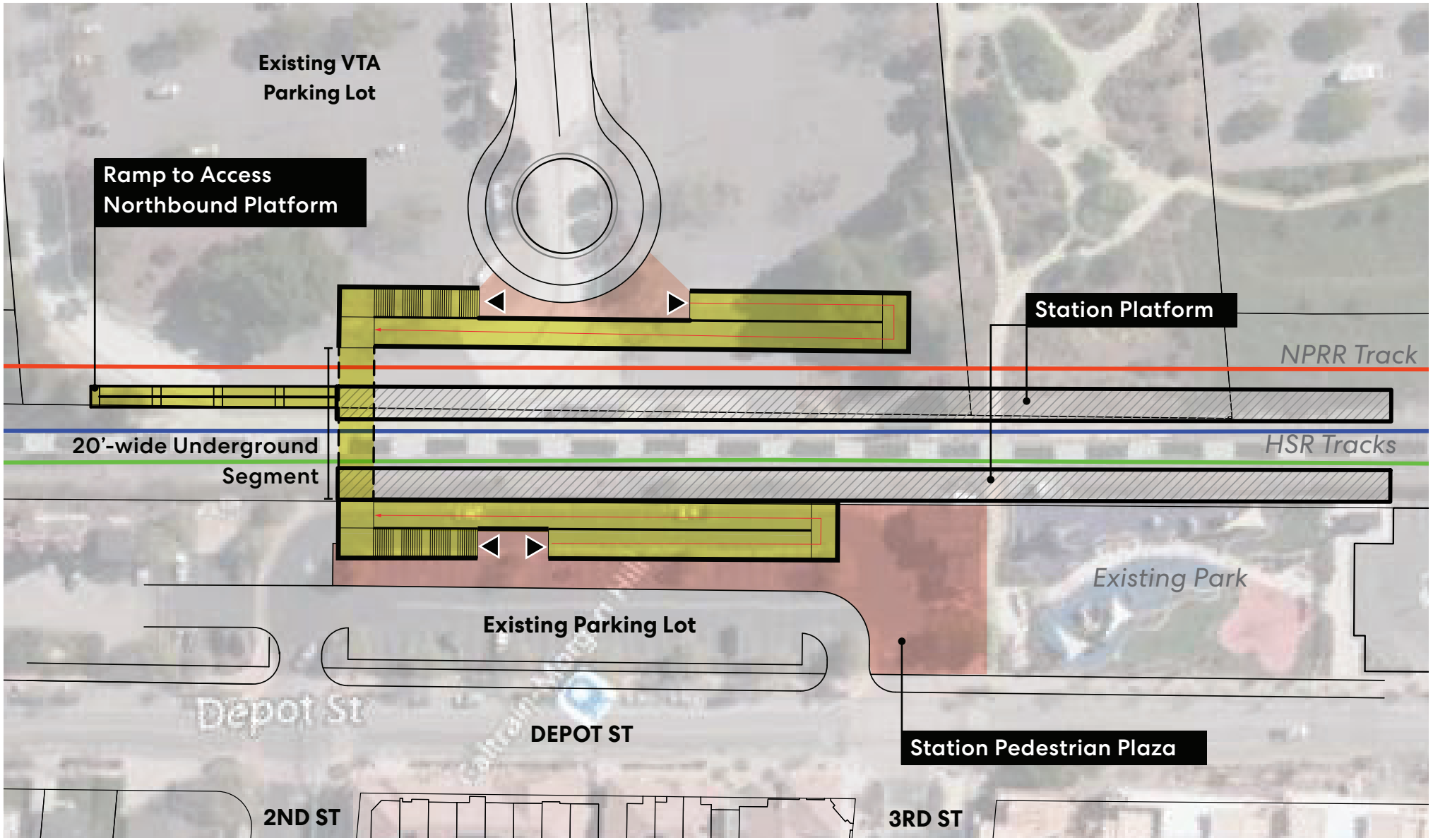


Willem Ii Railway Passage, Tilburg, Netherlands



Yerxa Road Underpass, Cambridge, Massachusetts, USA

Option 1: Minimum Space



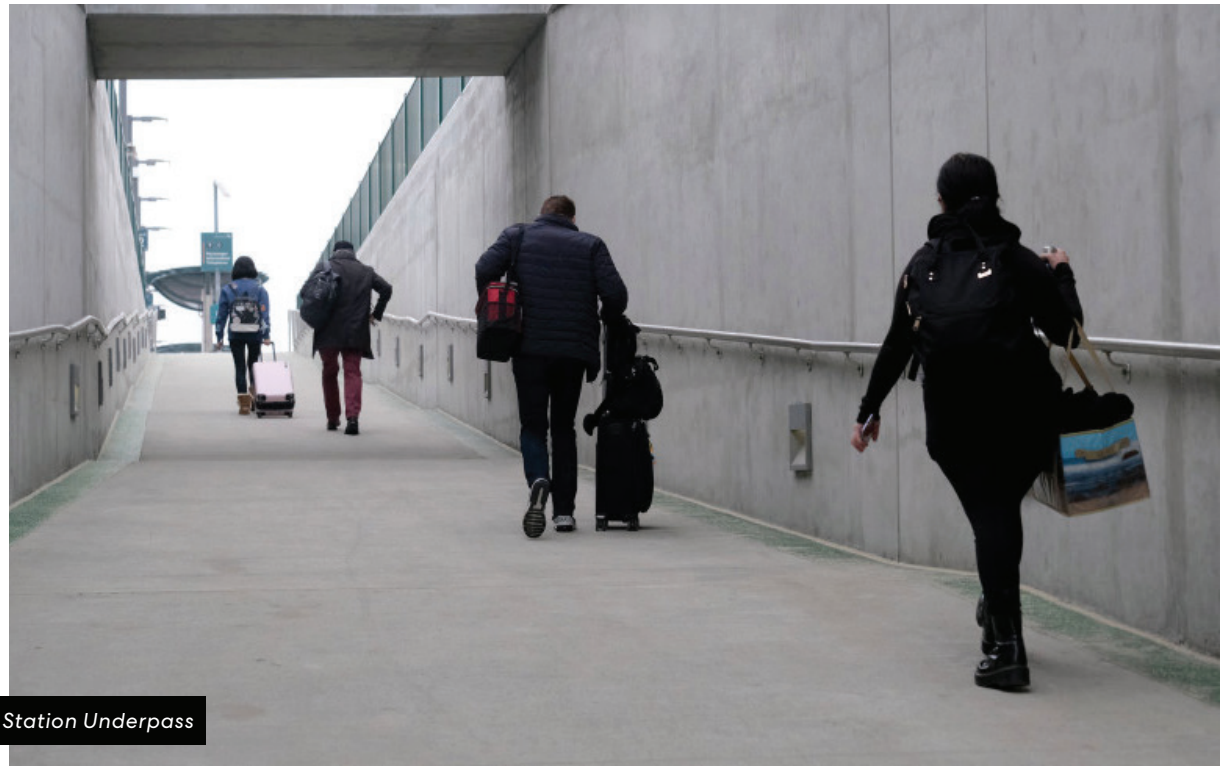
The placement of ramps and stairs takes up a minimum amount of space.

▲ Access Point

Pedestrian Circulation

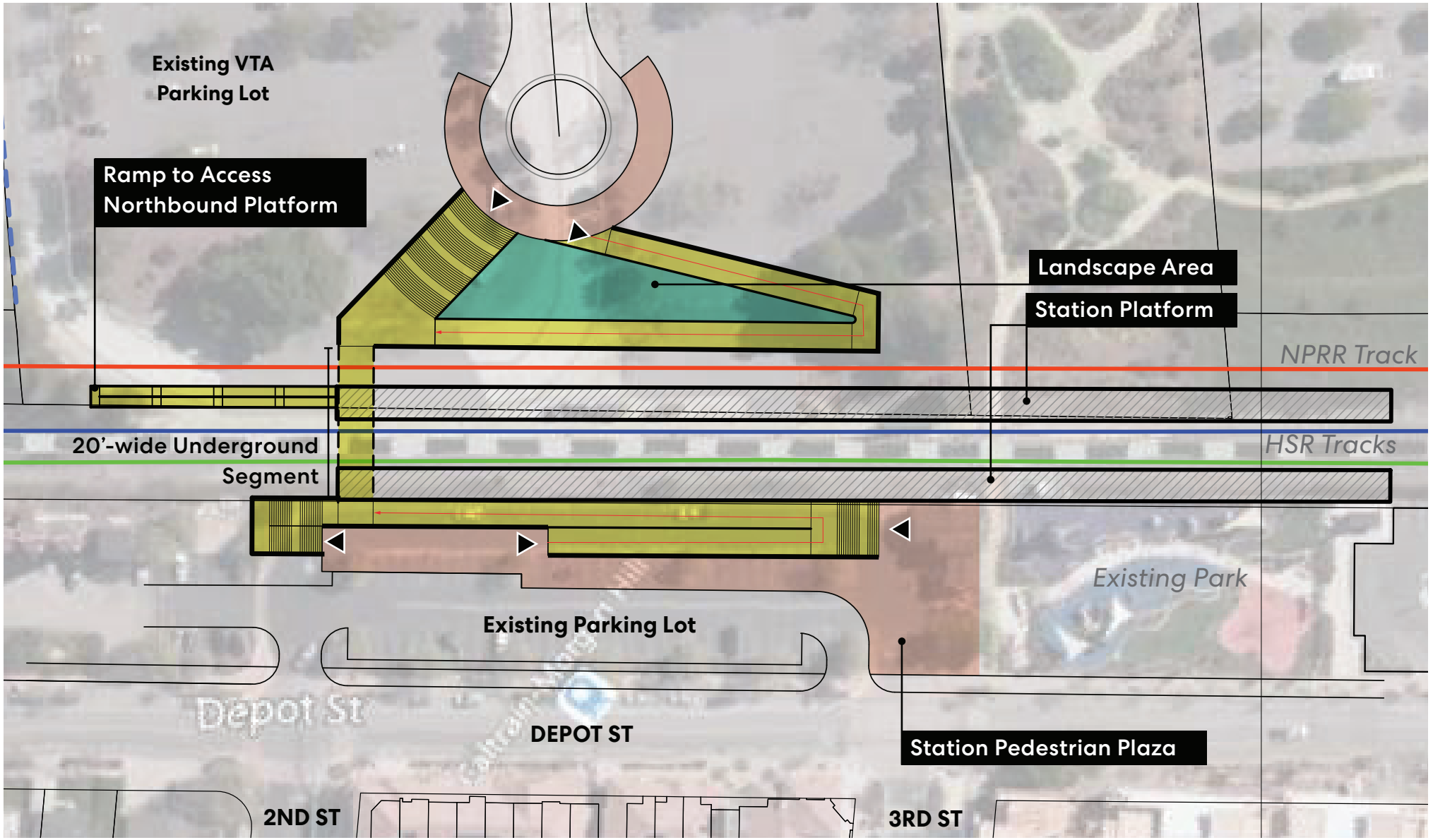
Transit Plaza/Public Space

**Assumes a 16'-wide and 5% sloped ramp.*



Van Nuys Metrolink Station Underpass

Option 2: Enhanced Landscape

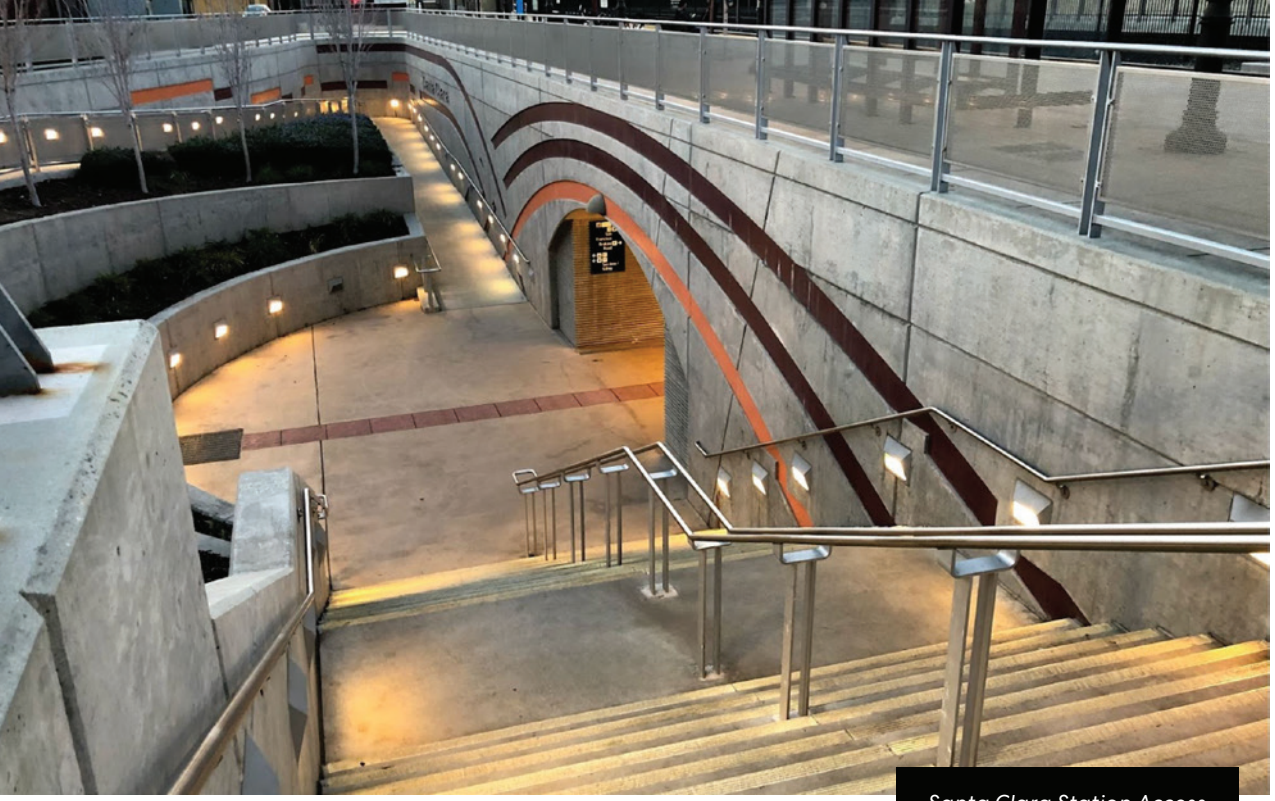


A landscape area is included on the east side to create a sense of arrival and provide more generous space and lighting to the area that is lower than the ground level.

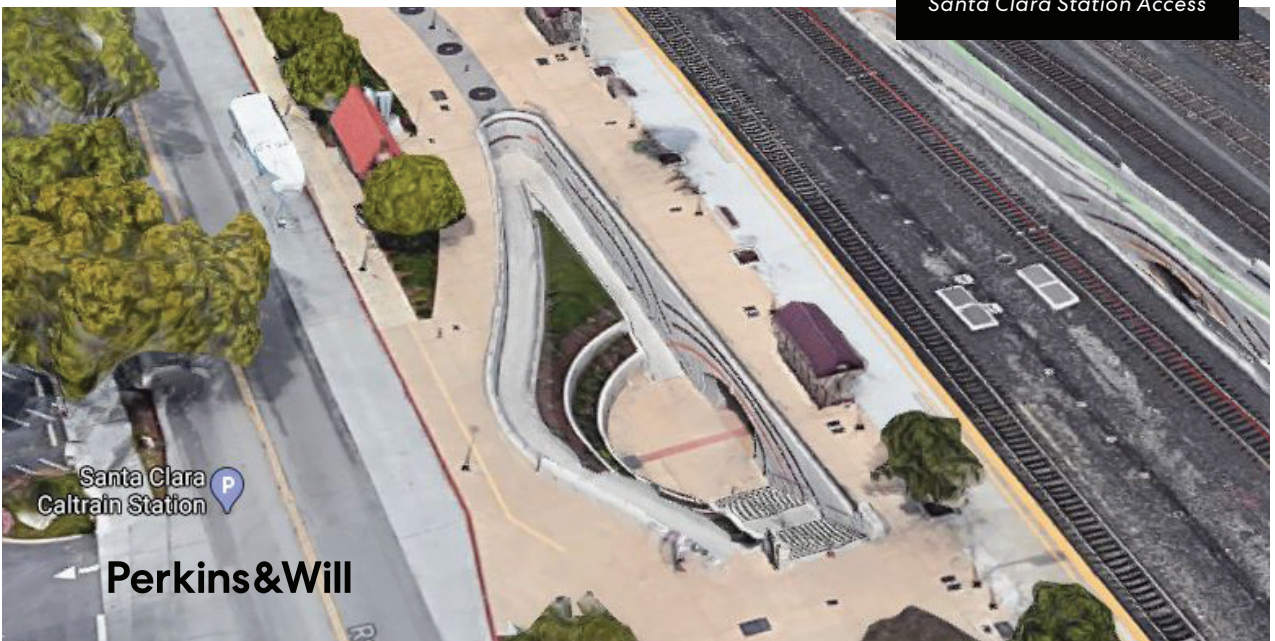
Compact ramp and stair configuration on the west side to preserve more parking spaces in the existing lot.

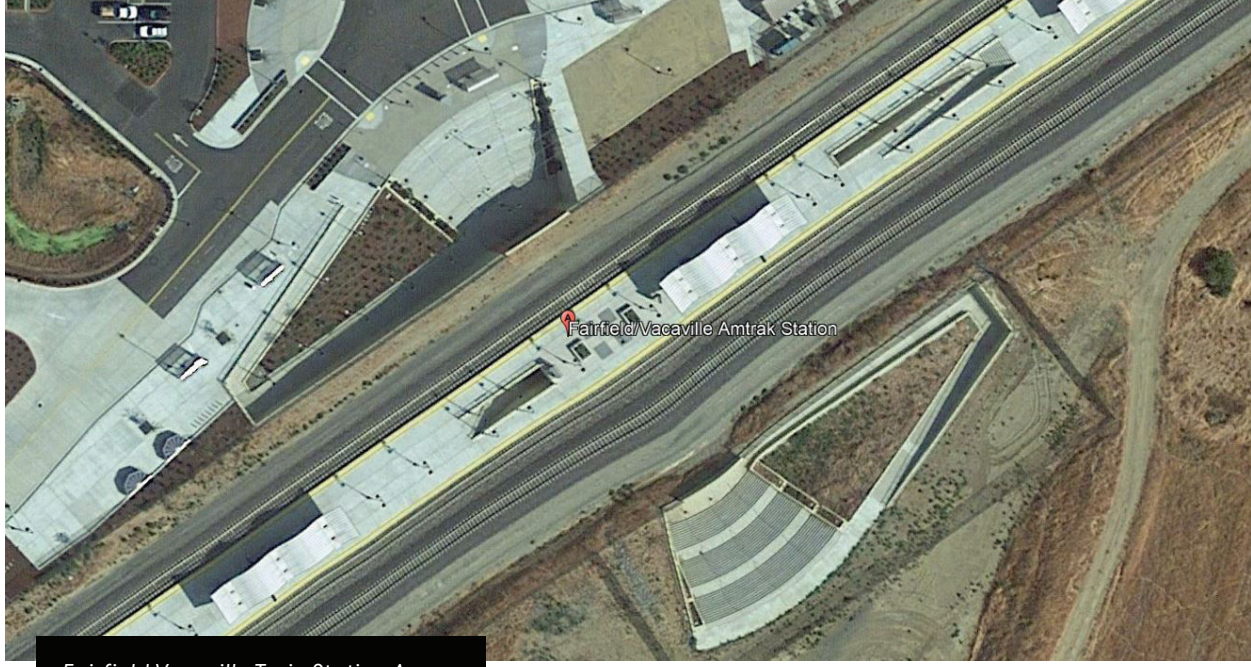
- ▲ Access Point
- Pedestrian Circulation
- Transit Plaza/Public Space
- Landscape

**Assumes a 16'-wide and 5% sloped ramp.*



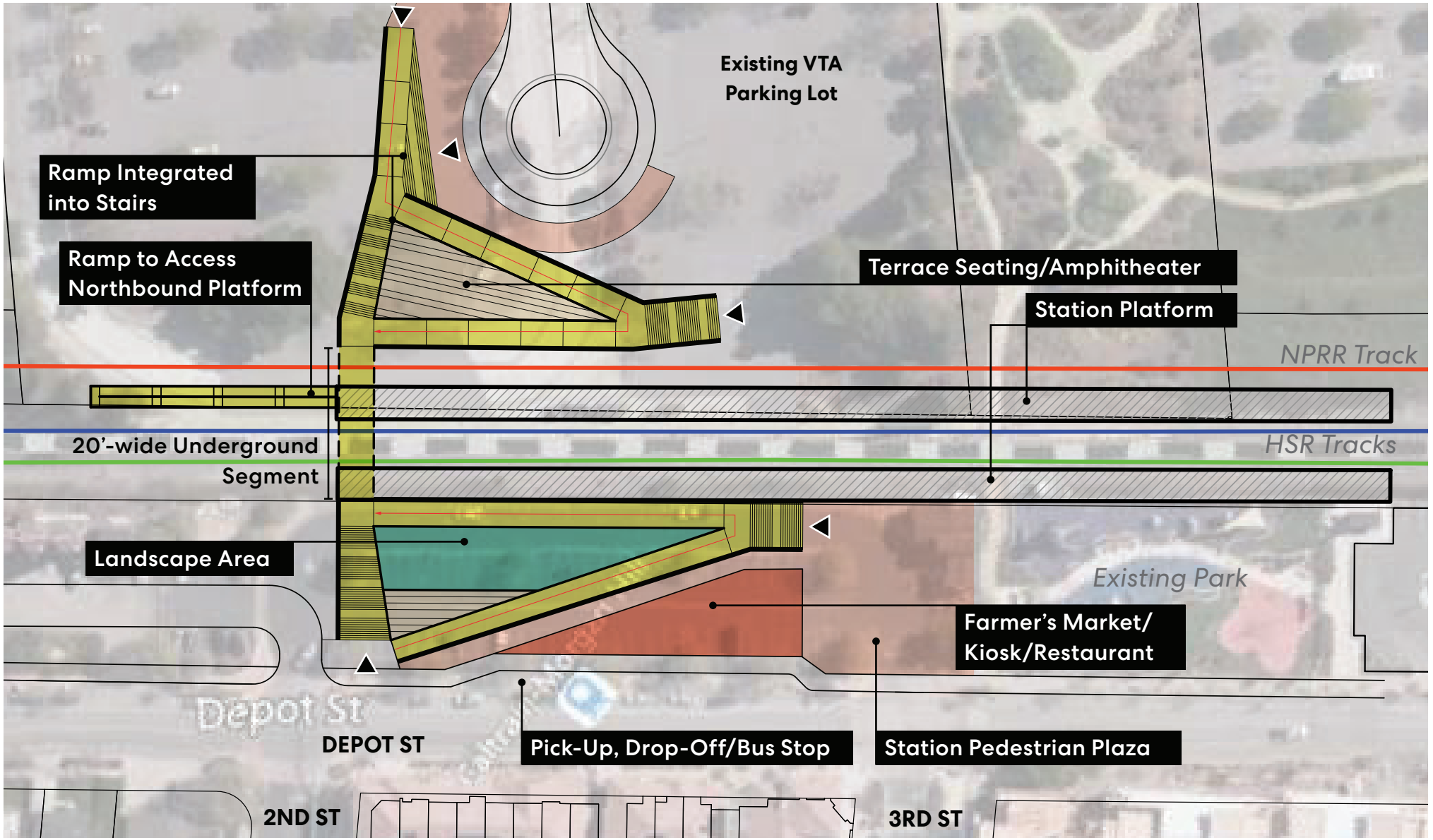
Santa Clara Station Access





Fairfield Vacaville Train Station Access

Option 3: Town Center/Gateway



Dedicates more space on both sides of the tracks to create a gateway and centralized public space at the future Caltrain Station.

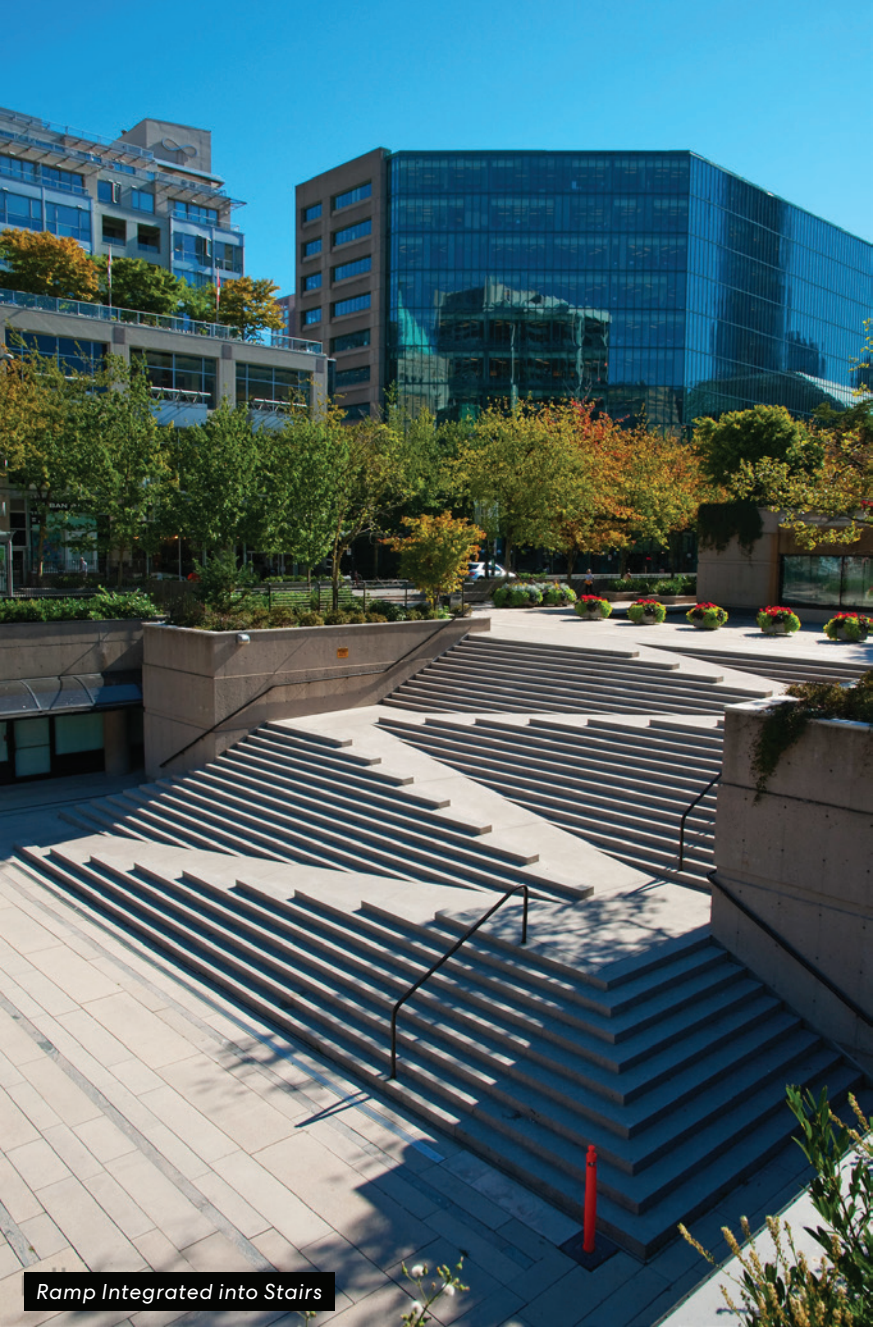
Creates public space both at the ground level and along the ramps and stairs to provide placemaking opportunities.

Provides more generous space and lighting to the lower area.

- ▲ Access Point
- Pedestrian Circulation
- Transit Plaza/Public Space
- Event/Programmed Public Space
- Landscape

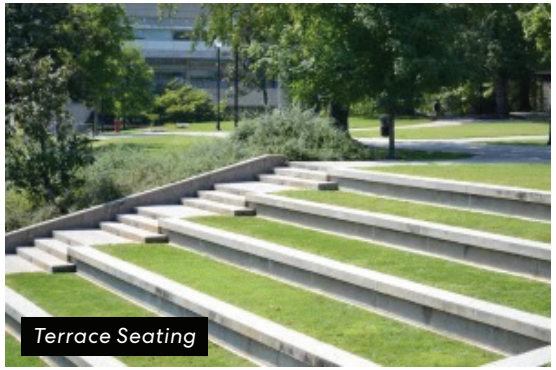
**Assumes a 16'-wide, 8% sloped ramp on the east side and a 5% sloped ramp on the west side.*

Perkins&Will



Ramp Integrated into Stairs

Terrace Seating



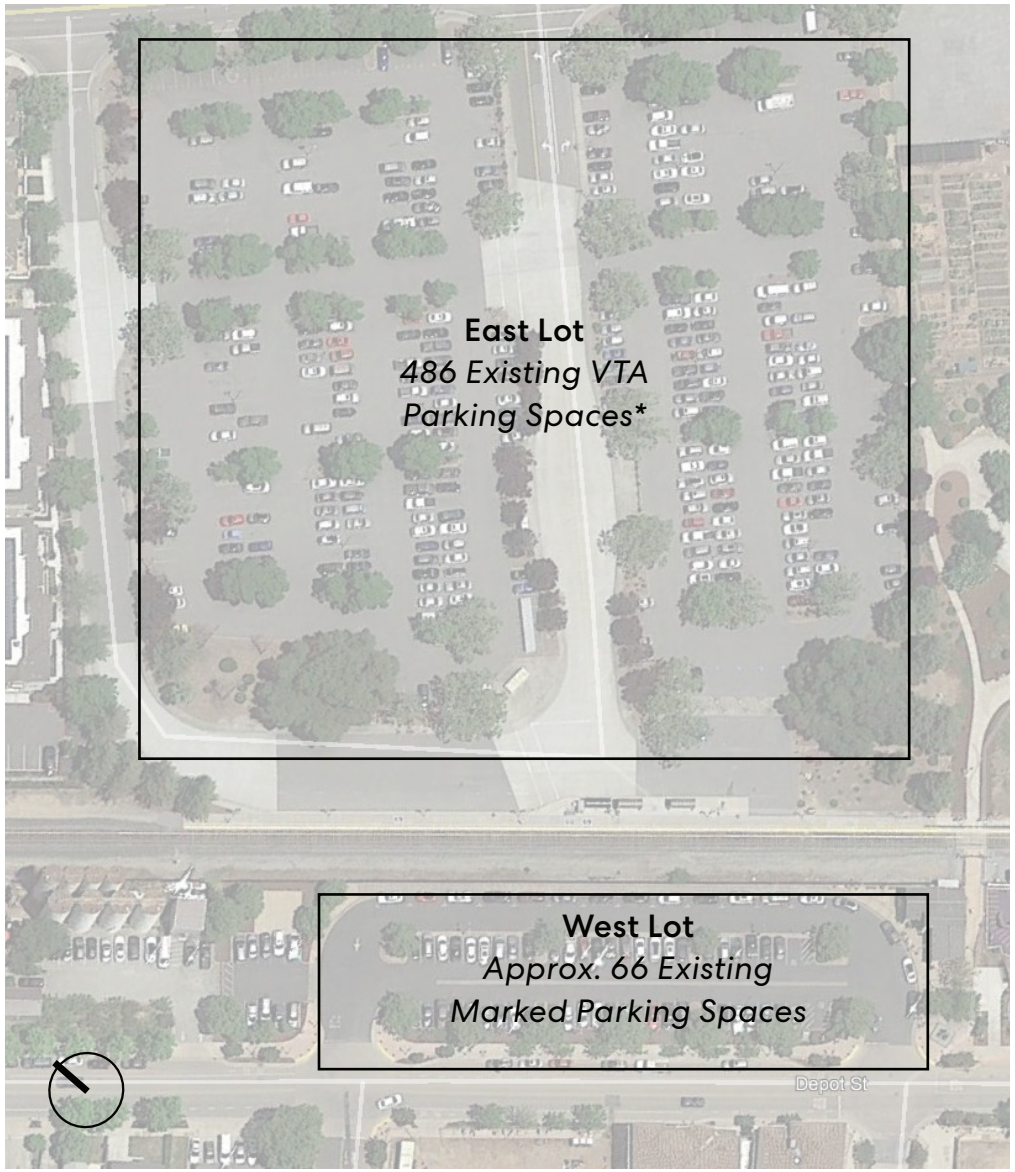
Terrace Seating

Street Fair (Potential Program for Station Plaza)

Kiosk (Potential Program for Station Plaza)

Farmers Market (Potential Program for Downtown Plaza)

Assessment of Parking Impact



East Lot

Option 1:

- Detailed design needed to minimize the parking impact and provide spaces to compensate parking loss
- Impacts **approximately 20** existing parking spaces

Option 2 & 3:

- Detailed design needed to minimize the parking impact and provide spaces to compensate parking loss
- Impacts **approximately 45-55** existing parking spaces

West Lot

Option 1 & 2:

- Detailed design needed to minimize the parking impact and provide spaces to compensate parking loss
- Impacts **approximately half** of the existing parking spaces

Option 3:

- Detailed design needed to minimize the parking impact and provide spaces to compensate parking loss
- Impacts **60% to 100%** of the existing parking spaces

* Source: https://www.vta.org/go/stations/morgan-hill-caltrain

Caltrain Station Access Key Takeaways

Impacts

Maintaining an ADA accessible slope will **take up a significant amount of space**. The capacity for parking and/or future proposed uses on the station-adjacent parcels will be impacted.

Considerations

The underpass should meet **ADA accessible design standard** and support bicycle access.

The location of the pedestrian underpass should be considered with the **planning and design of pedestrian paths, access way, pick-up/drop-off, parking, and future development** on the adjacent properties.

The design should provide **adequate lighting and maximize natural light** to enhance security while ensuring energy efficiency.

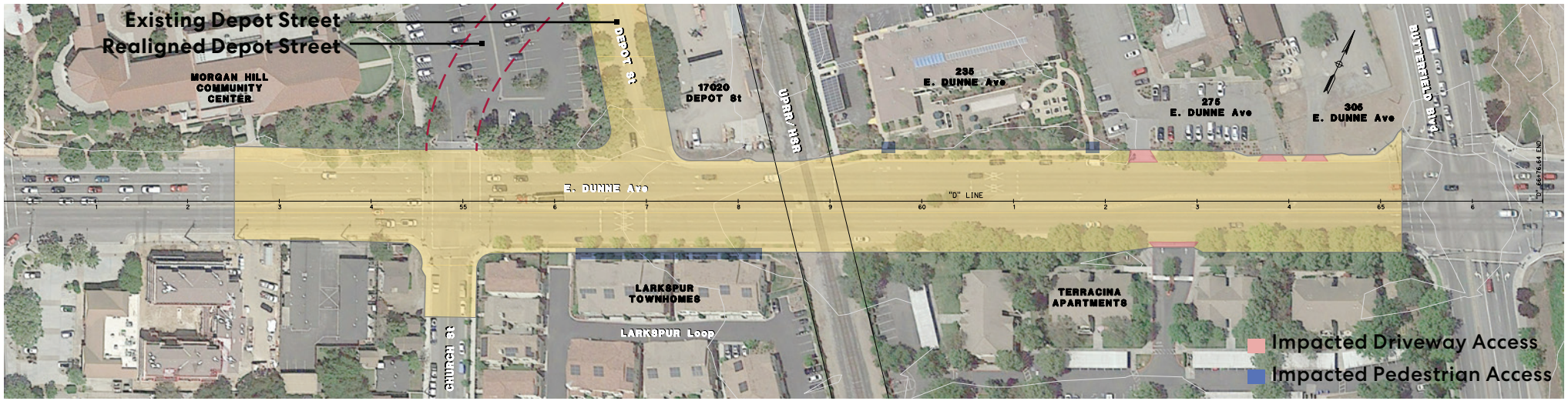
Recommendations

The tunnel (under the tracks and platforms) should be, at a minimum, **20 feet wide and 10 feet tall** with ground texture or paving differentiating space dedicated to **pedestrians and bicycles**.

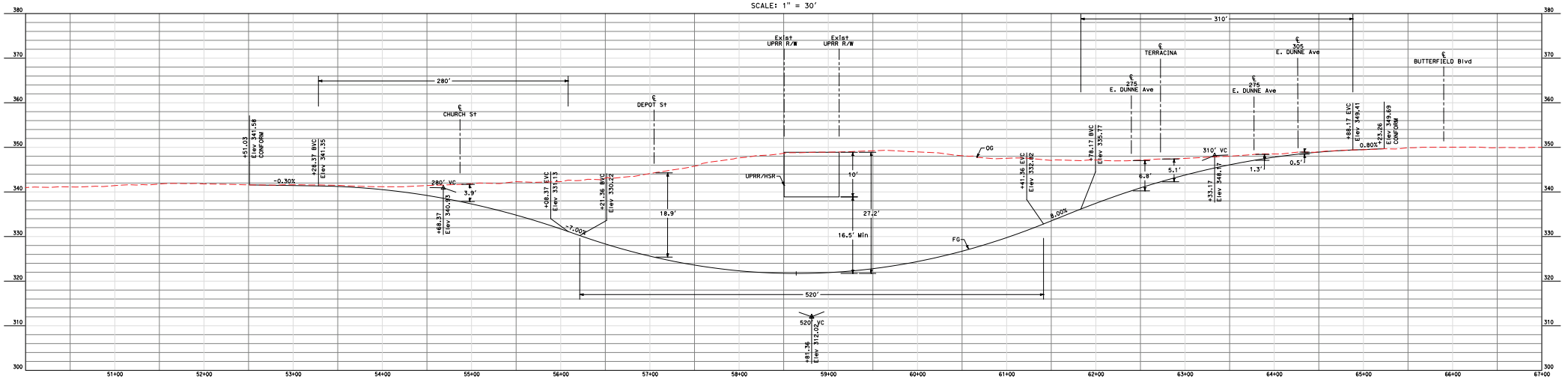
The access ramps and stairs should be **at least 16 feet wide**. Provide **a 5% slope** for a continuous access ramp where possible.

Provide adequate lighting in the pedestrian underpass. **Maximize exposure to daylight** through locating the ramps where opening to the sky is possible. Integrate **landscape features** into the design of the ramps to enhance the visual quality. Include artificial lighting and other safety and security elements as per Caltrain Design Criteria.

ROADWAY GRADE SEPARATION



PLAN
SCALE: 1" = 30'



PROFILE
E DUNNE Ave
"D" LINE
SCALE: Horiz 1" = 30'
Vert 1" = 6'

DESIGN SPEED = 40 MPH

05/20/2020

E. DUNNE AVENUE CROSSING - ALT 4 UNDERCROSSING

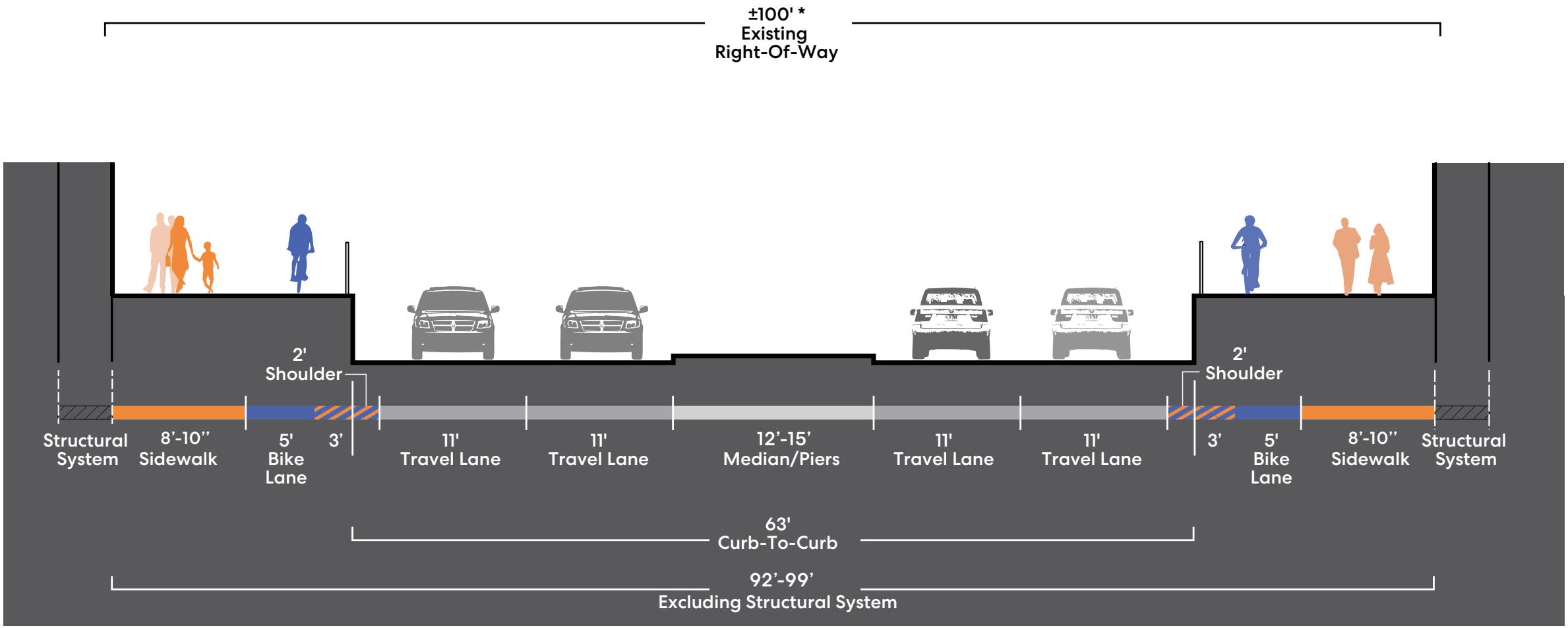
BKF 100+ YEARS ENGINEERS . SURVEYORS . PLANNERS

CITY OF MORGAN HILL

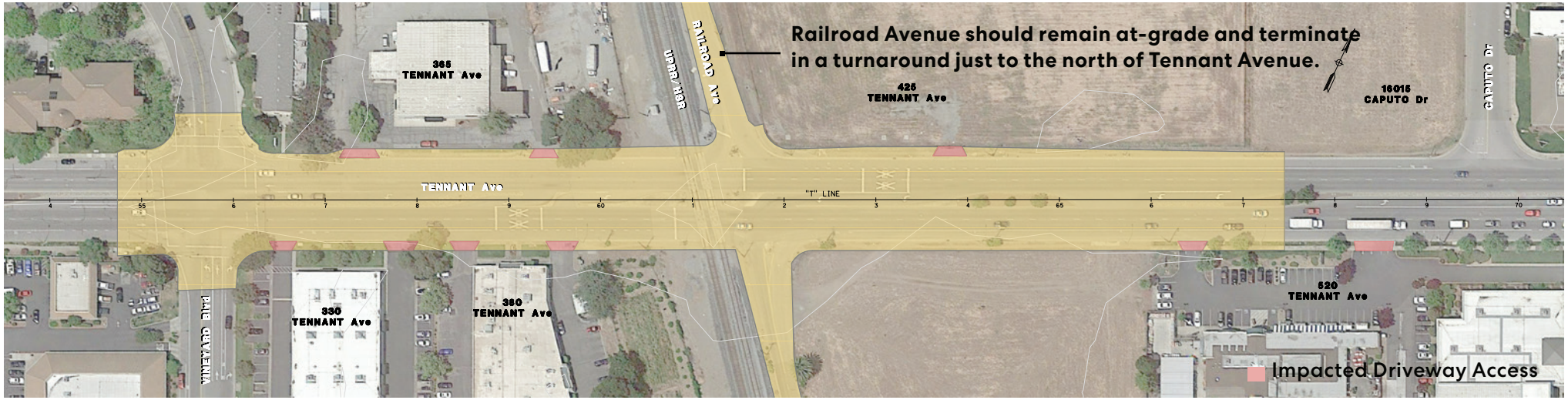
Perkins&Will

Dunne Avenue Potential Configuration

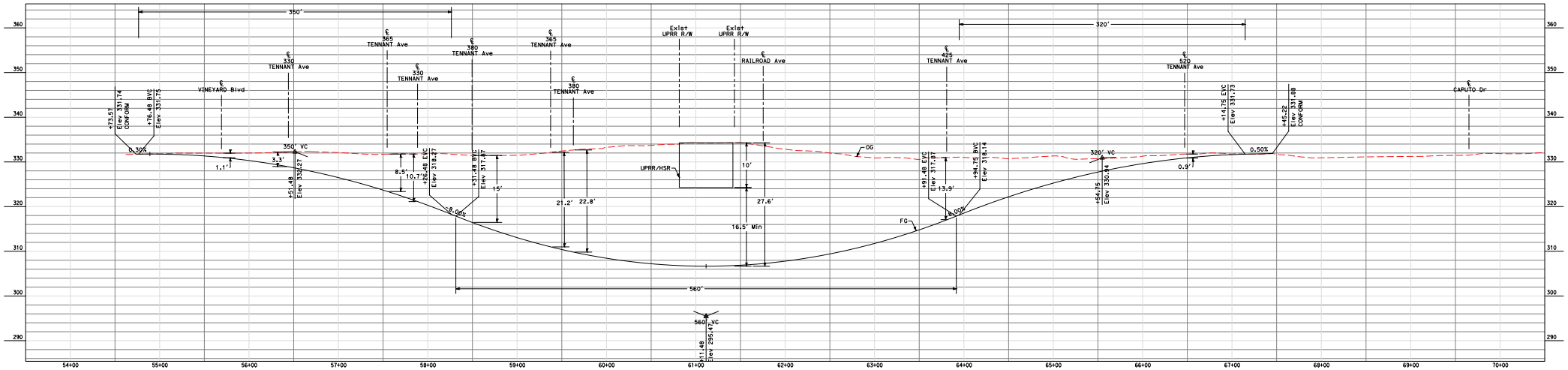
Conceptual diagram, not a design



** Measured from back of sidewalk to back of sidewalk. Parcel data shows 90' to 110' depending on the location.*



PLAN
SCALE: 1" = 30'

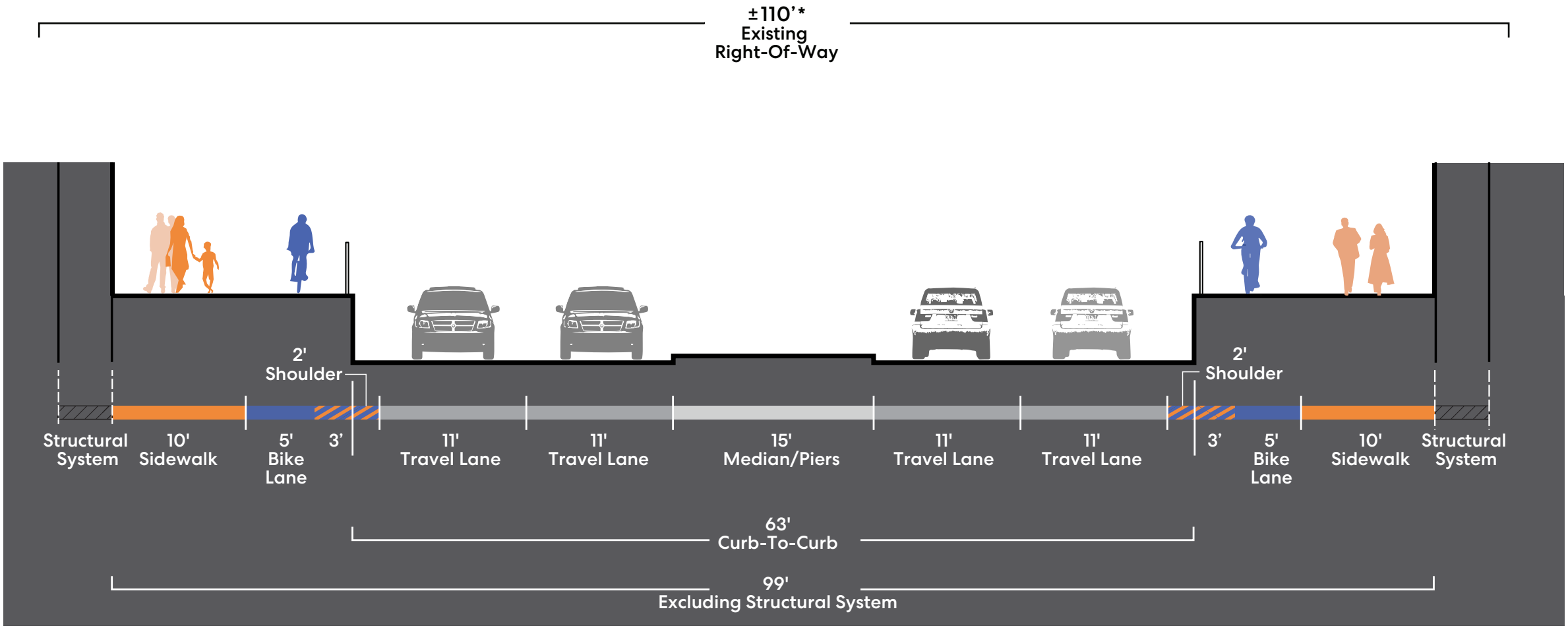


05/20/2020

TENNANT AVENUE CROSSING - ALT 4 UNDERCROSSING

Tennant Avenue Potential Configuration

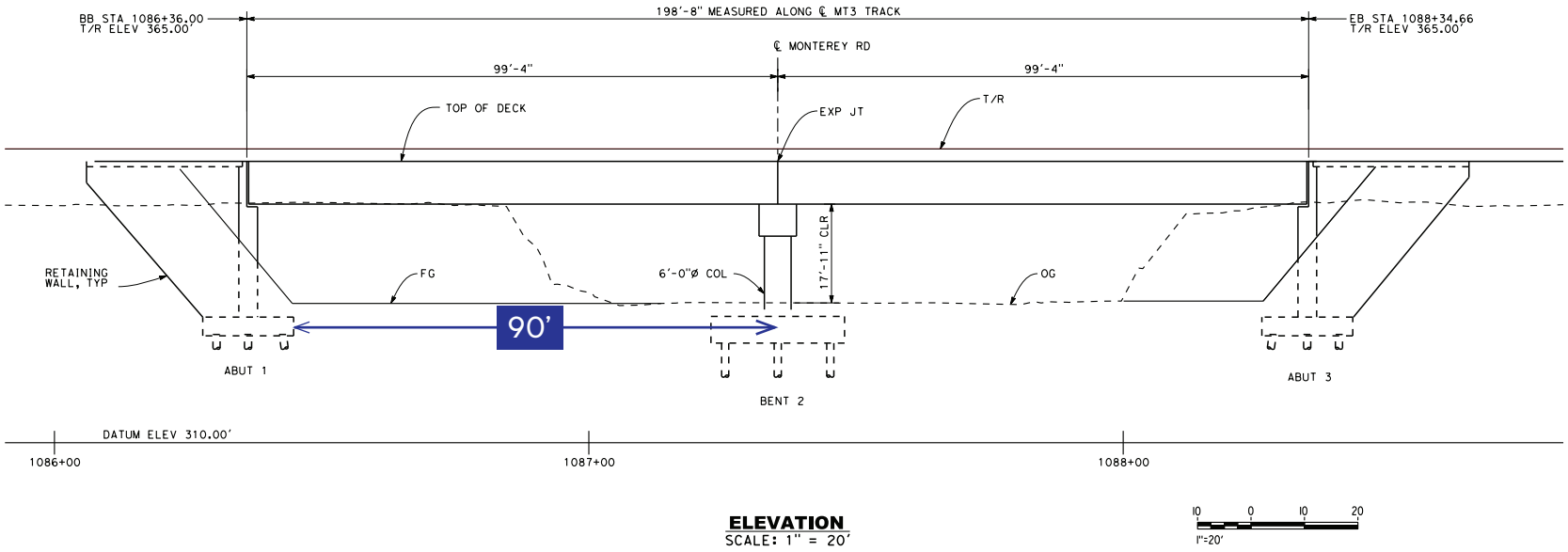
Conceptual diagram, not a design



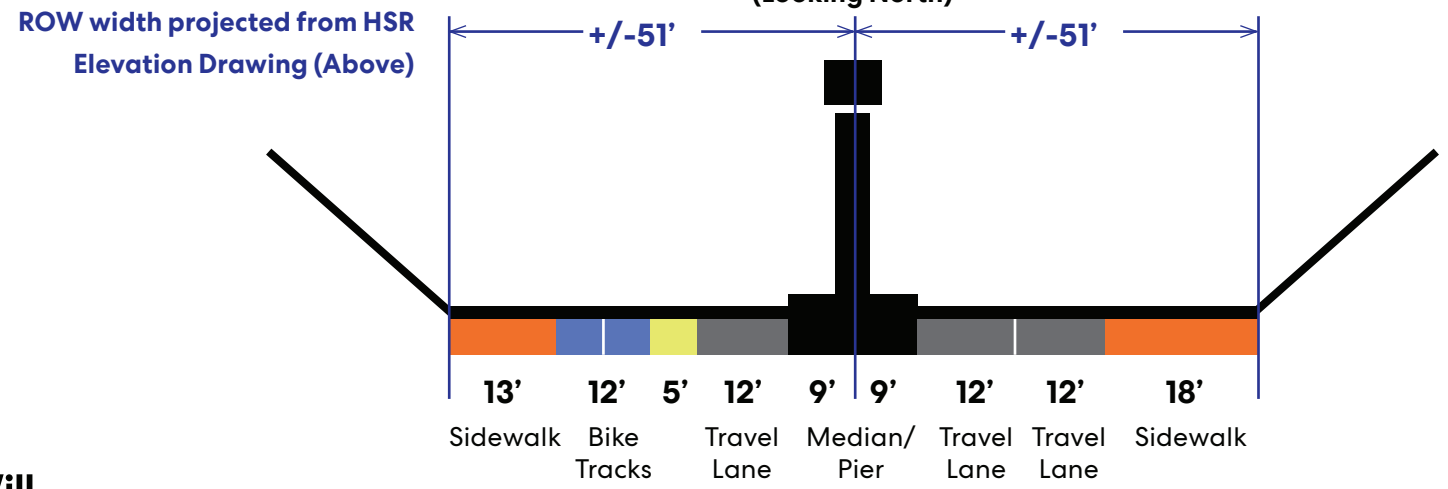
** Measured from back of sidewalk to back of sidewalk. Parcel data shows 110' to 120' depending on the location.*

Perkins&Will

Monterey Road Underpass - Potential Multimodal Configuration



Potential Configuration of Monterey Road within HSR Proposed ROW (Looking North)



Perkins&Will

Roadway Grade Separation Key Takeaways

Impacts

Depressing Dunne and Tennant Avenues near the HSR tracks will **impact the existing intersections** at Depot Street, Church Street, Vineyard Boulevard, and Railroad Avenue.

Existing driveways and buildings accesses along Dunne and Tennant Avenues will be impacted by depressing the roadway profiles.

Pedestrian and bicycle experience will be impacted by the slopes.

Considerations

Design coordination needed between the Dunne Avenue grade separation and the **Depot Street realignment**.

Maintaining the Tennant-Railroad Avenue intersection below-grade would require a realignment of Railroad Avenue and cause **a significant amount of permanent land-take** in adjacent properties.

The **sidewalks and bike lanes** along Dunne and Tennant Avenues should be compliant with ADA standards.

Mitigation for **driveway and building access impacts** along Dunne and Tennant Avenues should be considered.

Recommendations

Bicycle lanes & sidewalks should be incorporated into the proposed section. Physical barriers are recommended between bikes lanes and travel lanes.

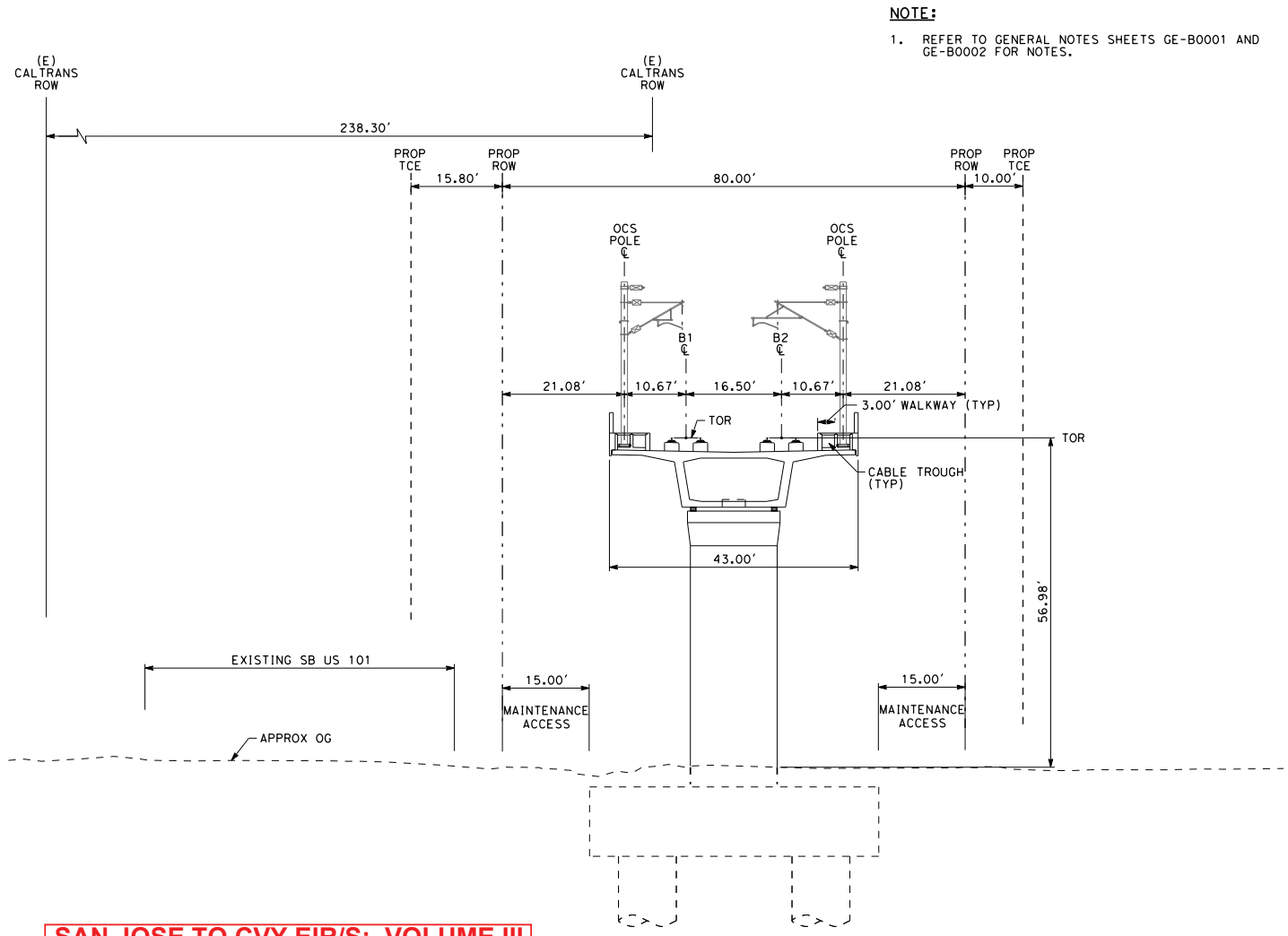
Railroad Avenue should **remain at-grade** and terminate in a turnaround just to the north of Tennant Avenue.

Create **a new easement or an alternative access point** to properties that currently can only be accessed from the depressed portion of Tennant Avenue. Create a **public pedestrian path at-grade** to preserve existing building access west of the tracks along Dunne Avenue.

Proposed section of Monterey Road Underpass should incorporate **sidewalks and bike lanes**.

U.S. 101 AREA/WALNUT GROVE PLACEMAKING OPPORTUNITY UNDER ALT 1 OR 3

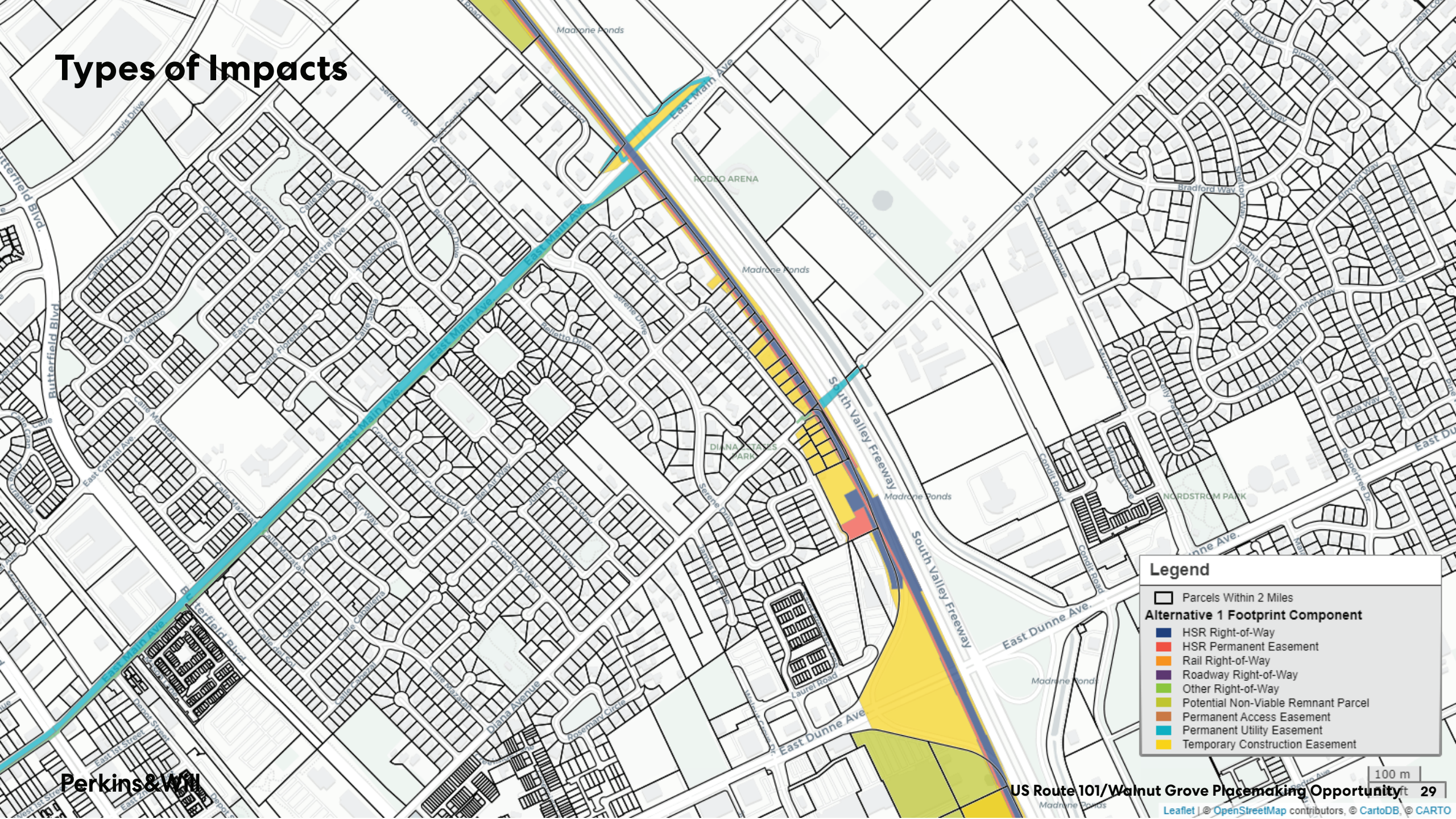
DEIR/EIS Proposed Section - Alternative 1 or 3



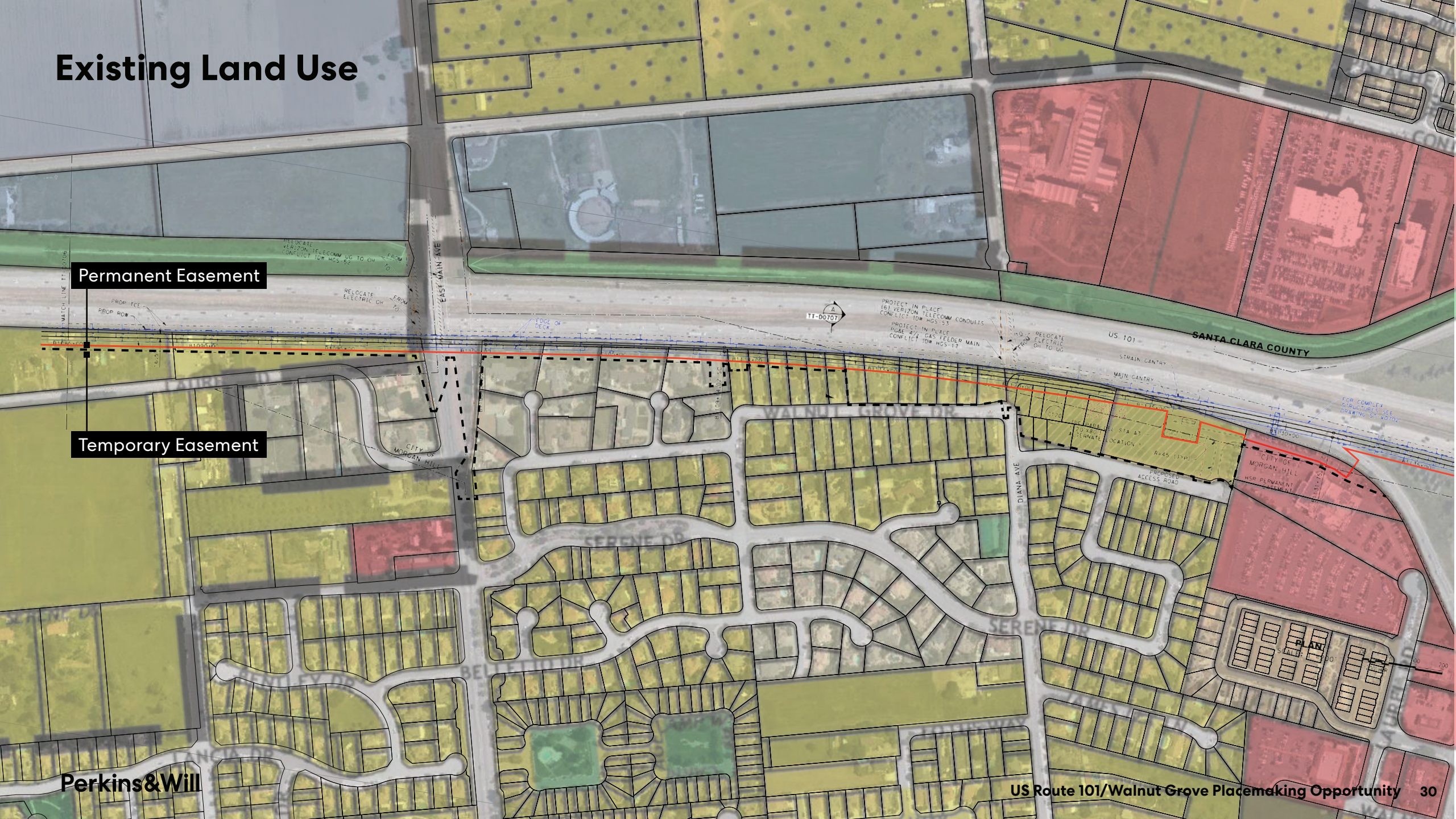
SECTION A
SCALE: 1"=20'
"B" 1113+00

SAN JOSE TO CVY EIR/S: VOLUME III
ALTERNATIVE 1
BOOK 1A
SHEET 16 OF 193

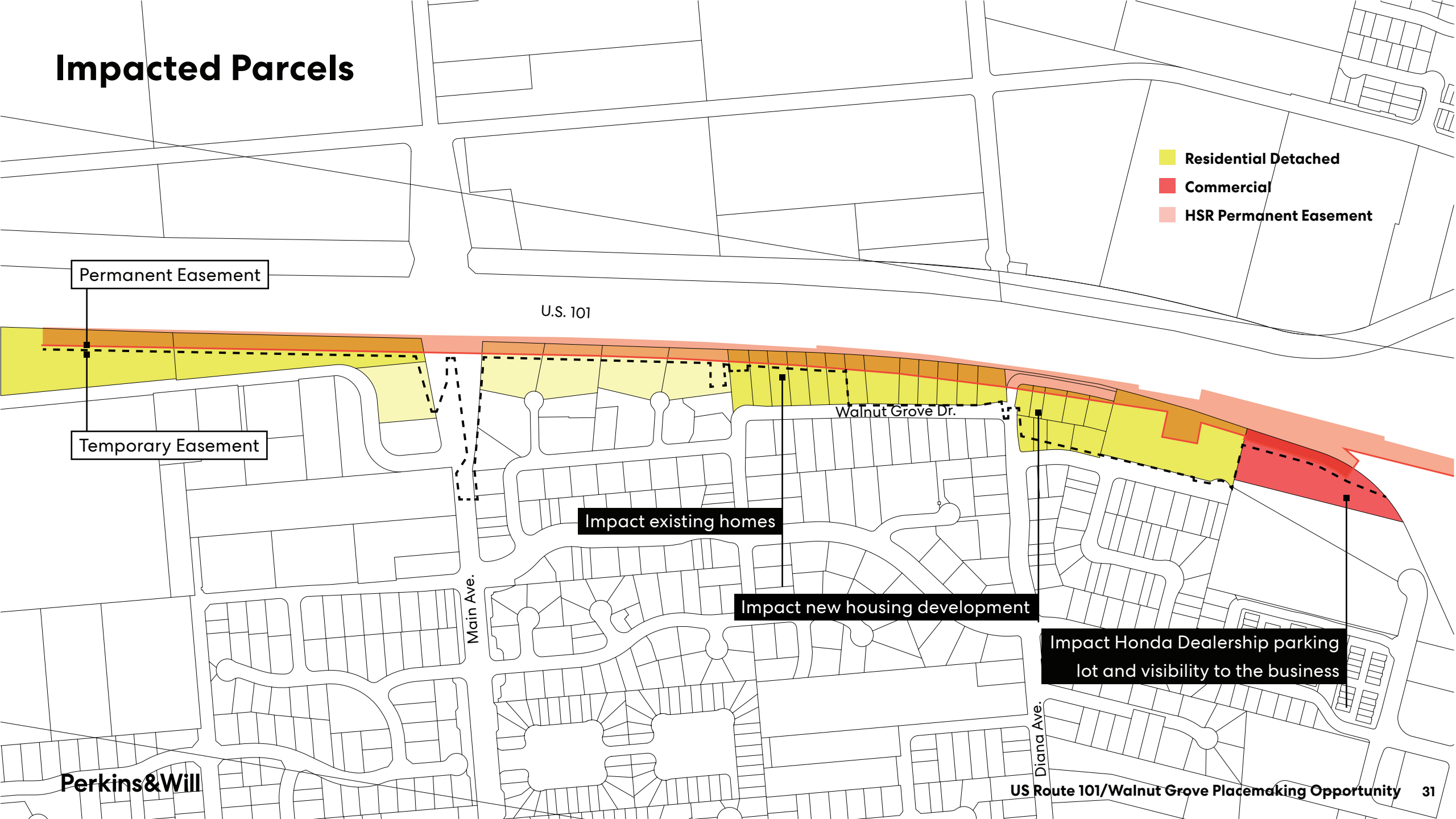
Types of Impacts



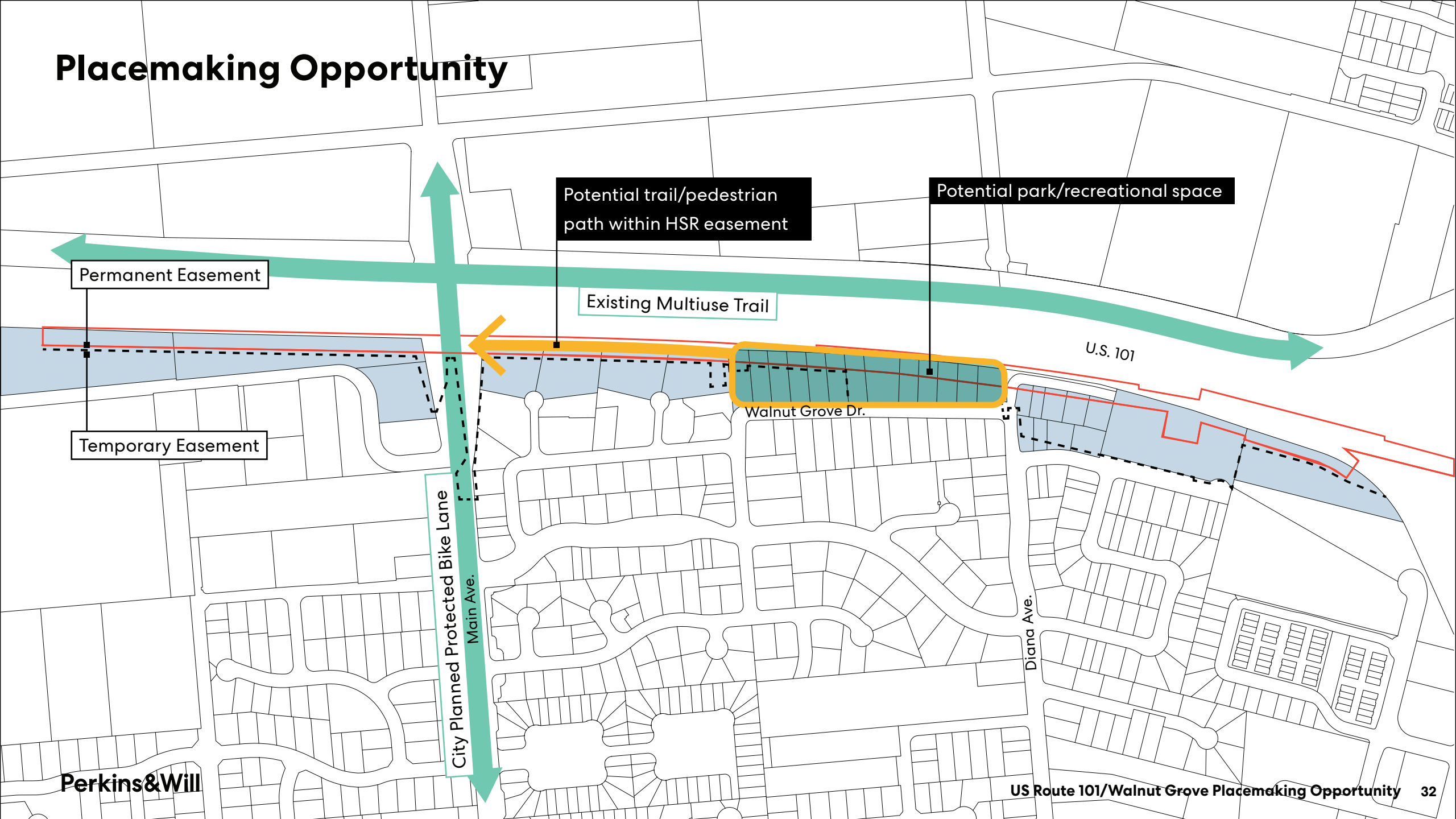
Existing Land Use



Impacted Parcels



Placemaking Opportunity



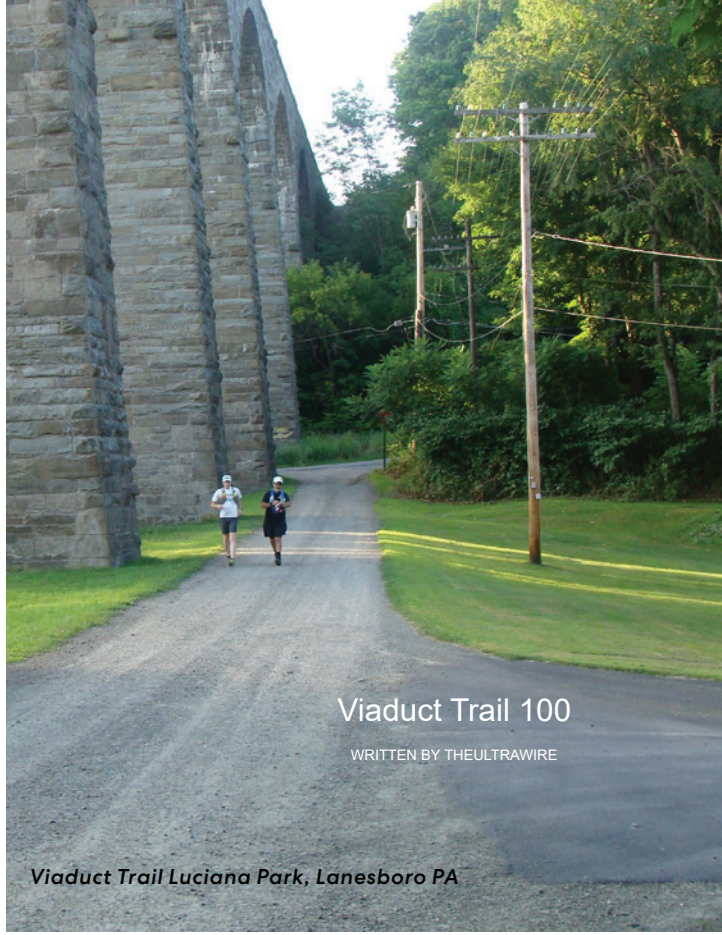
Precedents

The Meadoway, Toronto ON

The Meadoway, Toronto ON

BC Parkway and SkyTrain, Vancouver BC

Ohlone Greenway, Berkeley CA



Viaduct Trail Luciana Park, Lanesboro PA

Precedents

The Underline, Miami FL


StationSoccer at West End Station, Atlanta GA

U.S. 101/Walnut Grove Area Key Takeaways

Impacts

HSR permanent and temporary easements impact **residential properties** along Walnut Grove Drive and **the Honda Dealership** parking lot.

Considerations

Some partial/temporary property impacts might lead to takings. Strategies to **repurpose parcels** affected by building impacts will need to be considered.

The City's proposed bikeway and trail network needs to be considered with respect to the HSR corridor and related public space/ placemaking opportunities to ensure integration.

Recommendations

Consider opportunities for **a park, ball field, or open space** where a group of residential properties might be permanently impacted and become inappropriate for continued private ownership.

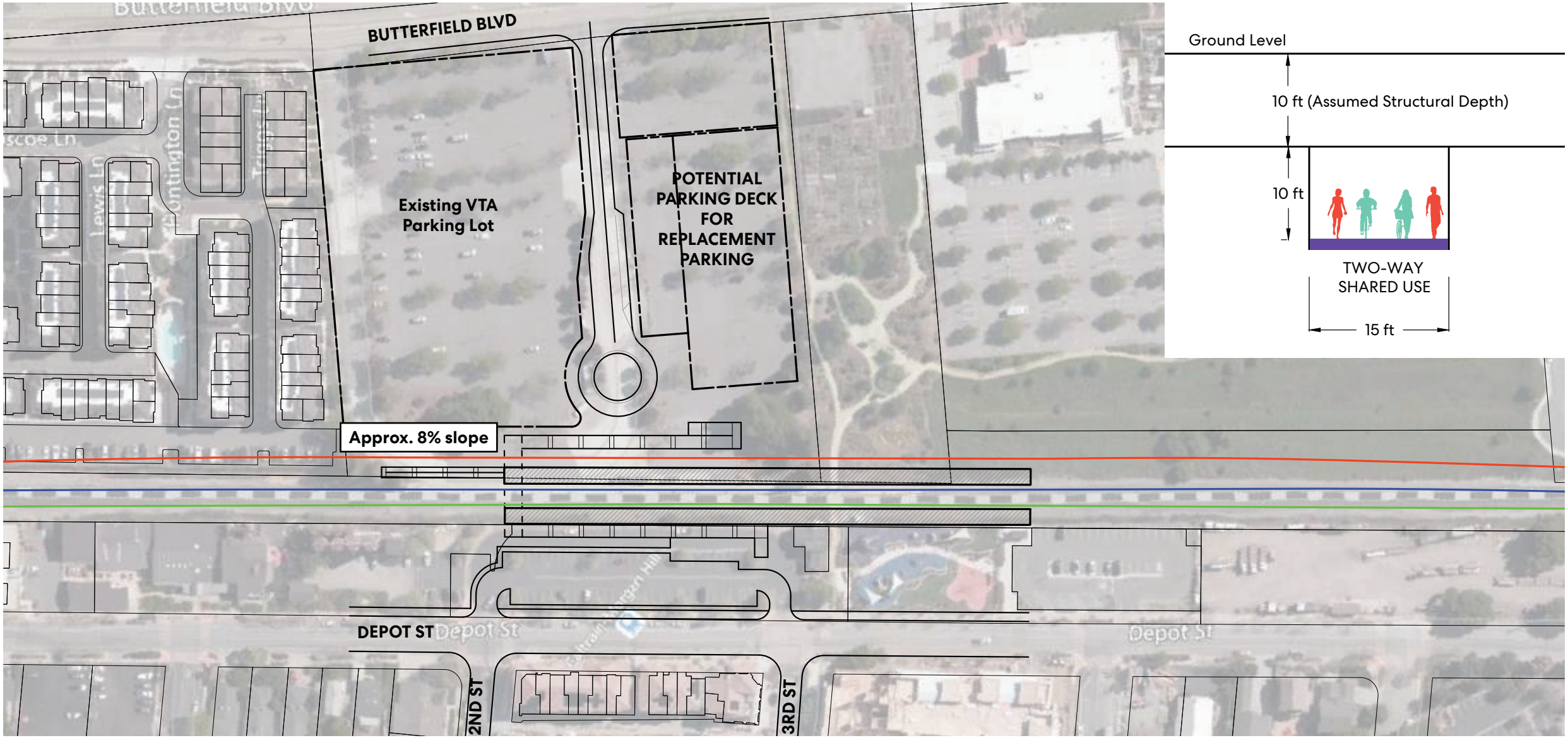
Consider **combining a trail/multiuse path with maintenance vehicle access** to provide residents a local amenity.

Integrate the proposed trail/multiuse path into the City's existing and planned network.

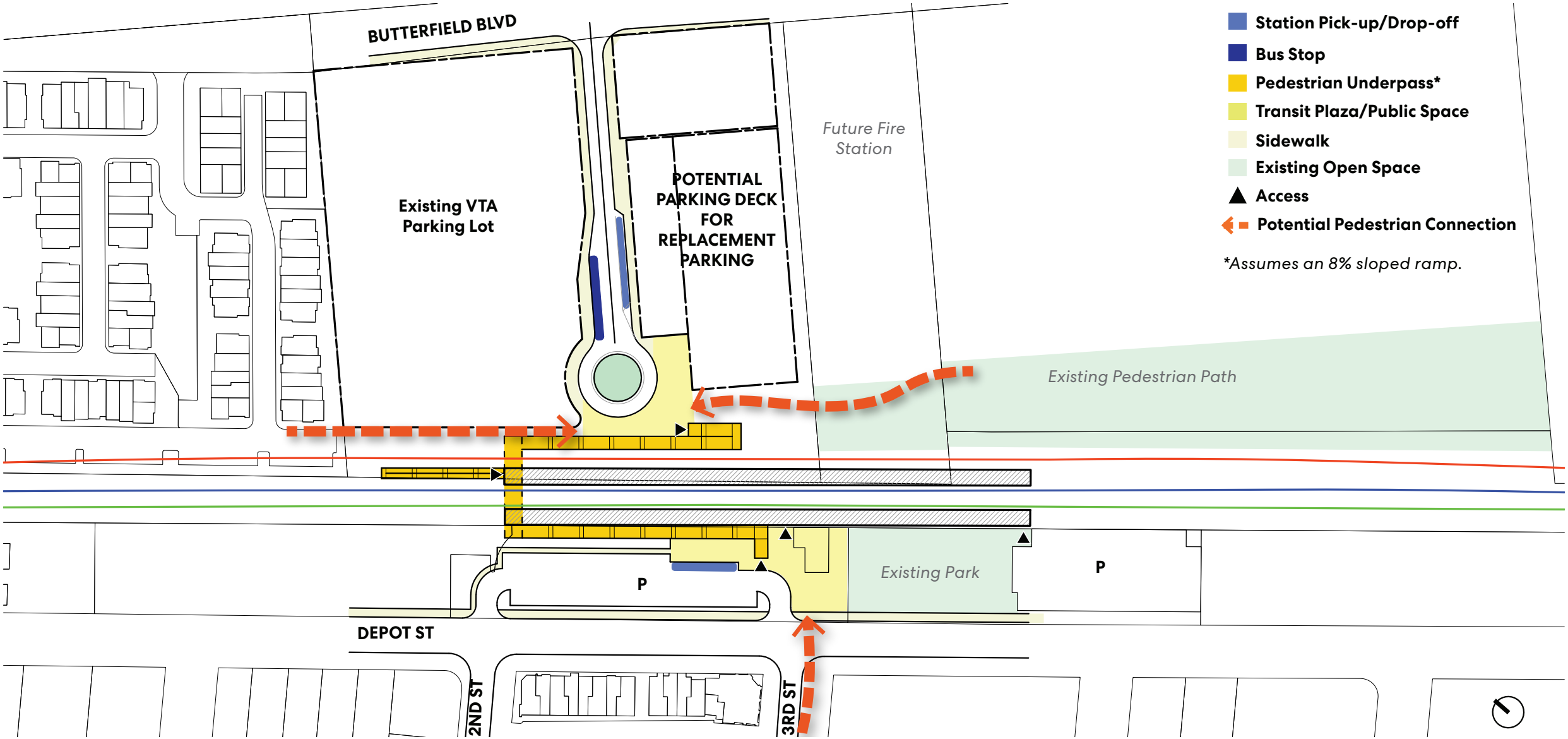
Appendix

Caltrain Station Access Options Assessed

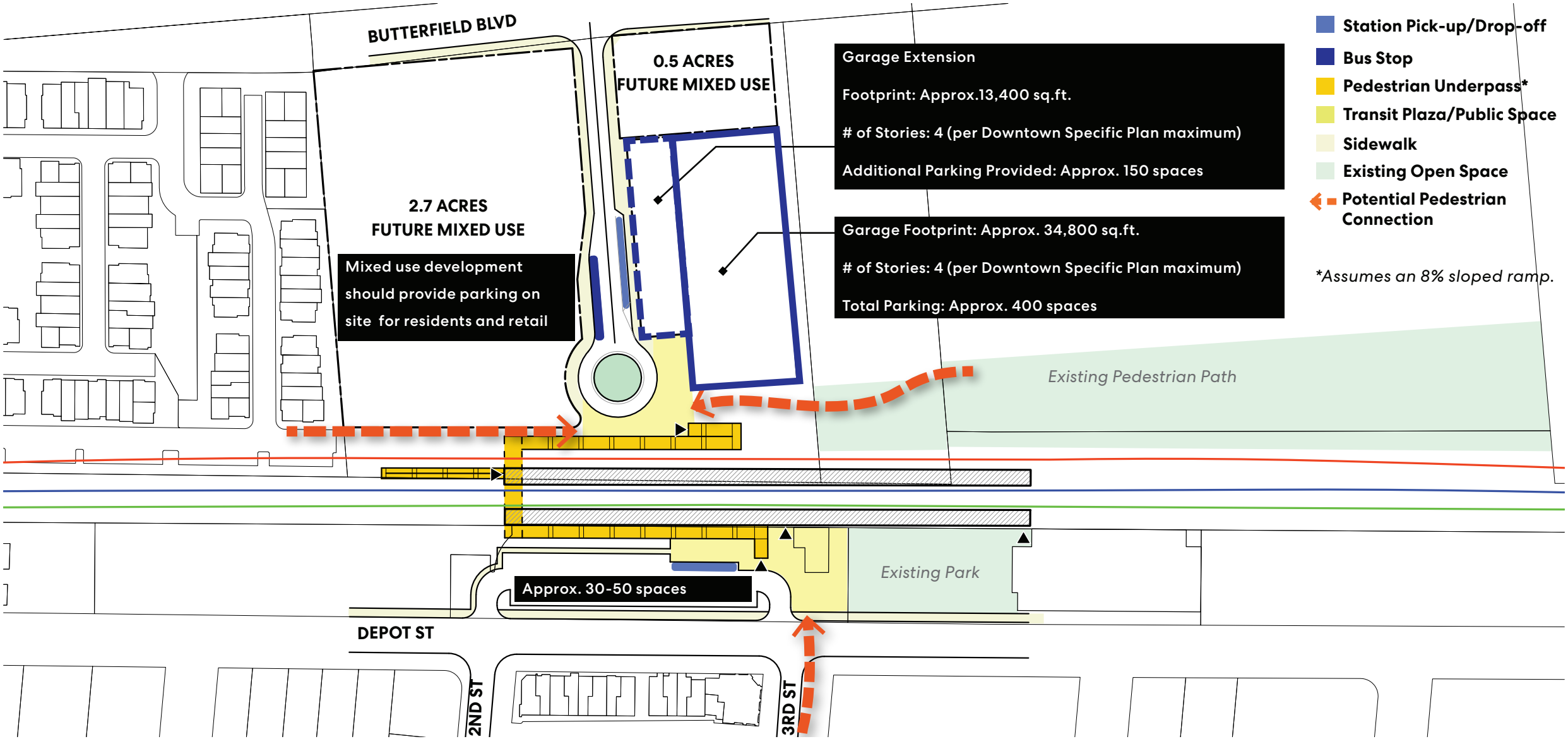
Option 1 - 8%-Slope ADA Compliant Ramp (Baseline)



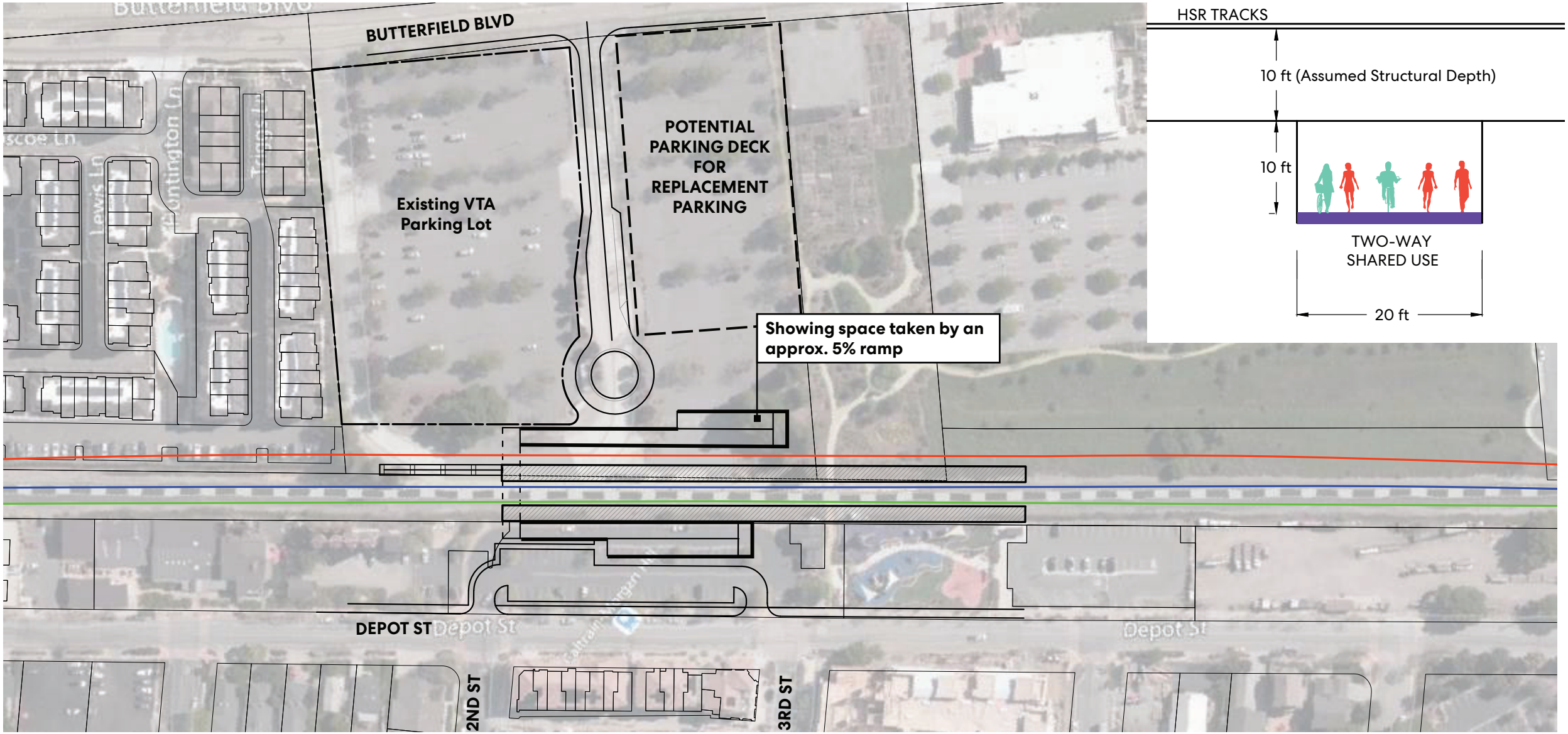
Option 1 - 8%-Slope ADA Compliant Ramp (Baseline)



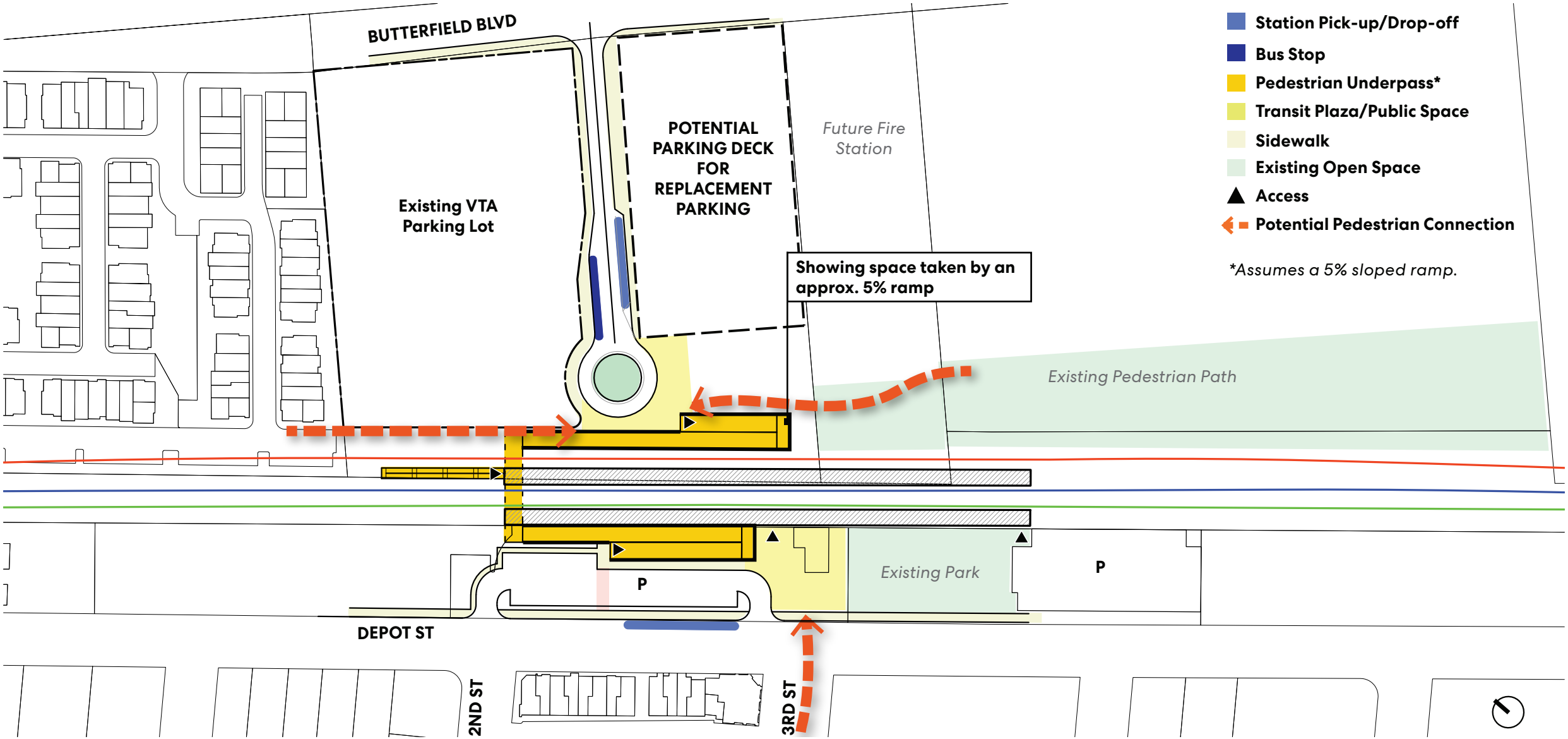
Option 1 - Parking Capacity Estimates



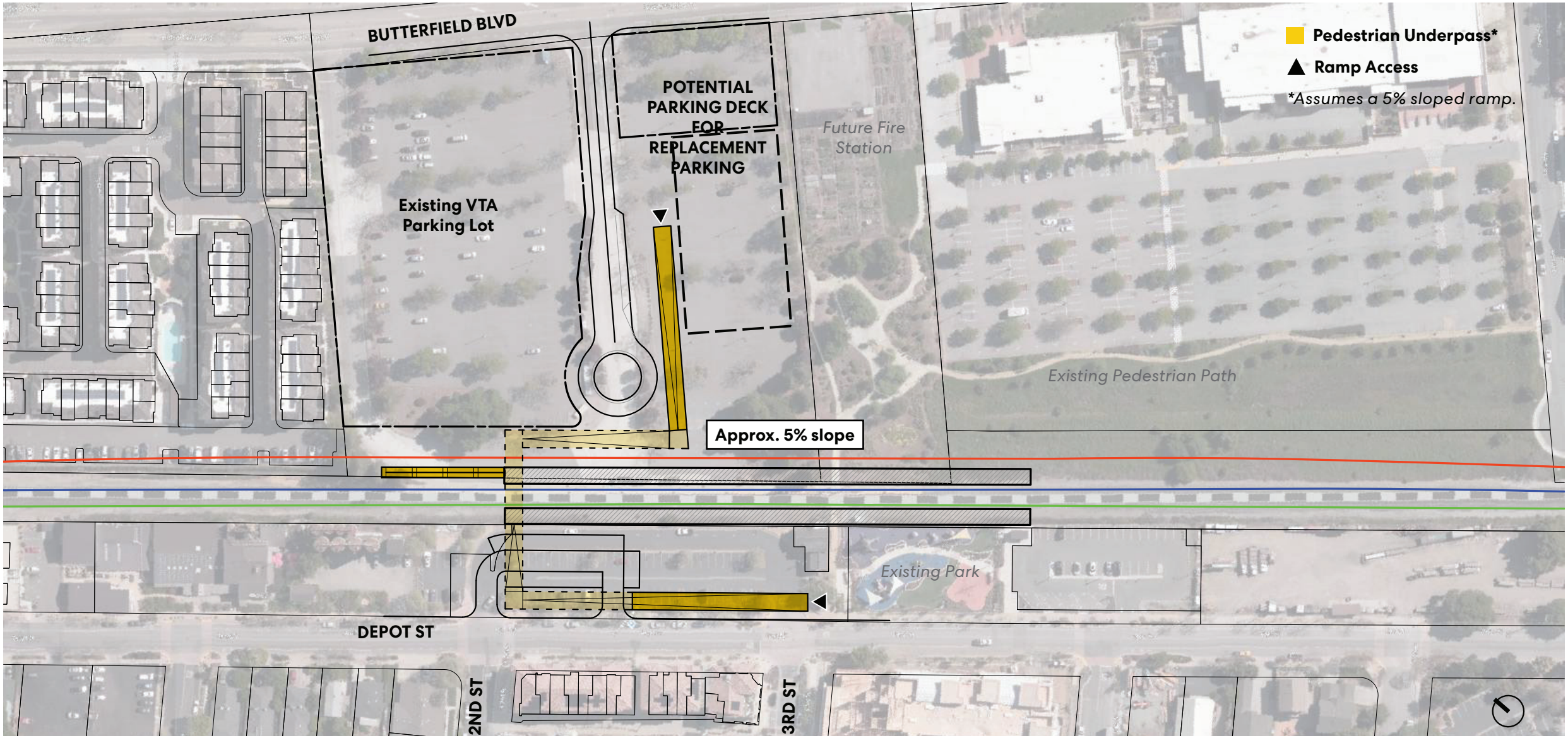
Option 2A - 5%-Slope Bicycle-Friendly Underpass



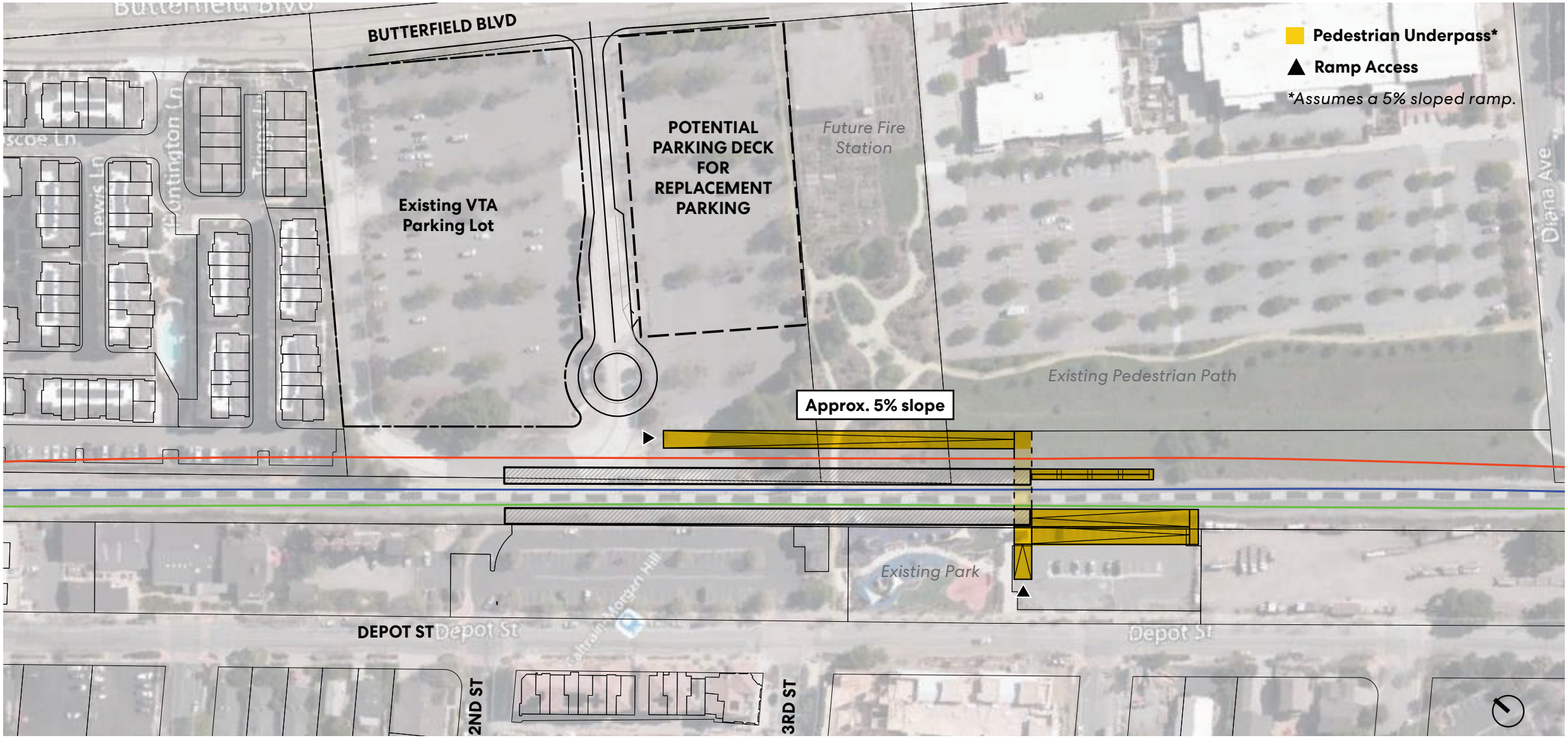
Option 2A - 5%-Slope Bicycle-Friendly Underpass



Option 2B - 5%-Slope Bicycle-Friendly Underpass



Option 3 - 5%-Slope Ramp at Alternative Location



Perkins&Will

CITY OF MORGAN HILL HSR ALIGNMENT ALTERNATIVES

DEIR/EIS TECHNICAL/ENGINEERING REVIEW SUPPORT MEMORANDUM

URBAN DESIGN

PREPARED FOR: CITY OF MORGAN HILL

5/15/2020

Perkins and Will (PW) has reviewed the four alignments proposed in the San Jose to Merced Draft EIR/EIS. Alternative 4, a blended at-grade alignment through the City of Morgan Hill, was identified by the California High-Speed Rail Authority (CHSRA) as their Preferred Alternative in this Draft EIR/EIS.

PW studied the context of existing conditions and known planned projects within Morgan Hill and assessed how well the proposed alternatives align with the City's planning visions and goals. The design elements of each alternative are also evaluated using best urban design practice in creating a safe, comfortable, beautiful and vibrant environment for pedestrian, cyclists and cars with a special emphasis on maintaining the existing and future vitality of the Downtown.

This memo focuses on urban design considerations related to Alternative 4, the CHSRA Preferred Alternative. Other alternatives are reviewed briefly in this urban design analysis due to the following considerations:

- Alternative 2 runs through Morgan Hill Downtown, similar to Alternative 4. However, its alignment and elevated berm requires additional right-of-way outside the existing UPRR right-of-way, causing more property and building impacts than Alternative 4. Furthermore, the raised tracks create a more significant visual barrier visible from downtown streets. Given a raised track profile, Alternative 2 largely excludes any potential at-grade crossings which would cause the closure of Depot Street at Main Avenue to accommodate the grade separation at Main Avenue.

- Alternative 1 and 3 both follow an alignment on a viaduct adjacent to U.S. Route 101 through Morgan Hill. These two alternatives will impact a swath of land including established residential properties along U.S. Route 101 near Walnut Grove Drive. The 60-foot high viaduct will create a negative impact on the character of the residential neighborhood.

1. ALTERNATIVE 4 (CHSRA PREFERRED ALTERNATIVE)

Alternative 4 runs at-grade through Morgan Hill downtown. It is located predominantly in the existing UPRR right-of-way.

Potential Urban Design Impact

- Pedestrian and bicycle access & connectivity

  - Alternative 4 proposes enhanced at-grade crossings at locations where streets are currently crossing the UPRR Corridor at grade. It also maintains the current pedestrian and bicycle infrastructure on existing streets. From a pedestrian and bicycle connectivity perspective, the at-grade crossings do not create significant impacts other than causing delays that could be more significant than existing conditions given the future frequency of service along this corridor. However, other concerns related to traffic and emergency response may drive a decision towards grade separation at Dunne Avenue and Tennant Avenue, which leads to a discussion below about potential design mitigation opportunities related to a grade-separated underpass at these locations.

  - The existing at-grade pedestrian railroad crossing at Caltrain Station and Morgan Hill Playground and Park will be replaced by a pedestrian underpass in Alternative 4. This will enhance safety and also allow for improved bicycle crossing conditions. A well-designed station underpass will not only service Caltrain passengers but also increase pedestrian foot traffic between Butterfield Boulevard and the Downtown.

- Visual impact
    - Alternative 4 has less impact on the visual character of the Downtown than the other three alternatives.
    - Additional evidence is needed to justify CHSRA's statement regarding increased of visual quality in the Aesthetics and Visual Quality section.
- Property and building impacts
    - Alternative 4 has less impact on adjacent properties through Morgan Hill Downtown compared to Alternative 2, which has elevated tracks on a berm following the same alignment as Alternative 4. The slopes of the berm require permanent land-take from properties on both sides of the tracks.
    - Alternative 4 would cause property impacts primarily around the Caltrain Station where the right-of-way is expanded to accommodate an additional station platform. Parking spaces on the VTA lot and the residential property near E Main Avenue will also be impacted.
    - The proposed Caltrain Station pedestrian underpass and ramps with an ADA accessible slope will take up a significant amount of space. The capacity for parking and/or future proposed uses on the station-adjacent parcels will be impacted.

Potential Mitigation Opportunity, Consideration and Recommendation

1. ***Caltrain Station access***

    Considerations

    - The underpass serving Caltrain Station must meet ADA accessible design standards and support bicycle access.
    - The location of the pedestrian underpass should be considered with the planning and design of pedestrian paths, access way, pick-up/drop-off, parking, and future development on the adjacent properties.
    - The design should provide adequate lighting and maximize natural light to enhance security while ensuring energy efficiency. The length of actual tunnel should be minimized.

    Recommendations

    - The tunnel should be minimum 20 feet wide and 10 feet tall with a ground texture or pavers differentiating the zones dedicated to pedestrians and bicycles.
    - A five percent slope is recommended for a continuous access ramp to improve ADA accessibility and to support cyclists.
    - A compact design of the ramps is recommended to allow for future flexibility in the use of the public properties adjacent to the Caltrain Station.

- Provide adequate lighting in the pedestrian underpass. Preserve maximum exposure to daylight through locating the ramps where opening to the sky is possible. Consider integrating landscape features into the design of the ramps to enhance the visual quality of the infrastructure.

2. Dunne Avenue potential grade separation

Considerations

- Dunne Avenue is a primary connection close to Morgan Hill downtown – an integral part of the city's proposed Bikeway, Trails, Parks and Recreation System. A grade-separated underpass provides an opportunity to minimize disruption to pedestrian and bicycle flow.
- The sidewalks and bike lanes along Dunne Avenue should be compliant with ADA standards.
- Mitigation for driveway and building access impacts along Dunne Avenue should be considered.

Recommendations

- Proposed Dunne Avenue grade separation should be designed in coordination with the realignment of Depot Street to connect with Church Street.
- Bicycle lanes and sidewalks should be incorporated into the proposed section of the Dunne Avenue underpass. Physical barriers are recommended between bikes lanes and travel lanes. In the case that a grade difference is needed between the sidewalks and travel lanes in order to maintain ADA compliance, the bike lanes should be located at the sidewalk level.
- Consider creating a public pedestrian path at-grade to preserve existing building access to the homes along the north face of the Larkspur Loop block.

3. Tennant Avenue potential grade separation

Considerations

- The proposed Tennant Avenue grade separation should be taken into consideration the existing Railroad Avenue – Tennant Avenue intersection. Maintaining the intersection below-grade would require a realignment of Railroad Avenue to intersect with the lowered intersection and cause a significant amount of permanent land-take in adjacent properties.
- The sidewalks and bike lanes along Tennant Avenue should be compliant with ADA standards.
- Mitigation for driveway and building access impacts along Tennant Avenue should be considered.

Recommendations

- Bicycle lanes and sidewalks should be incorporated into the proposed section of the Tennant Avenue underpass. Physical barriers are recommended between bikes lanes and travel lanes. In the case that a grade difference is

needed between the sidewalks and travel lanes in order to maintain ADA compliance, the bike lanes should be located at the sidewalk level.

- Railroad Avenue should remain at-grade and terminate in a turnaround just to the north of Tennant Avenue. Although Railroad Avenue will no longer intersect with Tennant Avenue, given that Tennant Avenue will pass below the tracks, it will cause significantly less impact on adjacent properties.

- Create a new easement or an alternative access point to mitigate the impact to properties on the west side of the HSR corridor that currently can only be accessed from Tennant Avenue.

4. Monterey Underpass

Recommendations

- Proposed section of Monterey Road Underpass should incorporate sidewalks and bike lanes.

Attachment C:
Standards of Coverage Assessment volume 1 and Vomune 2

CITYGATE ASSOCIATES, LLC
PUBLIC SAFETY SERVICES

STANDARDS OF COVERAGE ASSESSMENT

VOLUME 1 OF 2: TECHNICAL REPORT

CITY OF GILROY
CITY OF MORGAN HILL
SOUTH SANTA CLARA COUNTY FIRE DISTRICT

NOVEMBER 14, 2019

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gilroy
CITY OF MORGAN HILL

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VOLUME 1 of 2 – Technical Report (this volume)

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VOLUME 2 of 2 – Map Atlas (separately bound)

EXECUTIVE SUMMARY

The Cities of Gilroy and Morgan Hill (Cities) and the South Santa Clara County Fire District (Fire District), collectively referred to as the "Departments," jointly retained Citygate Associates, LLC (Citygate) to conduct a comprehensive Standards of Coverage (SOC) assessment to provide a foundation for future local and regional fire service planning. The goal of this assessment is to identify both current services and desired service levels and then to assess the partner fire agencies' ability to provide them. After understanding any possible gaps in operations and resources, Citygate has provided recommendations to improve regional operations and services over time.

This assessment is presented in several parts, including this Executive Summary outlining the most significant findings and recommendations, and the fire station/crew deployment analysis supported by maps and response statistics. A separate Map Atlas (**Volume 2**) contains all the maps referenced throughout this report. Overall, there are 40 findings and 10 specific action recommendations.

POLICY CHOICES FRAMEWORK

There are no mandatory federal or state regulations directing the level of fire service staffing, response times, or outcomes. Thus, the level of fire protection services provided is a *local policy decision.* Communities have the level of fire services that they can afford, which may not always be the level desired. However, if services are provided at all, local, state, and federal regulations relating to firefighter and citizen safety must be followed.

OVERALL DEPLOYMENT SUMMARY

Citygate finds that the three Departments are well organized to accomplish their mission to serve their respective populations over a varied land use pattern.

Simply stated, fire service deployment is about the *speed* and *weight* of the response. *Speed* refers to initial response (first-due) of all-risk intervention resources (engines, trucks, and/or ambulances) strategically deployed across a jurisdiction for response to emergencies within a time interval to achieve desired outcomes. *Weight* refers to multiple-unit responses (Effective Response Force (ERF) also commonly called a First Alarm) for more serious emergencies such as building fires, multiple-patient medical emergencies, vehicle collisions with extrication required, or technical rescue incidents. In these situations, enough firefighters must be assembled within a reasonable time interval to safely control the emergency and prevent it from escalating into a more serious event.

If desired outcomes include limiting building fire damage to only part of the inside of an affected building and/or minimizing permanent impairment resulting from a medical emergency, then

initial units should arrive within 7:30 minutes from 9-1-1 notification, and a multiple-unit ERF should arrive within 11:30 minutes of 9-1-1 dispatch center notification, all at 90 percent or better reliability. Total response time to emergency incidents includes three distinct components: (1) 9-1-1 call processing/dispatch; (2) crew turnout; and (3) travel. Recommended best practices for these response components are 1:30 minutes, 2:00 minutes, and 4:00/8:00 minutes respectively for first-due and multiple-unit ERF responses in urban areas.

Table 1 shows overall 90th percentile call-to-arrival performance for 2016–2018 by station. As Table 1 shows, none of the station response areas receive service close to the 7:30-minute best practice goal for urban/suburban population densities; however, the Fire District's Masten and Gilroy Gardens stations meet Citygate's best practice goal of 14:00 minutes or less for rural population densities.

Table 1—Call-to-Arrival Performance – 2016–2018 (Taken from Table 20)

Station	90th Percentile Performance
Overall	**9:15**
SC1 – Morgan Hill	9:25
SC2 – Masten[1]	12:34
SC3 – Gilroy Gardens[1]	14:06
MH4 – El Toro	8:31
MH5 – Dunne Hill	9:51
GY7 – Chestnut	8:55
GY8 – Las Animas	8:11
GY9 – Sunrise	8:34
GYSTR – Glen Loma	10:51

Source: Fire Departments' incident records
[1] 14:00-minute call-to-arrival goal for rural response areas

Call processing/dispatch performance is *excellent* for Morgan Hill and the Fire District; however, Gilroy's dispatch performance is about 1:00 minute (66 percent) *slower* than the best practice goal of 90 seconds or less at 90 percent or better reliability. The times in Table 1 also reflect a slower *travel* time than the preferred 4:00 minutes for 90 percent of the incidents in an urban population density, as summarized in Table 2.

Table 2—First-Due Travel Time Performance – 2016–2018 (Taken from Table 19)

Station	90th Percentile Performance
Overall	**6:08**
SC1 – Morgan Hill	6:26
SC2 – Masten[1]	8:50
SC3 – Gilroy Gardens[1]	11:24
MH4 – El Toro	6:01
MH5 – Dunne Hill	7:25
GY7 – Chestnut	5:37
GY8 – Las Animas	5:06
GY9 – Sunrise	5:09
GYSTR – Glen Loma	7:39

Source: Fire Departments' incident records
[1] 10:30-minute travel time goal for rural response areas

The region-wide call-to-arrival response time of 9:15 minutes from 9-1-1 call answer is *significantly slower* than Citygate's recommendation of 7:30 minutes, due to multiple response time challenges in many of the fire station areas.

Overall, Citygate finds that the study partners are facing three primary challenges in the provision of fire services as follows:

Challenge #1—Daily Staffing Capacity

While Citygate considers the three jurisdictions' physical response resources appropriate to protect against the hazards likely to impact each respective jurisdiction, the daily staffing level in each City of 10–12 response personnel provides a total response force only minimally sufficient for a single emerging fire incident or a one- to three-patient emergency medical services (EMS) incident. Even with automatic aid from the Fire District, daily staffing in both Cities barely meets the recommended minimum of 15 personnel including at least one Chief Officer for incident command and safety. A major shopping holiday at the outlet mall or a downtown community event can significantly affect service demand. When high service demand occurs or incident needs require more than the 10–12 on-duty personnel, the Cities are *dependent* on the Fire District to provide both first-due and ERF response staffing capacity. Similarly, the Fire District is *dependent* on one or both Cities for first-due and ERF staffing capacity.

Given increasing annual service demand and the Cities' continuing growth, Citygate is concerned about overall daily staffing and the Cities' ability to respond with more *weight of response* and to

also have sufficient capacity for concurrent incidents. Thus, in Citygate's opinion, both Cities are *understaffed* to provide a suitable *weight of response* and capacity for concurrent incidents, and Citygate recommends that each City construct and staff an additional station as soon as fiscally feasible.

CHALLENGE #2—FIRE STATION LOCATIONS

Overall longer-than-desired first-due *travel* times shown in Table 2 are due to current fire station spacing, the non-grid street network design in some areas of each jurisdiction, gated/limited access communities, topography, natural and built barriers (hills and the highways), simultaneous incidents at peak hours of the day, and traffic congestion.

If desired outcomes include limiting building fire damage to only part of the inside of an affected building and/or minimizing permanent impairment resulting from a medical emergency, then both Cities should have travel time coverage to provide a Citygate-recommended *total* response time goal of 7:30 minutes or less for the first-due unit, and 11:30 minutes or less for a multiple-unit ERF response, all from 9-1-1 dispatch notification at 90 percent or better reliability. As the geographic mapping discussed in Section 2.6.1 shows, the stations are appropriately located in all major neighborhoods; however, they are spaced too far apart to provide the desired first-due and ERF travel time coverage. Thus, in Citygate's opinion, the two Cities have grown past their current station spacing, and quicker dispatch processing and turnout times cannot resolve the longer-than-desired travel times and traffic congestion—only an additional fire station in each City can.

Gilroy has implemented a pilot Alternative Service Model (ASM) study that provides a two-person Type-1 ambulance or Type-6 wildland fire engine for EMS calls in the newly developing Glen Loma area of the City. Citygate recommends that the ASM be continued until the City constructs and staffs a permanent fourth fire station in that area as soon as fiscally feasible.

Citygate also recommends that Morgan Hill construct and staff a third fire station in the central section of the City as soon as fiscally feasible. Potential interim steps to this goal include staffing the truck with three additional personnel daily as a third City unit, and/or dynamic deployment of a two-person Type-6[1] all-risk unit in central Morgan Hill during peak service demand hours.

The Fire District's Station #3 at Gilroy Gardens is poorly located within the City of Gilroy to serve its primary first-due response area along the west Highway 152 corridor and northwest generally along the Watsonville Road corridor. Should the District decide to relocate this station to a more suitable location further west or northwest of Gilroy, it would significantly impact first-due and ERF capacity and travel time coverage for Gilroy. Because of this, Citygate strongly encourages

[1] 18,000- to 20,000-pound GVW truck chassis with utility body, fire pump, water tank, and hose. May also be equipped to provide ALS/BLS EMS and initial rescue services.

the District and City to collaborate on future service delivery in this area of the City and District, including evaluating potential shared service opportunities such as cost-sharing a fire station to serve both jurisdictions similar to an arrangement between Morgan Hill and the Fire District.

While the Fire District's Masten station provides good first-due and ERF travel time coverage in all directions, an alternate location in the vicinity of the South Santa Clara County Airport would provide improved response time to the airport, San Martin, and Morgan Hill; however, it would increase response times into Gilroy and Fire District areas east of Gilroy. Any consideration to relocate this station should thus include both Cities.

Challenge #3—Mutual Aid Isolation

While the three fire agencies have automatic aid agreements that provide for the dispatch of the closest first-due and ERF response resource(s) regardless of jurisdiction, they are poorly located geographically for prompt additional mutual aid. Thus, mutual aid cannot realistically be provided in a timely manner by Watsonville or the Pajaro Valley Fire District from the west, Hollister or the Aromas Tri-County Fire District from the south, CAL FIRE (when available) from the east, or San Jose from the north unless southern San Jose units are available and do not encounter traffic congestion on southbound U.S. 101. The three jurisdictions are essentially self- or co-reliant to provide the resources needed to resolve all but the most catastrophic emergencies without outside assistance. Such physical isolation, combined with fiscal realities that prevent any one jurisdiction from being able to afford a service level providing enough resources and staffing to handle all calls for service without assistance, makes a cooperative service delivery model that maximizes utilization of the combined resources to provide optimal operational and fiscal effectiveness and efficiency the best long-term alternative for all three jurisdictions.

Key Findings and Recommendations

Following are the key findings and all recommendations from this study. This is not a comprehensive list of each finding throughout the report, thus the finding numbers in this section are not continuous. A full list of all findings and recommendations can be found in Section 4 of this report.

Finding #14: First unit travel time for Gilroy is about 1:00 minute (25 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities, but only slightly (11–22 percent) slower than the Department's current 4:30-minute goal except for the Glen Loma / Santa Teresa area, where travel time is more than 3:00 minutes (67 percent) *slower* than the current 4:30-minute goal, and more than 3:30 minutes (87 percent) *slower* than the recommended 4:00-minute goal.

Finding #15: First unit travel time for Morgan Hill is 2:00–3:25 minutes (50–87 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities.

Finding #16: First unit travel time from the Fire District's Masten station meets a Citygate-recommended goal of 10:30 minutes or less for rural zones and is 1:00 minute (10 percent) *slower* than the goal from the Gilroy Gardens station. First unit travel time from the Morgan Hill station is 2:26 minutes (62 percent) *slower* than the 4:00-minute goal for urban/suburban population densities.

Finding #17: Call-to-arrival response performance in Gilroy, Morgan Hill, and the Fire District's Morgan Hill station is nine percent to 45 percent *slower* than Citygate's recommended 7:30-minute goal for urban/suburban response zones. Call-to-arrival performance from the Fire District's Masten and Gilroy Gardens stations *meets* Citygate's recommended 14:00-minute goal for rural areas.

Finding #18: Effective Response Force (ERF or First Alarm) call-to-arrival performance is *significantly slower* than the Citygate-recommended goal of 11:30 minutes for urban/suburban areas, except in the Glen Loma station area in Gilroy which is 9:38 minutes. Also, ERF performance *meets* the Citygate-recommended *rural* response goal of 19:30 minutes for the Fire District's Masten station response area.

Finding #19: Gilroy and Morgan Hill do not deploy enough firefighters daily to safely resolve even a single serious fire or EMS incident, nor to provide adequate capacity for simultaneous incidents.

Finding #20: Gilroy and Morgan Hill are dependent on Fire District resources to achieve a minimal Effective Response Force staffing of 14 personnel.

Finding #21: Gilroy and the Fire District receive mutual benefit from their current automatic aid agreement.

Finding #22: Morgan Hill and the Fire District receive mutual benefit from their current cost-shared engine and automatic aid agreement.

Finding #23: The three jurisdictions are poorly located geographically for prompt mutual aid other than from each other.

Finding #24: The three jurisdictions are essentially self- or co-reliant to provide the response resources to resolve all but the most catastrophic emergencies without outside assistance.

Finding #28: Citygate projects service demand will continue to increase approximately 2–5 percent annually over the next 16–21 years (2035–2040), with EMS service demand increasing at a slightly higher 3–6 percent annually and comprising an increasing percentage of total service demand.

Finding #29: The City of Gilroy is geographically too large to effectively provide recommended service levels from its three existing fire stations and Fire District Station #3 at Gilroy Gardens.

Finding #30: A fourth fire station in southwest Gilroy would improve five deployment needs including first-due travel time coverage, daily Citywide staffing, multiple-unit Effective Response Force (ERF) staffing, travel time coverage during traffic congestion periods, and reduced dependence on the Fire District's Station #3 at Gilroy Gardens for first-due and ERF capacity and staffing.

Finding #31: If the Fire District relocates the Gilroy Gardens station further west, it will impact first-due and Effective Response Force capacity, staffing, and travel time coverage for Gilroy.

Finding #32: The City of Morgan Hill is geographically too large to effectively provide recommended service levels from its two existing fire stations and shared Fire District Station #1.

Finding #33: The risks in Morgan Hill, combined with projected future growth, justify a dedicated minimum daily City staffing level of nine personnel, with 12 total personnel daily including the Fire District's Morgan Hill engine.

Finding #34: A third fire station in central Morgan Hill would improve Citywide daily staffing capacity and both first-due and Effective Response Force travel time coverage.

Finding #37: Relocation of the Fire District's Masten station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Finding #38: Relocation of the Fire District's Gilroy Gardens station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Finding #39: A cooperative fire service model that maximizes utilization of the combined three fire agency jurisdictions' resources is the best alternative going forward for efficient and cost-effective delivery of fire services in south Santa Clara County.

Finding #40: Close collaboration between Gilroy, Morgan Hill, and the Fire District is critical to establishing and maintaining a cooperative regional fire service delivery model that maximizes utilization of the combined jurisdictions' resources to provide long-term operational and fiscal efficiencies.

Recommendation #1: **Adopt Updated Deployment Policies:** The Departments' elected officials should adopt *updated*, complete performance measures to aid deployment planning and to monitor performance. The measures of time should be designed to deliver outcomes that will save patients when possible upon arrival and to keep small but serious fires from becoming more serious. With this is mind, Citygate recommends the following measures:

1.1 Distribution of Fire Stations: In *urban/suburban* population density areas, to treat pre-hospital medical emergencies and control small fires, the first-due unit should arrive within 7:30 minutes, 90 percent of the time from the receipt of the 9-1-1 call at fire dispatch. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 4:00-minute travel time.

In rural population density areas, the first-due unit should arrive within 14:00 minutes from the receipt of the 9-1-1 call at fire dispatch at 80 percent or better reliability. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 10:30-minute travel time.

1.2 Multiple-Unit Effective Response Force (ERF) for Serious Emergencies: In *urban/suburban* population density areas, to confine building fires near the room of origin, keep vegetation fires under one acre in size, and treat multiple medical patients at a single incident, a multiple-unit ERF of at least 17 personnel, including two Battalion Chiefs, should arrive within 11:30 minutes from the time of 9-1-1 call receipt at fire dispatch 90 percent of the time. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and an 8:00-minute travel time.

For *rural* population density areas, a multiple-unit ERF of at least 13 personnel, including at least one Battalion Chief, should arrive within 19:30 minutes from the time of 9-1-1 call receipt at fire dispatch 80 percent of the time. This equates to a 90-second

dispatch time, a 2:00-minute crew turnout time, and a 16:00-minute travel time.

1.3 Hazardous Materials Response: Provide hazardous materials response designed to protect the communities from the hazards associated with uncontrolled release of hazardous and toxic materials. The fundamental mission of the Departments' response is to isolate the hazard, deny entry into the hazard zone, and notify appropriate officials/resources to minimize impacts on the community. This can be achieved with a first-due total response time of 7:30 minutes or less to provide initial hazard evaluation and/or mitigation actions. After the initial evaluation is completed, a determination can be made whether to request additional resources from the regional hazardous materials team.

1.4 Technical Rescue: Respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue with a first-due total response time of 7:30 minutes or less to evaluate the situation and/or initiate rescue actions. Following the initial evaluation, assemble additional resources as needed within a total response time of 11:30 minutes to safely complete rescue/extrication and delivery of the victim to the appropriate emergency medical care facility.

Recommendation #2: Gilroy needs to work to substantially lower dispatch processing times, and Morgan Hill and the Fire District need to work to lower crew turnout times.

Recommendation #3: The City of Gilroy should construct a fourth fire station in the southwest Glen Loma area of the City, and staff it with a full-time three-person crew as soon as fiscally feasible.

Recommendation #4: The City of Gilroy should continue the current pilot Alternative Service Model until such time as the Glen Loma station is constructed and staffed with a full-time crew.

Recommendation #5: The City of Gilroy and the Fire District should continue to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Recommendation #6: The City of Morgan Hill should construct and staff a third fire station in the central section of the City as soon as fiscally feasible; or incrementally staff the truck with three personnel as a fourth unit, or dynamically deploy a two-person Peak Activity Unit during peak service demand periods.

Recommendation #7: Morgan Hill and the Fire District should continue to collaborate to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Recommendation #8: The Fire District should collaborate closely with both Cities relative to any potential station relocations.

Recommendation #9: Gilroy, Morgan Hill, and Fire District leadership should establish desire and intent as soon as possible to provide cooperative fire services for many decades, perhaps through a formal Memorandum of Understanding.

Recommendation #10: Given the desire and intent to jointly provide cooperative fire services for many decades, the three jurisdictions should establish a joint strategic planning team with policy-level direction to evaluate potential cooperative service elements for approval by the respective policy bodies, and then to conduct the detailed implementation planning necessary.

NEXT STEPS

Citygate's recommended immediate next steps for Gilroy, Morgan Hill, and the Fire District are:

- Review and absorb the content, findings, and recommendations of this study
- Prepare a staff report and draft Resolution for each City Council and the Fire District Board of Commissioners to adopt the included recommended response performance goals
- Determine interest and intent to provide long-term joint cooperative fire services in south Santa Clara County
  - Consider a Memorandum of Understanding to memorialize such intent.

Recommended intermediate-term next steps include:

- Monitor response performance and unit workload at least annually

- Establish a joint agency strategic planning team with policy-level direction to evaluate potential cooperative service opportunities, including, but not limited to, fire crew staffing, deployment, cost sharing, and fire dispatch services, with the intent to develop a mutually beneficial long-term commitment and solution that optimizes the use of all three jurisdictions' resources to provide efficient and cost-effective fire services in south Santa Clara County.

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SECTION 1—INTRODUCTION AND BACKGROUND

The Cities of Gilroy and Morgan Hill (Cities) and the South Santa Clara County Fire District (Fire District), jointly retained Citygate Associates, LLC (Citygate) to conduct a comprehensive Standards of Coverage (SOC) assessment to provide a foundation for future fire service planning. The goal of this assessment is to identify both current services and desired service levels, and then to assess the partner agencies' abilities to provide them. Citygate's scope of work and corresponding Work Plan were developed consistent with Citygate's Project Team members' experience in fire administration and deployment. Citygate utilizes various National Fire Protection Association (NFPA) and Insurance Services Office (ISO) publications as best practice guidelines, along with the self-assessment criteria of the Commission on Fire Accreditation International (CFAI).

1.1 REPORT ORGANIZATION

This report is organized into the following sections. **Volume 2** (Map Atlas) is separately bound.

Executive Summary: A summary of current services and significant future challenges, key findings and recommendations, and next steps.

Section 1 **Introduction and Background:** An introduction to the study and background facts about the three jurisdictions.

Section 2 **Standards of Coverage Assessment:** An overview of the SOC process and detailed analysis of existing deployment policies, outcome expectations, critical tasks, distribution and concentration effectiveness, reliability and historical response effectiveness, and overall deployment evaluation.

Section 3 **Future Service Needs and Alternative Service Models:** Quantification of future service demand and related service needs based on projected community growth and development, and identification and evaluation of potential alternative service delivery models.

Section 4 **Findings and Recommendations:** A comprehensive list of all findings and recommendations in this report.

Section 5 **Next Steps:** Recommended immediate and intermediate-term next steps.

Appendix A **Community Risk Assessment:** A comprehensive assessment of hazards likely to impact the community, probability of a hazard occurrence, likely impact severity resulting from a hazard occurrence, and overall risk by hazard type.

1.1.1 Goals of the Report

This report cites findings and makes recommendations, as appropriate, related to each finding. Findings and recommendations throughout this report are sequentially numbered. A complete list of these findings and recommendations is provided in Section 4.

This document provides technical information about how fire services are provided and legally regulated and how the three study partner agencies currently operate. This information is presented in the form of recommendations and policy choices for consideration by each respective City Council and the Fire District Board of Commissioners.

The result is a solid technical foundation upon which to understand the advantages and disadvantages of the choices facing the Cities' and Fire District's leadership regarding the best way to provide fire services and, more specifically, at what level of desired outcome and expense.

1.1.2 Limitations of Report

In the United States, there are no federal or state regulations requiring a specific minimum level of fire services. Each community, through the public policy process, is expected to understand the local fire and non-fire risks and its ability to pay, and then choose its level of fire services. *If* fire services are provided, federal and state regulations specify how to safely provide them for the public and for the personnel providing the services.

While this report and technical explanation can provide a framework for a discussion of how to best provide fire services in south Santa Clara County, neither this report nor the Citygate team can make the final decisions, nor can they cost out every possible alternative in detail. Once final strategic choices receive policy approval, City and Fire District staff can conduct any final costing and fiscal analyses as typically completed in their normal operating and capital budget preparation cycle.

1.2 Project Approach and Scope of Work

1.2.1 Project Approach and Research Methods

Citygate utilized multiple sources to gather, understand, and model information about the Cities and the Fire District. Citygate initially requested a large amount of background data and information to better understand current costs, service levels, history of service level decisions, and other prior studies.

In subsequent site visits, Citygate performed focused interviews of the project team members and other project stakeholders. Citygate reviewed demographic information about the Cities and Fire District, including the potential for future growth and development. Citygate also obtained map and response data from which to model current and projected fire service deployment with the goal

to identify the location(s) of stations and crew quantities required to best serve the Cities and Fire District as they currently exist and to facilitate future deployment planning.

Once Citygate gained an understanding of the three service areas and their fire and non-fire risks, the Citygate team developed a model of fire services that was tested against the travel time mapping and prior response data to ensure an appropriate fit. Citygate also evaluated future growth potential and service demand by risk type and evaluated potential alternative emergency service delivery models. This resulted in Citygate proposing an approach to address current and long-range needs with effective and efficient use of existing resources. The result is a framework for enhancing fire services while meeting reasonable community expectations and fiscal realities.

1.2.2 Project Scope of Work

Citygate's approach to this SOC assessment involved:

- Reviewing information provided by the three jurisdictions and conducting listening sessions with project stakeholders
- Utilizing FireView™, a geographic mapping software program, to model fire station travel time coverage
- Using StatsFD™, an incident response time analysis program, to review the statistics of prior incident performance and plot the results on graphs and geographic mapping exhibits
- Identifying and evaluating future population and related development growth
- Identifying and evaluating potential alternative service delivery models
- Recommending appropriate risk-specific response performance goals.

1.3 STUDY AREA OVERVIEW

The City of Gilroy, which incorporated as a charter city in March 1870, is located 70 miles south of San Francisco at the southern end of Santa Clara County. Best known as the Garlic Capital of the World and home to the annual Garlic Festival each July, the City encompasses 16 square miles with a 2017 population of just over 54,000, which is projected to grow by up to 10 percent over the next five years. While the City's economy has historically centered on agricultural products and processing, Silicon Valley technology has more recently expanded south to Gilroy. The City is also home to more than 145 Premium Outlet stores, as well as Gavilan Community College.[2]

[2] Reference: City of Gilroy website and 2020 General Plan

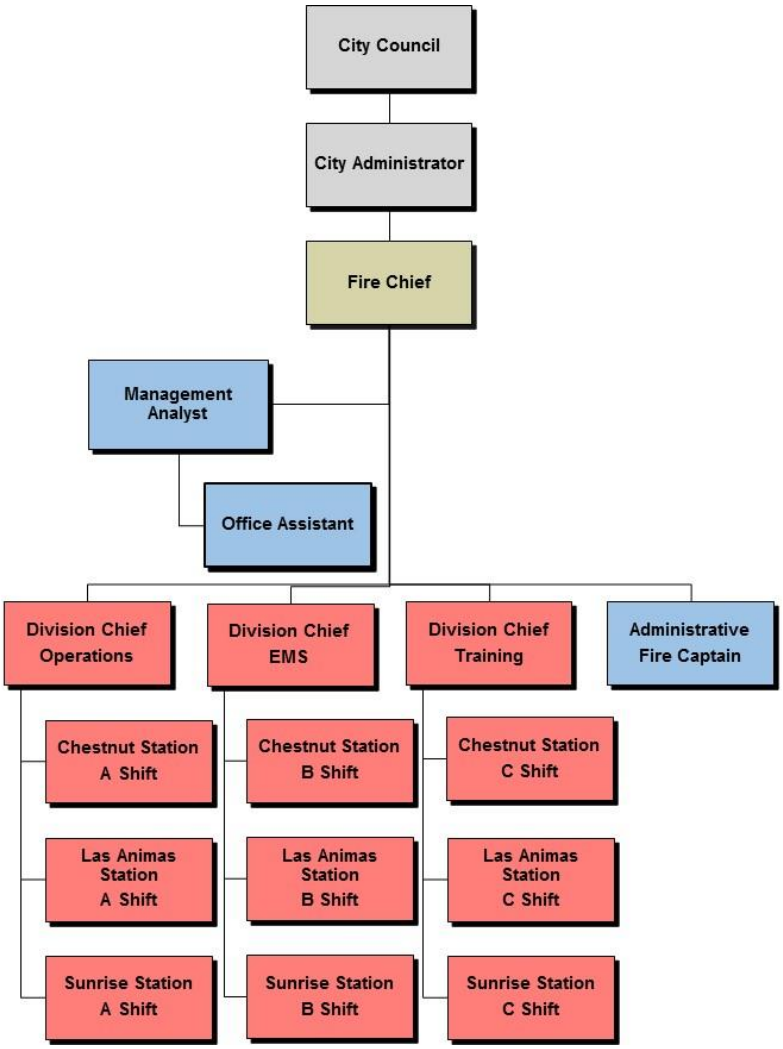
The City of Morgan Hill, incorporated in 1906, is located 12 miles north of Gilroy and 22 miles south of San Jose along U.S. 101. Known as one of the last communities in the region with a charming small-town atmosphere, Morgan Hill encompasses nearly 13 square miles with a 2017 population of just over 43,000 residents. The City's economy began transitioning in the 1950s from an agricultural center to more of a suburban residential community, although several technology companies as well as research and development firms and other industries are based in Morgan Hill.

The South County Fire Protection District of Santa Clara County, generally known as the South Santa Clara County Fire District, was formed in 1980 through consolidation of the Gilroy and Morgan Hill Rural Fire Districts. Encompassing approximately 432 square miles of unincorporated Santa Clara County in the areas of Gilroy, Morgan Hill, and San Martin, the Fire District serves a suburban/rural population of approximately 40,300. The Fire District is a dependent District of the County governed by the Board of Supervisors as the District Board of Directors, and a seven-member Board of Commissioners appointed by the Santa Clara County District 1 Supervisor.

1.4 Fire Agencies Overview

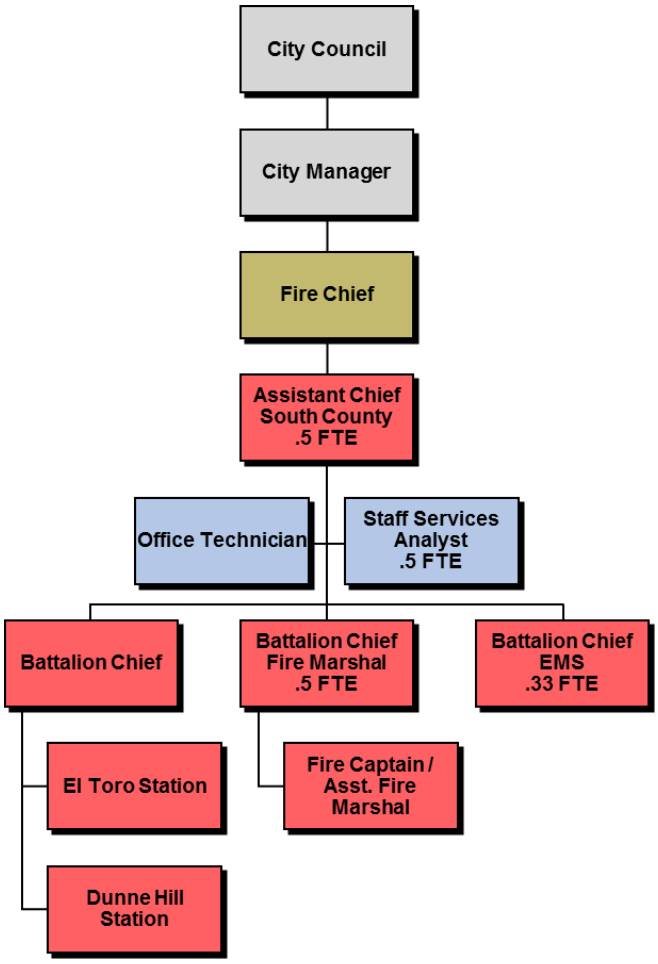
The Gilroy Fire Department, operating under authority of the Gilroy City Charter, provides all-risk fire, rescue, and Advanced Life Support (ALS) pre-hospital emergency medical services with a staff of 42 personnel, including a daily response force of nine personnel staffing three Type-1 structural fire engines and one Division Chief from the City's three fire stations. The Department's administrative staff consists of seven personnel including the Fire Chief, three Division Chiefs, an Administrative Fire Captain, a Management Analyst, and an Office Assistant as summarized in Figure 1.

Figure 1—Gilroy Fire Department



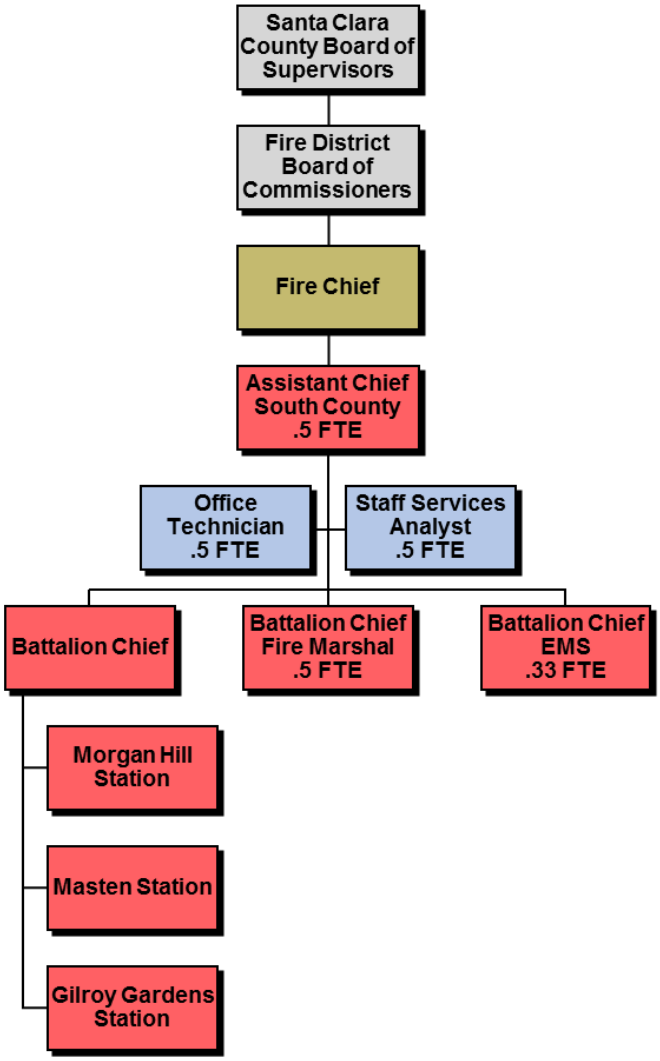
The City of Morgan Hill contracts with the California Department of Forestry and Fire Protection (CAL FIRE) to staff and operate its Fire Department. Operating under authority of California Government Code Section 38611, the Morgan Hill Fire Department provides all-risk fire, rescue, and ALS pre-hospital emergency medical services with a staff of 27.33 personnel, including a daily response force of six personnel staffing two Type-1 structural fire engines and one Battalion Chief from the City's two fire stations. The Department's administrative staff consists of five personnel including a shared CAL FIRE Assistant Chief, one CAL FIRE Battalion Chief, a shared Battalion Chief/Fire Marshal, one Office Technician, and a shared Staff Services Analyst as summarized in Figure 2.

Figure 2—Morgan Hill Fire Department



The Fire District also contracts with the California Department of Forestry and Fire Protection (CAL FIRE) to staff and manage Fire District facilities and functions. Operating under authority of California Health and Safety Code Section 13800, known as the Fire Protection District Law of 1987, the Fire District provides all-risk fire, rescue, and ALS pre-hospital emergency medical services with a staff of 25.83 personnel, including a daily response force of nine personnel staffing three Type-1 structural fire engines and one Battalion Chief from the Fire District's three fire stations. The Fire District's administrative staff consists of five personnel including a shared CAL FIRE Assistant Chief, one CAL FIRE Battalion Chief, a shared Battalion Chief/Fire Marshal, one Office Technician, and a shared Staff Services Analyst as summarized in Figure 3.

Figure 3—South Santa Clara County Fire District



Response personnel for all three agencies are trained to either the Emergency Medical Technician (EMT) level capable of providing Basic Life Support (BLS) pre-hospital emergency medical care, or the EMT-Paramedic (Paramedic) level capable of providing ALS pre-hospital emergency medical care. Ground Paramedic ambulance service is provided by Santa Clara County Ambulance, now a division of American Medical Response (AMR) (previously Rural/Metro), a private-sector ambulance provider operating under a non-exclusive operating area contract administered by the Santa Clara County Emergency Medical Services Agency. Air ambulance services, when needed, are provided by CALSTAR (Gilroy) and Life Flight (Palo Alto). Four area hospitals provide emergency medical services, including Saint Louise Regional Hospital in Gilroy, two in San Jose, and one in Palo Alto, all of which have trauma centers.

Response personnel are also trained to the U. S. Department of Transportation Hazardous Material First Responder Operational (FRO) level to provide initial hazardous material incident assessment, hazard isolation, and support for a regional hazardous material response team available to all three jurisdictions from the City of San Jose or Central Santa Clara County Fire District through mutual aid. Gilroy can also deploy a hazardous materials decontamination unit as needed in support of the regional Hazardous Materials Response Team.

Response personnel from all three Departments are further trained to Confined Space Awareness level, and the Fire District can deploy a Type-2 Urban Search and Rescue (USAR) Team from its Gilroy Gardens station as needed or requested through the County mutual aid system.

Table 3 summarizes total budgeted personnel by agency and function.

Table 3—Budgeted Personnel by Agency

Function	Budgeted Personnel			
	Gilroy	Morgan Hill[1]	Fire District[1]	Total
Administration	7.0	3.83	3.33	**14.16**
Operations	35.0	22.0	22.0	**79.0**
Fire Prevention	0	1.5	.5	**2.0**
Total	**42.0**	**27.33**	**25.83**	**95.16**

Source: Fire agencies
[1] Does not include state-funded Unit/Fire Chief

Gilroy personnel work a 48/96-hour shift schedule of two consecutive 24-hour days on duty, followed by four consecutive days off. Morgan Hill and Fire District personnel work a 72/96 schedule of three consecutive 24-hour days on duty, followed by four consecutive days off.

SECTION 2—STANDARDS OF COVERAGE ASSESSMENT

This section provides a detailed analysis of the three fire agencies' current ability to deploy and mitigate emergency risks within their service area. The response analysis uses prior response statistics and geographic mapping to help each agency and the community visualize what the current response system can and cannot deliver.

2.1 STANDARDS OF COVERAGE PROCESS OVERVIEW

The core methodology used by Citygate in the scope of its deployment analysis work is *Standards of Cover*, fifth and sixth editions, which is a systems-based approach to fire department deployment published by the Commission on Fire Accreditation International (CFAI). This approach uses local risk and demographics to determine the level of protection best fitting a community's needs.

The Standards of Coverage (SOC) method evaluates deployment as part of a fire agency's self-assessment process. This approach uses risk and community expectations on outcomes to help elected officials make informed decisions on fire and emergency medical services deployment levels. Citygate has adopted this multiple-part systems approach as a comprehensive tool to evaluate fire station locations. Depending on the needs of the study, the depth of the components may vary.

Such a systems approach to deployment, rather than a one-size-fits-all prescriptive formula, allows for local determination. In this comprehensive approach, each agency can match local needs (risks and expectations) with the costs of various levels of service. In an informed public policy debate, a governing board "purchases" the fire and emergency medical service levels the community needs and can afford.

While working with multiple components to conduct a deployment analysis is admittedly more work, it yields a much better result than using only a singular component. For instance, if only travel time is considered, and frequency of multiple calls is not, the analysis could miss over-worked companies. If a risk assessment for deployment is not considered, and deployment is based only on travel time, a community could under-deploy to incidents.

Table 4 describes the eight elements of the SOC process.

Table 4—Standards of Coverage Process Elements

SOC Element		Description
1	Existing Deployment Policies	A review of the deployment goals/policies the agency has in place today.
2	Community Outcome Expectations	A review of the expectations of the community for responses to emergencies.
3	Community Risk Assessment	A review of the values to be protected from hazards in the community. (For this report, see Appendix A—Community Risk Assessment.)
4	Critical Task Analysis	A review of the tasks that must be performed and the personnel required to deliver the stated outcome expectation for the Effective Response Force.
5	Distribution Analysis	A review of the spacing of first-due response resources (typically engines) to control routine emergencies.
6	Concentration Analysis	A review of the spacing of fire stations so that more complex emergencies can receive sufficient resources in a timely manner (First Alarm Assignment or the ERF).
7	Reliability and Historical Response Effectiveness Analysis	An evaluation of prior response statistics to determine the percent of compliance the existing system delivers.
8	Overall Evaluation	Proposed Standard of Coverage statements by risk type, as necessary.

Source: CFAI *Standards of Cover*, Fifth Edition

Simply summarized, fire service deployment is about the *speed* and *weight* of the response. *Speed* refers to initial response (first-due), all-risk intervention resources (engines, trucks, and/or ambulances) strategically deployed across a jurisdiction for response to emergencies within a specified time interval to control routine to moderate emergencies without the incident escalating to greater size or severity. *Weight* refers to multiple-unit responses for more serious emergencies, such as building fires, multiple-patient medical emergencies, vehicle collisions with extrication required, or technical rescue incidents. In these situations, an adequate number of firefighters must be assembled within a reasonable time interval to safely control the emergency and prevent it from escalating into a more serious event. Table 5 illustrates this deployment paradigm.

Table 5—Fire Service Deployment Paradigm

Element	Description	Purpose
Speed of Response	Travel time of initial response all-risk intervention units strategically located across a jurisdiction	To control routine to moderate emergencies without the incident escalating in size or complexity
Weight of Response	The number of firefighters in a multiple-unit response for serious emergencies	To assemble enough firefighters within a reasonable time frame to safely control a more complex emergency without escalation

Smaller fires and less complex emergencies require a single-unit or two-unit response (engine and/or specialty resource) within a relatively short response time. Larger or more complex incidents require more units and personnel to control. In either case, if the crews arrive too late or the total number of personnel is too few for the emergency, they are drawn into an escalating and more dangerous situation. The science of fire crew deployment is to spread crews out across a community or jurisdiction for quick response to keep emergencies small with positive outcomes, without spreading resources so far apart that they cannot assemble quickly enough to effectively control more serious emergencies.

2.2 CURRENT DEPLOYMENT

SOC ELEMENT 1 OF 8
EXISTING DEPLOYMENT POLICIES

Nationally recognized standards and best practices suggest using several incremental measurements to define response time. Ideally, the clock start time is when the 9-1-1 dispatcher receives the emergency call. In some cases, the call must then be transferred to a separate fire dispatch center. In this setting, the response time clock starts when the fire center receives the 9-1-1 call into its computer-aided dispatch (CAD) system. Response time increments include dispatch center call processing, crew alerting and response unit boarding (commonly called turnout time), and actual driving (travel) time.

At the time of this study, each agency's response time goals included:

2.2.1 City of Gilroy

> Chapter 7 of the City's General Plan 2020 states in *Policy 18.01 Standards of Service*, *"Continue to provide and maintain police and fire services that are adequate in manpower, equipment, and resources to respond to localized emergencies and calls for service within the City. The departments' current levels of service should be maintained or improved as the City continues to grow, with*

average emergency response times for police services of approximately 4.5 minutes and average emergency response times for fire services of less than 5.0 minutes."

Other City documents reflect general wording about acceptable risk but do not really define what that means for various types of fire, medical, and technical emergencies. One of the City Council's 2018 Strategic Goals is to "Enhance Public Safety Capabilities."

The Gilroy Fire Department has operating goals to:

- Respond to emergency calls for service within 5:00 minutes 75 percent of the time
- Contain building fires to the room of origin 70 percent of the time
- Provide an effective response force (First Alarm) of 12–15 personnel within 10:00 minutes of initial dispatch for 95 percent of fires to contain the escalation of the emergency
- Have crew turnout time after notification be 60–80 seconds based on protective clothing needed and time of day

2.2.2 City of Morgan Hill

Chapter 9 of the City's General Plan states:

- *Goal SSI-11 Efficient police, fire and emergency medical response services, and access to local medical facilities*
- *Policy SSI-11.1 Staffing. Provide police and fire staffing and facilities as necessary to provide adequate public safety protection.*
- *Other policies cover access and preparedness, although in very general terms*

The Fire Department has a policy for EMS to arrive in urban and suburban (as defined by census data) areas in 7:59 minutes or less, and in rural areas in 11:59 minutes or less 95 percent of the time. These two measures come from the County's EMS system and ambulance provider plans.

For structural fires, the Department should deploy 12 firefighters plus two Chief Officers within 14:00 minutes 90 percent of the time.

2.2.3 South Santa Clara County Fire District

The Fire District has a policy for EMS to arrive in urban and suburban (as defined by census data) areas in 7:59 minutes or less, and in rural areas in 11:59 minutes or less 95 percent of the time. These two measures come from the County's EMS system and ambulance provider goals.

For structural fires, the Fire District should deploy 12 firefighters plus two Chief Officers within 14:00 minutes 90 percent of the time.

None of these goals begin the time measure from the receipt of the 9-1-1 call, nor do they separate crew turnout time from actual driving time, which is a current best practice. They also do not address response performance to other risks within the jurisdictions, such as hazardous materials and technical rescue, as recommended by the CFAI. The three agencies do have a few goals and service-level histories that can be documented in response times, number of response companies, and minimum staffing. However, departmental goals are not adopted elected official policy direction as recommended by CFAI.

Currently, NFPA Standard 1710, a recommended deployment standard for *career* fire departments in urban/suburban areas, recommends initial (first-due) intervention units' arrival within a 4:00-minute travel time and recommends arrival of all the resources comprising the multiple-unit First Alarm within 8:00 minutes, at 90 percent or better reliability.[3]

The most recent published best practices by the NFPA for dispatching have increased the dispatch processing time up to 90 seconds and, if there are language barriers, 120 seconds. Further, for crew turnout time, 60–80 seconds is recommended, depending on the type of protective clothing that must be donned.

If the travel time measures recommended by the NFPA (and Citygate) are added to dispatch processing and crew turnout times recommended by Citygate and best practices, then a realistic 90 percent first unit arrival goal is now 7:30 minutes from the time of fire dispatch receiving the call. This is comprised of 90 seconds dispatch, 2:00 minutes crew turnout, and 4:00 minutes travel.

Finding #1:	None of the three agencies have elected-official-approved response performance objectives meeting all best practice elements for time and desired outcomes. Some of the departmental policies have a portion of the elements of best practices-based response time and outcomes desired policies.
Finding #2:	All three agencies have, over the last decade or more, completed a fire master plan, Standards of Response Cover assessment, or a contract for services agreement, yet the elected officials have not clearly adopted the response time policies as recommended in prior studies.

[3] NFPA 1710 – Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (2016 Edition).

2.2.4 Current Deployment Model

Resources and Staffing

Table 6 summarizes the current fire services deployment model in the joint south County service area:

Table 6—Agency Facilities and Response Resources

Station	Address	Assigned Apparatus	Minimum Staffing
South Santa Clara Fire District			**10**
Morgan Hill 1	15670 Monterey Road, Morgan Hill	**Engine 67** **Battalion Chief[1]**	**3** **1**
Masten 2	10810 No Name Uno, Gilroy	**Engine 68**	**3**
Gilroy Gardens 3	3050 Hecker Pass Hwy., Gilroy	**Engine 69**	**3**
City of Morgan Hill			**6**
El Toro 4	18300 Old Monterey Road	**Engine 57** **Truck 57**	**3**
Dunne Hill 5	2100 E. Dunne Avenue	**Engine 58**	**3**
City of Gilroy			**10**
Chestnut 7	7070 Chestnut Street	**Engine 47** **Division Chief**	**3** **1**
Las Animas 8	8383 Wren Avenue	**Engine 48**	**3**
Sunrise 9	880 Sunrise Drive	**Engine 49**	**3**

Source: South Santa Clara County fire agencies
[1] Battalion Chief is co-funded by the City of Morgan Hill and the Fire District

The three agencies have automatic mutual aid agreements with all other Santa Clara County fire agencies and are also signatories to the County and State of California mutual aid agreements.

Response Plan

The three agencies provide all-risk first response services to the people and facilities they protect including fire suppression; pre-hospital Paramedic (ALS) or Basic Life Support (BLS) emergency medical services (EMS); hazardous material and technical rescue response; and other non-emergency services, including fire prevention, community safety education, and other related services.

Given the diverse set of emergency risks presented in the south County area, the agencies utilize a best practice-based tiered response plan calling for different types and numbers of resources

depending on incident/risk type. The two fire dispatch centers (Gilroy and CAL FIRE) select and dispatch the closest and most appropriate resource types pursuant to the three Departments' joint response plan, as shown in Table 7.

Table 7—Response Plan by Major Incident Type

Incident Type	Resources Dispatched	Total Personnel
Single-Patient EMS	1 Engine + 1 County Paramedic Ambulance	**5**
Vehicle Fire	1 Engine	**3**
Residential Building Fire	4 Engines, 2 Battalion Chiefs (Add Morgan Hill Ladder Truck if Commercial Building in Morgan Hill or Fire District Areas)	**14**
Wildland Fire (Medium)	4 Engines, 1 Water Tender, 1 Battalion Chief	**14**
Rescue	2 Engines, 1 Battalion Chief	**7**
Hazardous Material	2 Engines, 1 Battalion Chief	**7**

Source: Fire Departments

Finding #3: The three fire agencies have a standard response plan that considers risk and establishes an appropriate initial response for each incident type. Each type of call for service receives the combination of engines, trucks, specialty units, and command officers customarily needed to effectively control that type of incident based on each agency's experience.

2.3 Outcome Expectations

SOC Element 2 of 8
Community Outcome Expectations

The Standards of Coverage process begins by reviewing existing emergency services outcome expectations. This includes determining for what purpose the response system exists and whether the governing body has adopted any response performance measures. If it has, the time measures used must be understood and sound data must be available.

Current national best practice is to measure percent completion of a goal (e.g., 90 percent of responses) instead of an average measure. Mathematically, this is called a fractile measure.[4] This is because measuring the average only identifies the central or middle point of response time

[4] A *fractile* is that point below which a stated fraction of the values lie. The fraction is often given in percent; the term percentile may then be used.

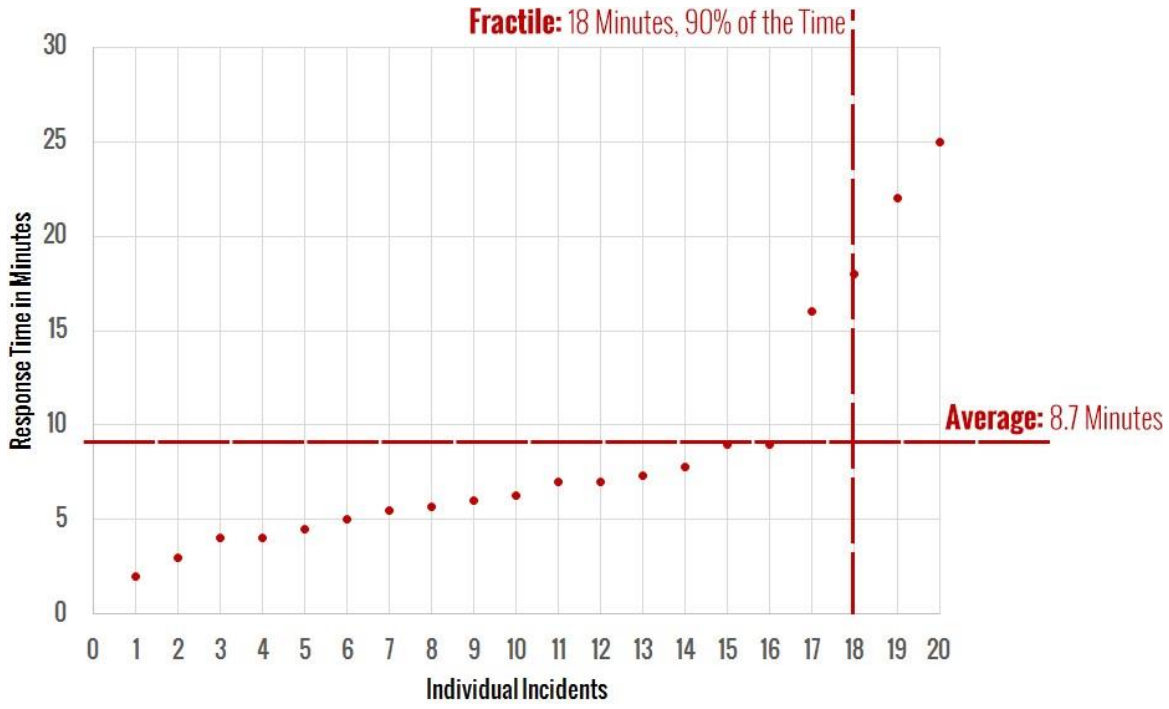
performance for all calls for service in the data set. Using an average makes it impossible to know how many incidents had response times that were far above the average or just above.

For example, Figure 4 shows response times for a fictitious fire department. This agency is small and receives 20 calls for service each month. Each response time has been plotted on the graph from shortest response time to longest response time.

Figure 4 shows that the average response time is 8.7 minutes. However, the average response time fails to properly account for four calls for service with response times far exceeding a threshold in which positive outcomes could be expected. In fact, it is evident in Figure 4 that 20 percent of responses are far too slow and that this jurisdiction has a potential life-threatening service delivery problem. Average response time as a measurement tool for fire services is simply not sufficient. This is a significant issue in larger cities if hundreds or thousands of calls are answered far beyond the average point.

By using the fractile measurement with 90 percent of responses in mind, this small jurisdiction has a response time of 18:00 minutes, 90 percent of the time. This fractile measurement is far more accurate at reflecting the service delivery situation of this small agency.

Figure 4—Fractile versus Average Response Time Measurements



More importantly, within the SOC process, positive outcomes are the goal. From that, crew size and response time can be calculated to allow appropriate fire station spacing (distribution and concentration). Emergency medical incidents include situations with the most severe time

constraints. The brain can only survive 4:00–6:00 minutes without oxygen. Cardiac arrest and other events can cause oxygen deprivation to the brain. While cardiac arrests make up a small percentage, drowning, choking, trauma constrictions, or other similar events have the same effect. In a building fire, a small incipient fire can grow to involve the entire room in a 6:00- to 8:00-minute time frame. If fire service response is to achieve positive outcomes in severe emergency medical situations and incipient fire situations, *all* responding crews must arrive, assess the situation, and deploy effective measures before brain death occurs or the fire spreads beyond the room of origin.

Thus, from the time of 9-1-1 receiving the call, an effective deployment system is *beginning* to manage the problem within a 7:00- to 8:00-minute total response time. This is right at the point that brain death is becoming irreversible and the fire has grown to the point of leaving the room of origin and becoming very serious. Thus, the City needs a *first-due* response goal that is within a range to give the situation hope for a positive outcome. It is important to note that the fire or medical emergency continues to deteriorate from the time of inception, not from the time the fire engine starts to drive the response route. Ideally, the emergency is noticed immediately and the 9-1-1 system is activated promptly. This step of awareness—calling 9-1-1 and giving the dispatcher accurate information—takes, in the best of circumstances, 1:00 minute. Crew notification and travel time take additional minutes. Upon arrival, the crew must approach the patient or emergency, assess the situation, and appropriately deploy its skills and tools. Even in easy-to-access situations, this step can take 2:00 minutes or more. This time frame may be increased considerably due to long driveways, apartment buildings with limited access, multiple-story apartments or office complexes, or shopping center buildings.

Unfortunately, there are times when the emergency has become too severe, even before the 9-1-1 notification and/or fire department response, for the responding crew to reverse. However, when an appropriate response time policy is combined with a well-designed deployment system, only anomalies like bad weather, poor traffic conditions, or multiple emergencies slow down the response system. Consequently, a properly designed system will give citizens the hope of a positive outcome for their tax dollar expenditure.

For this report, total response time is the sum of the agency's fire dispatch center's dispatch processing, crew turnout, and road travel time. This is consistent with CFAI best practice recommendations.

2.4 COMMUNITY RISK ASSESSMENT

SOC ELEMENT 3 OF 8
COMMUNITY RISK ASSESSMENT

The third element of the SOC process is a community risk assessment. Within the context of an SOC study, the objectives of a community risk assessment are to:

- Identify the values at risk to be protected within the community or service area.
- Identify the specific hazards with the potential to adversely impact the community or service area.
- Quantify the overall risk associated with each hazard.
- Establish a foundation for current/future deployment decisions and risk-reduction/hazard mitigation planning and evaluation.

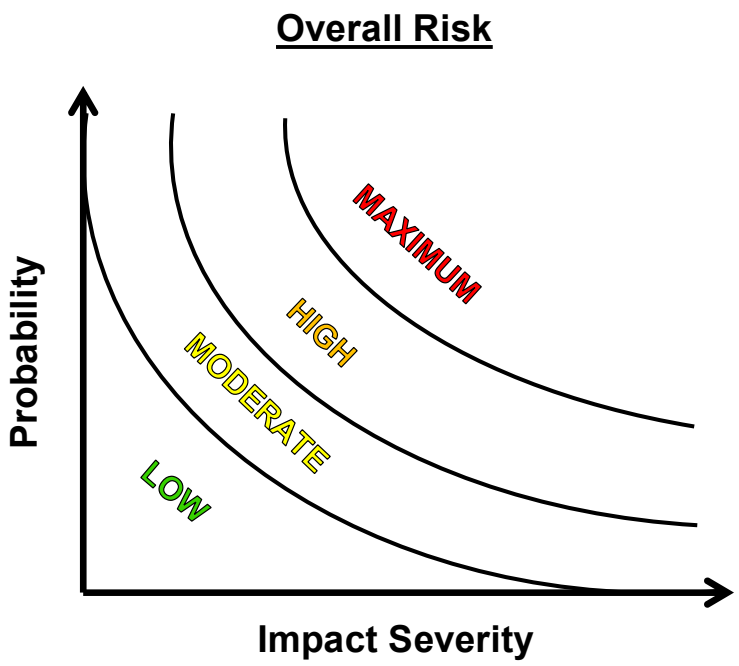
A *hazard* is broadly defined as a situation or condition that can cause or contribute to harm. Examples include fire, medical emergency, vehicle collision, earthquake, flood, etc. *Risk* is broadly defined as the *probability of hazard occurrence* in combination with the *likely severity of resultant impacts* to people, property, and the community as a whole.

2.4.1 Risk Assessment Methodology

The methodology employed by Citygate to assess community risks as an integral element of an SOC study incorporates the following elements:

- Identification of geographic planning sub-zones (risk zones) appropriate to the community or jurisdiction.
- Identification and quantification (to the extent data is available) of the specific values at risk to various hazards within the community or service area.
- Identification of the fire and non-fire hazards to be evaluated.
- Determination of the probability of occurrence for each hazard.
- Identification and evaluation of multiple, relevant impact severity factors for each hazard by planning zone, using agency/jurisdiction-specific data and information.
- Quantification of overall risk for each hazard based on probability of occurrence in combination with probable impact severity as shown in Figure 5.

Figure 5—Overall Risk



2.4.2 Values at Risk to Be Protected

Broadly defined, *values at risk* are those tangibles of significant importance or value to the community or jurisdiction that are potentially at risk of harm or damage from a hazard occurrence. Values at risk typically include people, critical facilities/infrastructure, buildings, and key economic, cultural, historic, and/or natural resources.

People

Residents, employees, visitors, and travelers through a community or jurisdiction are vulnerable to harm from a hazard occurrence. Particularly vulnerable are specific at-risk populations, including those unable to care for themselves or self-evacuate in the event of an emergency. At-risk populations typically include children younger than 10 years of age, the elderly, people housed in institutional settings, those requiring special access, and/or those who have functional needs. Key demographic data for each of the three service areas is contained in **Appendix A—Community Risk Assessment**.

Critical Infrastructure / Key Resources

The U.S. Department of Homeland Security defines Critical Infrastructure / Key Resources as those physical assets essential to the public health and safety, economic vitality, and resilience of a community, such as lifeline utilities infrastructure, telecommunications infrastructure, essential government services facilities, public safety facilities, schools, hospitals, airports, etc. The 2017

Santa Clara County Operational Area Hazard Mitigation Plan (Volume 2) identifies critical facilities and infrastructure within the two Cities and the unincorporated Fire District areas. A hazard occurrence with significant impact severity affecting one or more of these facilities would likely adversely impact critical public or community services.

Buildings

The three-jurisdiction service area includes thousands of housing units and hundreds more non-residential occupancies, including office, research, professional services, and retail sales buildings; restaurants/bars; motels; churches; schools; government facilities; healthcare facilities; and other non-residential uses as described in **Appendix A**.

2.4.3 Hazard Identification

Citygate utilizes prior risk studies where available, fire and non-fire hazards as identified by the CFAI, and data and information specific to the agency/jurisdiction to identify the hazards to be evaluated for this report.

Following an evaluation of the hazards identified in all three agencies' fire and non-fire hazards as identified by the CFAI as they relate to services provided by the Departments, Citygate evaluated the following five hazards for this risk assessment:

- Building Fire
- Vegetation/Wildland Fire
- Medical Emergency
- Hazardous Material Release/Spill
- Technical Rescue

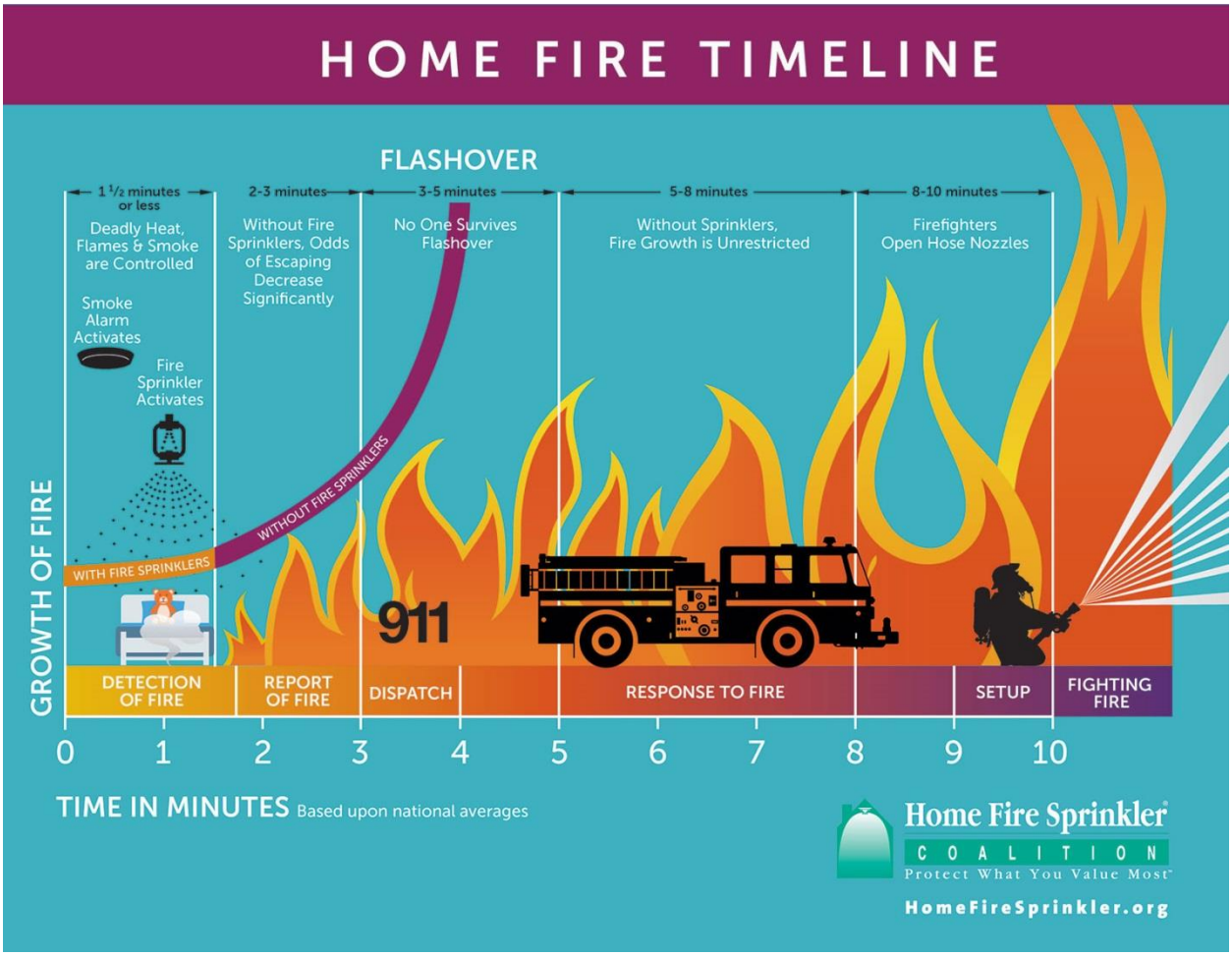
Because building fires and medical emergencies have the most severe time constraints if positive outcomes are to be achieved. Following is a brief overview of building fire and medical emergency risk. **Appendix A** contains the full risk assessment for all five hazards.

Building Fire Risk

One of the primary hazards in any community is building fire. Building fire risk factors include building density, size, age, occupancy, and construction materials and methods, as well as the number of stories, the required fire flow, the proximity to other buildings, built-in fire protection/alarm systems, an available fire suppression water supply, building fire service capacity, fire suppression resource deployment (distribution/concentration), staffing, and response time.

Figure 6 illustrates the building fire progression timeline and shows that flashover, which is the point at which the entire room erupts into fire after all the combustible objects in that room reach their ignition temperature, can occur as early as 3:00–5:00 minutes from the initial ignition. Human survival in a room after flashover is extremely improbable.

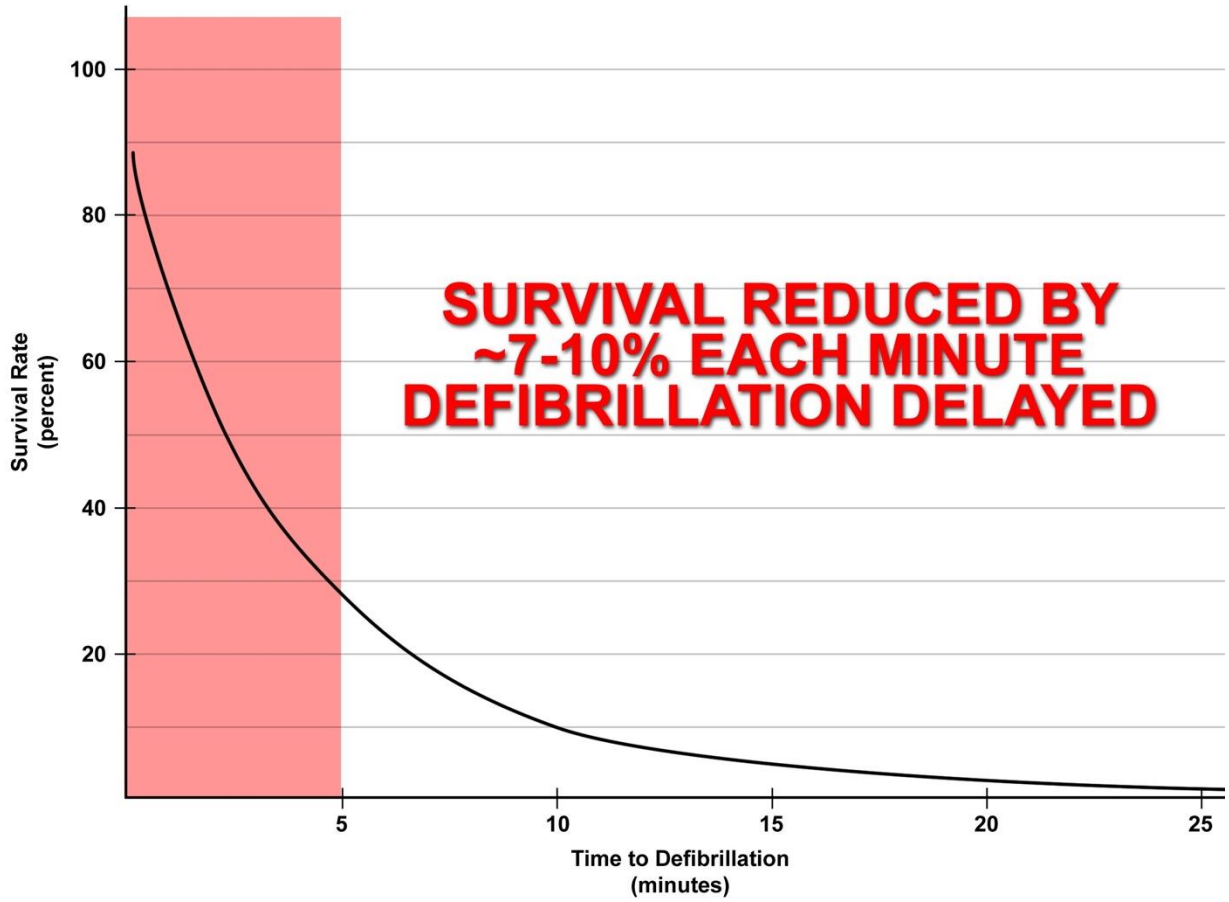
Figure 6—Building Fire Progression Timeline



Medical Emergency Risk

Fire agency service demand in most jurisdictions is predominantly for medical emergencies. Figure 7 illustrates the reduced survivability of a cardiac arrest victim as time to defibrillation increases.

Figure 7—Survival Rate versus Time to Defibrillation



Source: www.suddencardiacarrest.org

The three fire agencies currently provide first responder ALS or BLS pre-hospital emergency medical services, with operational personnel trained to the EMT or EMT-Paramedic level.

2.4.4 Risk Assessment Summary

Citygate's assessment of the values at risk and hazards likely to impact the three-agency service area yields the following overall risk ranging from ***Low*** to ***High*** for the five hazards, as summarized in the following table by fire station area planning zone. See **Appendix A** for the full risk assessment.

Table 8—Overall Risk by Hazard

Hazard	Risk Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Building Fire	*Moderate*	*Low*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*
Vegetation/Wildland Fire	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*	*Low*	*Low*	*Moderate*	*Moderate*
Medical Emergency	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*
Hazardous Material	*Moderate*	*Moderate*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*
Technical Rescue	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*

2.5 Critical Task Time Measures—What Must Be Done over What Time Frame to Achieve the Stated Outcome Expectation?

SOC Element 4 of 8
Critical Task Time Study

SOC studies use critical task information to determine the number of firefighters needed within a timeframe to achieve desired objectives on fire and emergency medical incidents. Table 9 and Table 10 illustrate critical tasks typical of building fire and medical emergency incidents, including the minimum number of personnel required to complete each task. These tables are composites from Citygate clients in urban/suburban departments similar to the three fire agencies, with units staffed with three personnel per engine or ladder truck. It is important to understand the following relative to these tables:

- It can take considerable time after a task is ordered by command to complete the task and arrive at the desired outcome.
- Task completion time is usually a function of the number of personnel that are *simultaneously* available. The fewer firefighters available, the longer some tasks will take to complete. Conversely, with more firefighters available, some tasks are completed concurrently.
- Some tasks must be conducted by a minimum of two firefighters to comply with safety regulations. For example, two firefighters are required to search a smoke-filled room for a victim.
- These issues are important as the three population centers with their fire stations are all not immediately adjacent to one another. For serious fire staffing, either City needs the District crews to be immediately available and/or needs U.S. 101 to be open and clear for one city to get to the other quickly.

2.5.1 Critical Firefighting Tasks

Table 9 illustrates the critical tasks required to control a typical single-family dwelling fire with five response units (four engines/trucks and two Chief Officers) from the three Departments, for a total Effective Response Force (ERF) of **14** personnel. These tasks are taken from typical fire departments' operational procedures, which are consistent with the customary findings of other agencies using the SOC process. No conditions exist to override the Occupational Safety and Health Administration (OSHA) two-in/two-out safety policy, which requires that firefighters enter atmospheres that are immediately dangerous to life and health, such as building fires, in teams of two while two more firefighters are outside and immediately ready to rescue them should trouble arise.

Scenario: *Simulated approximately 2,000 square-foot, two-story, residential fire with unknown rescue situation. Responding companies receive dispatch information typical for a witnessed fire. Upon arrival, they find approximately 50 percent of the second floor involved in fire.*

Table 9—First Alarm Residential Fire Critical Tasks—14 Personnel

Critical Task Description		Personnel Required
First-Due Engine (Three Personnel)		
1	Conditions report	1
2	Establish supply line to hydrant.	2
3	Deploy initial fire attack line to point of building access.	1–2
4	Operate pump and charge attack line.	1
5	Establish incident command.	1
6	Conduct primary search.	2
Second-Due Engine (Three Personnel)		
7	If necessary, establish supply line to hydrant.	1–2
8	Deploy a backup attack line.	1–2
9	Establish Initial Rapid Intervention Crew.	2
Third-Due Engine or Truck (Three Personnel)		
10	Conduct initial search and rescue, if not already completed.	2
11	Deploy ground ladders to roof.	1–2
12	Establish horizontal or vertical building ventilation.	1–2
13	Open concealed spaces as required	2
Chief Officers (Two)		
14	Transfer of incident command.	1
15	Establish exterior command and scene safety.	1
Fourth-Due Engine (Three Personnel)		
16	Establish Initial Rapid Intervention Crew.	3
17	Secure utilities.	2
18	Deploy second attack line as needed.	2
19	Conduct secondary search.	2

Grouped together, the duties in Table 9 form an Effective Response Force, or First Alarm Assignment. These distinct tasks must be performed to effectively achieve the desired outcome; arriving on scene does not stop the emergency from escalating. While firefighters accomplish these tasks, the incident progression clock keeps running.

Fire in a building can double in size during its free-burn period before fire suppression is initiated. Many studies have shown that a small fire can spread to engulf an entire room in fewer than 4:00–5:00 minutes after free burning has started. Once the room is completely superheated and involved

in fire (known as flashover), the fire will spread quickly throughout the structure and into the attic and walls. For this reason, it is imperative that fire suppression and search/rescue operations commence before the flashover point occurs *if* the outcome goal is to keep the fire damage in or near the room of origin. In addition, flashover presents a life-threatening situation to both firefighters and any occupants of the building.

2.5.2 Critical Medical Emergency Tasks

The Departments respond to thousands of EMS incidents annually, including vehicle accidents, strokes, heart attacks, difficulty breathing, falls, childbirths, and other medical emergencies.

For comparison, Table 10 summarizes the critical tasks required for a cardiac arrest patient.

Table 10—Cardiac Arrest Critical Tasks—3–4 Engine Personnel + ALS Ambulance

Critical Task		Personnel Required	Critical Task Description
1	Chest compressions	2	Compression of chest to circulate blood
2	Ventilate/oxygenate	1–2	Mouth-to-mouth, bag-valve-mask, apply O_2
3	Airway control	1–2	Manual techniques/intubation/cricothyroidotomy
4	Defibrillate	1–2	Electrical defibrillation of dysrhythmia
5	Establish I.V.	1–2	Peripheral or central intravenous access
6	Control hemorrhage	1–2	Direct pressure, pressure bandage, tourniquet
7	Splint fractures	2–3	Manual, board splint, HARE traction, spine
8	Interpret ECG	2	Identify type and treat dysrhythmia
9	Administer drugs	2	Administer appropriate pharmacological agents
10	Spinal immobilization	2–5	Prevent or limit paralysis to extremities
11	Extricate patient	3–5	Remove patient from vehicle, entrapment
12	Patient charting	1–2	Record vitals, treatments administered, etc.
13	Hospital communication	1–2	Receive treatment orders from physician
14	Treat en route to hospital	2–4	Continue to treat/monitor/transport patient

2.5.3 Critical Task Analysis and Effective Response Force Size

A critical task analysis reveals that the time required to complete the critical tasks necessary to stop the escalation of an emergency (as shown in Table 9 and Table 10) must be compared to outcomes. As shown in nationally published fire service time versus temperature tables, after approximately 4:00 to 5:00 minutes of free burning a room, fire will escalate to the point of flashover. At this point, the entire room is engulfed in fire, the entire building becomes threatened,

and human survival near or in the room of fire origin becomes impossible. Additionally, brain death begins to occur within 4:00 to 6:00 minutes of the heart stopping. Thus, the ERF must arrive in time to prevent these emergency events from becoming worse.

The agencies' daily staffing plus automatic aid is sufficient to deliver a *single* ERF of **12** firefighters and two Chief Officers to a building fire totaling 14, if they can arrive in time, which the statistical analysis of this report will discuss in depth. Mitigating an emergency event is a *team* effort once the units have arrived. This refers to the *weight* of response analogy; if too few personnel arrive too slowly, the emergency will escalate instead of improve. The outcome times, of course, will be longer and yield less desirable results if the arriving force is later or smaller.

The quantity of staffing and the arrival time frame can be critical in a serious fire. Fires in older and/or multiple-story buildings could well require the initial firefighters to rescue trapped or immobile occupants. If the ERF is too small, rescue *and* firefighting operations *cannot* be conducted simultaneously.

Fires and complex medical incidents require that additional units arrive in time to complete an effective intervention. Time is one factor that comes from *proper station placement*. Good performance also comes from *adequate staffing* and training. But where fire stations are spaced too far apart, and one unit must cover another unit's area or multiple units are needed, these units can be too far away, and the emergency will escalate and/or result in less-than-desirable outcome.

Previous critical task studies conducted by Citygate and NFPA Standard 1710 find that all units need to arrive with **15** firefighters plus at least one Chief Officer within 11:30 minutes (from the time of 9-1-1 call) at a building fire to be able to *simultaneously and effectively* perform the tasks of rescue, fire suppression, and ventilation.

If fewer firefighters arrive, most likely, the search team would be delayed, as would ventilation. The attack lines would only consist of two firefighters, which does not allow for rapid movement of the hose line above the first floor in a multiple-story building. Rescue is conducted with at least two-person teams; thus, when rescue is essential, other tasks are not completed in a simultaneous, timely manner. Effective deployment is about the **speed** *(travel time)* and the **weight** *(number of firefighters)* of the response.

Fifteen initial firefighters plus a command chief could handle a moderate-risk, confined residential fire. However, even an ERF of 16 personnel will be seriously slowed if the fire is above the first floor in a low-rise apartment building or commercial/industrial building. This is where the capability to add additional personnel and resources to the standard response becomes critical.

Given that the three agencies' ERF plan delivers 14 personnel to a moderate-risk building fire, it reflects a goal to confine serious building fires inside the building of origin, *but not inside the compartment of origin* and to prevent the spread of fire to adjoining buildings. This is a typical desired outcome in less populated suburban areas.

The agencies' current physical response to building fires is, in effect, its de-facto deployment measure to more densely populated urban areas—*if those areas are within a reasonable travel time from multiple fire stations*. Thus, this becomes the baseline policy for the deployment of firefighters.

2.6 Distribution and Concentration Studies—How the Location of First-Due and First Alarm Resources Affects Emergency Incident Outcomes

SOC Element 5 of 8
Distribution Study

SOC Element 6 of 8
Concentration Study

The combined South Santa Clara County area is served today by three agencies deploying eight engine companies, one cross-staffed aerial ladder truck, and one Chief Officer per agency as the duty Incident Commander from eight fire stations. It is appropriate to understand, using geographic mapping tools, what the existing stations do and do not cover within specific travel time goals, if there are any coverage gaps needing one or more stations, and what, if anything, to do about those gaps.

In brief, there are two geographic perspectives to fire station deployment:

- **Distribution**—the spacing of first-due all-risk intervention units to control routine emergencies before they escalate and require additional resources.
- **Concentration**—the spacing of fire stations sufficiently close to each other so that more complex emergency incidents can quickly receive sufficient resources from multiple fire stations. As indicated, this is known as the **Effective Response Force** (ERF), or more commonly, the First Alarm Assignment, which is the collection of a sufficient number of firefighters on scene, delivered within the concentration time goal to stop the escalation of the problem.

To analyze first-due fire unit travel time coverage, Citygate used FireView™, a geographic mapping tool that can measure theoretical travel time over a street network. For this calculation, the modeling tool calibrates the uncongested travel speeds by correcting speed limits to the actual speeds fire apparatus are traveling by roadway type, such as prime arterial, collector, or local neighborhood to simulate real-world travel time coverage. Using these tools, Citygate ran several deployment tests and measured their impact on various parts of the Departments' service areas.

A second travel time model was also constructed using traffic congestion data to slow the fire unit travel times according to the congestion present on various types of streets during commute periods. This data is not from social media sources, but from GIS vendors that mine extensive public and private data sources.

A 4:00-minute travel time goal for the neighborhood first responder is a nationally recommended best practice for urban areas. The City of Gilroy has been using 4:30 minutes as being reflective of both urban and edge area lighter population density neighborhoods. Given the Fire District and Morgan Hill do not have prior policy level response time goals and that their neighborhoods are reflective of Gilroy's, this study utilized Gilroy's goals. None of the three agencies have a multiple-unit response (First Alarm) time goal, so this study used a best practices-based measure of 8:00 minutes travel time for the last-arriving unit.

Most of the maps are provided in two views showing northern and southern areas of the joint study area so that fire unit travel time coverage can be seen at the neighborhood level.

2.6.1 Deployment Coverage Baselines

Map #1a/1b—General Geography, Station Locations, and Response Resource Types

Map set #1 shows the agency boundaries and fire station locations. This is a reference map for other maps that follow. Station symbols denote the type of staffed resources at each station. The staffing per resource varies and is explained in Table 6.

Maps #1a and #1b additionally show, by different colors, the primary service area for each fire station, including the proposed fire station location at Glen Loma. These areas also serve to tabulate and identify the risks to be protected in each zone.

Map #2a/2b—Risk Assessment: Population Density

Map set #2 shows the population density across the service areas for *resident* populations. Community General Plan land use and zoning determine population capacity. People drive EMS demand, and the highest population density areas are typically also the highest EMS demand areas.

Map #3a/3b—Distribution: 4:30-Minute First-Due Travel Time Coverage – Congested vs. Non-Congested

Map set #3 shows first-due travel time coverage from the agencies' current fire station locations, with green indicating the current road network that a fire engine should be expected to reach within 4:30 minutes, assuming it is in station and encounters *no traffic congestion*. The red road segments indicate the coverage as impacted by traffic congestion. Thus, the outer green areas are the maximum expected coverage (red + green = total minutes).

The purpose of response time modeling is to determine response time coverage across a jurisdiction's geography and station locations. This geo-mapping design is then validated against dispatch time data to reflect actual response times. There should be some overlap between station areas so that a second-due unit can have a chance of an acceptable response time when it responds to a call in a different station's first-due response area.

As can be seen, severe traffic congestion can hamper fire unit travel time, even with traffic signal preemption technology. The impact is the largest in the more travelled major road and commercial corridors. Also, the neighboring fire agency stations are too far away to be the primary provider in lieu of one of the three fire agencies' primary fire stations.

As can be seen, the non-congested coverage is adequate for the most developed (populated) areas. The small edge areas that do not receive *non-congested* coverage in both Morgan Hill and Gilroy are due to street design or topography and thus are not large enough to warrant a fire station move or addition from strictly a travel time perspective.

Finding #4:	During traffic congestion periods, there are multiple underserved core areas in Morgan Hill, suggesting the three stations are spaced too far apart. In Gilroy, the edge areas and new development beyond the current *non-congested* coverage area also suggests the need for an additional station.
Finding #5:	Given that only nine firefighters are on-duty in each City, if *both* Cities added a fourth fire station, raising daily staffing to 12, they would be less dependent on the Fire District's staffing for serious emergencies requiring a multiple-unit response.
Finding #6:	The Fire District's Station #3 in west Gilroy serves mostly Gilroy within its 4:30-minute first-due travel coverage. It would provide better rural area coverage if moved northwest of its current location.

The purpose of computer response mapping is to determine response time coverage across a community's geography and balance station locations to provide appropriate station distribution and concentration. This geo-mapping design is then validated against historical response data to reflect actual travel times. There should be some overlap between station areas so that a second-due unit has a chance of an adequate response time when it covers a call in another station's first-due area.

As detailed later in this section, the *travel* time to 90 percent of the fire and EMS incidents is 6:08 minutes across all three jurisdictions. This finding supports the GIS model coverage showing that 4:30-minute coverage does not extend out to all areas, with or without traffic congestion.

Map #4a/4b—Insurance Services Office 1.5-Mile Coverage Areas

Map set #4 displays the Insurance Services Office (ISO) recommendation that urban stations cover a 1.5-mile *distance* response area. Depending on a jurisdiction's road network, the 1.5-mile measure usually equates to a 3:30- to 4:00-minute travel time and is thus conservative. However,

a 1.5-mile measure is a reasonable indicator of station spacing and overlap. As can be seen, the 1.5-mile ISO coverage is much smaller than the 4:30-minute first-due coverage in Map #3. This suggests the stations are too few and/or too far apart.

Map #5a/5b/5c/5d—Concentration: Effective Response Force 8:00-Minute Travel Time Coverage – Congested vs. Non-Congested

Map Series #5 shows, with and without travel congestion, the streets where all three agencies' current response plans *should* deliver the initial ERF (First Alarm) within 8:00 minutes travel time. On Maps #5a and #5b, ERF consists of four engines responding anywhere in the service area. On Maps #5c and #5d, ERF consists of responses in the north of three engines, the Morgan Hill ladder truck, and one Chief Officer. The uncongested coverage shown in Map #5b is only adequate at 8:00 minutes from southern Morgan Hill through central Gilroy where there are multiple fire stations. Traffic congestion has the largest impact on this measure in the outer edge areas of all three jurisdictions.

Finding #7:	Even if all three agencies' fire stations are available, neither north Morgan Hill nor south and eastern Gilroy can receive a minimum multiple-unit Effective Response Force of 12 firefighters within 8:00 minutes travel time.

Map #6a/b—8:00-Minute Ladder Truck Travel Time Coverage – Congested vs. Non-Congested

Map set #6 shows 8:00-minute travel time coverage for the Morgan Hill ladder truck with and *without* traffic congestion. As can be seen, this specialized resource is typically only staffed in Morgan Hill, so the coverage is limited to the northern extent of the joint study area.

Map #7—Chief Officer 8:00-Minute Travel Time Coverage

Map #7 displays 8:00-minute travel time coverage for a Chief Officer from Morgan Hill and Gilroy.

Map #8—All Incident Locations

Map #8 shows the location of all incidents from January 2016 through December 2018. It is apparent that incidents occur in not only the most populated areas, but across the three-year study period, most suburban and rural areas also received emergency response services.

The more rural to remote incident locations also illustrate why a single response time policy for these agencies is not useful. The service area patterns show the need for at least an urban and a rural response time goal so that the rural incident response times do not overly mask adequate response times in the core populated areas.

Map #9—Emergency Medical Services and Rescue Incident Locations

Map #9 illustrates only the emergency medical and rescue incident locations. With the majority of the calls for service being medical emergencies, virtually the entire joint service area needs pre-hospital emergency medical services.

Map #10—All Fire Locations

Map #10 identifies the location of all fires within the joint service area over the past three years, including *any* type of fire call, from vehicle to dumpster to building. There are obviously fewer fires than medical or rescue calls. Even given this fact, it is evident that fires occur in all fire station areas.

Map #11—Structure Fire Locations

Map #11 displays the locations of the structure fire incidents over the past three years. While the number of structure fires is a smaller subset of total fires, there are two meaningful findings from this map. First, there are structure fires in every fire station area. Second, there are a relatively small number of building fires in Morgan Hill compared to Gilroy.

Additional Map Scenarios

Additional map scenarios are also found in **Volume 2** and represent proposed station locations for each fire agency that are described in Section 3.3.

2.6.2 Road Mile Coverage Measures

In addition to the visual displays of coverage that maps provide, the GIS software allows the miles of public streets covered at 4:30 or 8:00 minutes to be measured. The following table provides these metrics for the coverage with and without the impacts of traffic congestion.

Table 11—Service Area Road Mile Coverage Comparison (No Mutual Aid)

Travel Time Measure	Total Public Road Miles	Non-Congested Miles Covered	Non-Congested Percent of Total Miles	Congested Miles Covered	Congested Percent of Total Miles	Congested vs. Non-Congested Difference (Miles)
4:30 Minutes First-Due	**881.2**	579.75	**65.79%**	461.9	**52.41%**	117.85
8:00 Minutes ERF (4 Engines)	**881.2**	420.82	**47.75%**	303.55	**34.44%**	116.45
8:00 Minutes ERF (3/1/1)[1]	**881.2**	258.19	**29.29%**	160.25	**18.18%**	97.94
8:00 Minutes BC/DC[2]	**881.2**	637.63	**72.35%**	501	**56.85%**	136.63
8:00 Minutes Truck (MH 4)[3]	**881.2**	302.06	**34.27%**	228.23	**25.89%**	73.83

[1] 3/1/1 = three engines, one truck, and one Battalion Chief
[2] BC/DC = one Battalion Chief or Division Chief
[3] MH 4 = one truck from Station #4 in Morgan Hill

As can be seen, the existing 4:30-minute first-due travel coverage is reduced by 13.4 percent during traffic congestion periods. While there is an impact, it is not terrible. Elsewhere in the metropolitan areas of Santa Cara County, Citygate has measured 25–30 percent coverage reductions. If a desirable travel time goal is 4:30 minutes, and prior data shows the agencies' 90th percentile travel performance is 6:08 minutes, then traffic congestion is effectively adding to travel time as there are more incidents at peak traffic hours when human activity is the highest. The 8:00-minute ERF travel coverage shows a similar level of traffic congestion impact.

2.7 Statistical Analysis

SOC Element 7 of 8
Reliability & Historical Response Effectiveness Studies

The map sets described in Section 2.6 and presented in **Volume 2** show predicted response travel times under both normal and congested traffic conditions. Examination of the actual response data provides a picture of actual response performance with simultaneous calls, rush hour traffic congestion, units out of position, and delayed travel time for events such as severe weather.

The following subsections provide summary statistical information regarding the agencies and their services. While this combined study measures service demand and response performance of all three agencies as a single operational entity, demand and performance within each jurisdiction can be determined by examining individual station data as follows:

- South Santa Clara County Fire District—Stations SC1, SC2, and SC3

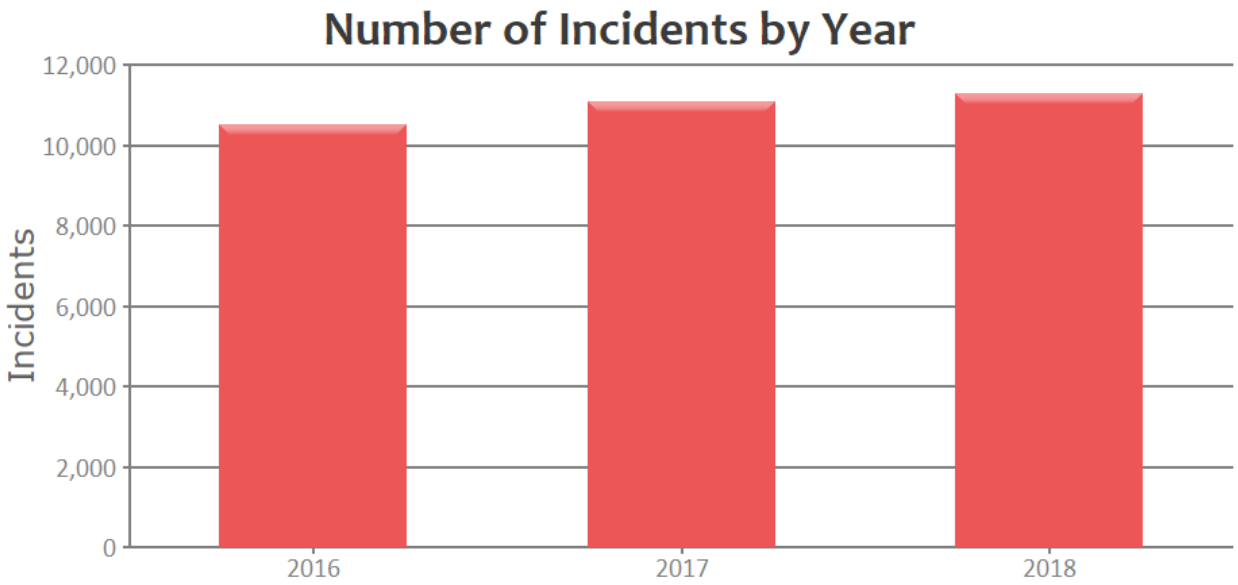
- Morgan Hill Fire Department—Stations MH4 and MH5
- Gilroy Fire Department—Stations GY7, GY8, and GY9 (plus proposed station area "GYSTR")[5]

2.7.1 Service Demand

In 2018, the Departments responded to 11,289 incidents. During this period, the Departments had a daily demand of 30.93 incidents. During this same period, there were 16,514 apparatus responses for an average of 1.46 apparatus responses per incident.

In 2018, the percentage of fire incidents was 4.4 percent, EMS incidents was 68.06 percent, and other types was 27.54 percent. The Departments experienced a slight increase in the number of incidents from 2016 through 2018 as illustrated in the following figure.

Figure 8—Number of Incidents by Year – 2016–2018



The following figure illustrates the number of incidents by NFIRS 5 incident type. While fire and EMS incidents grew, there was a very slight decline in other incident types in 2018.

[5] GYSTR is a defined geographic area of southwest Gilroy to be served by a future fourth fire station.

Figure 9—Number of Incidents by Year by Incident Type – 2016–2018

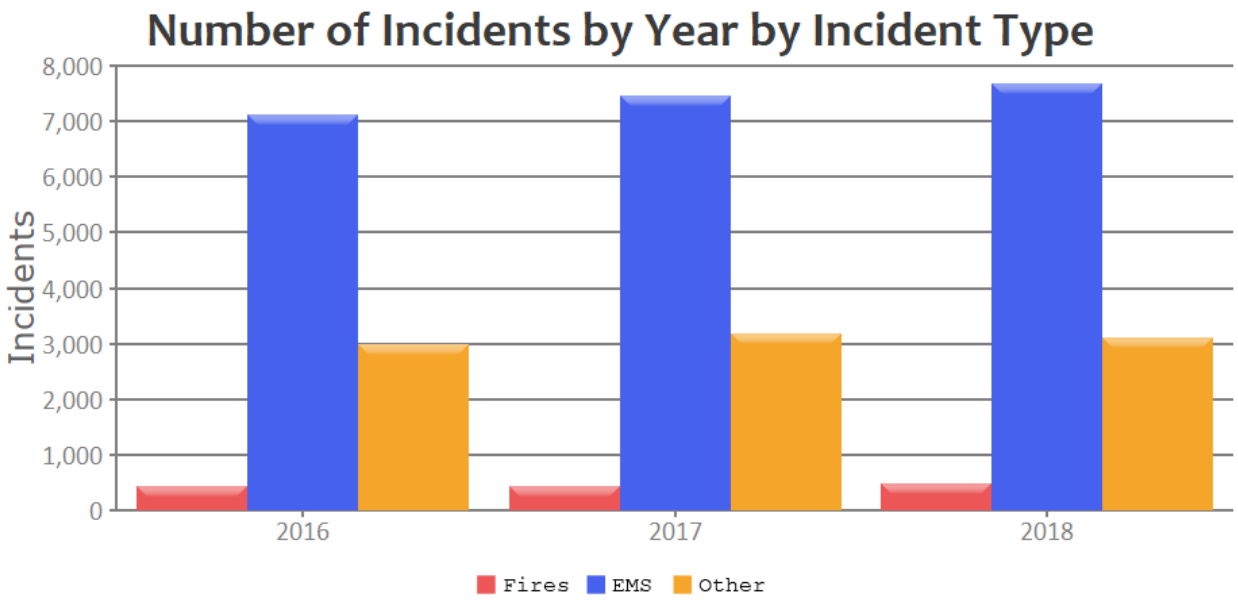
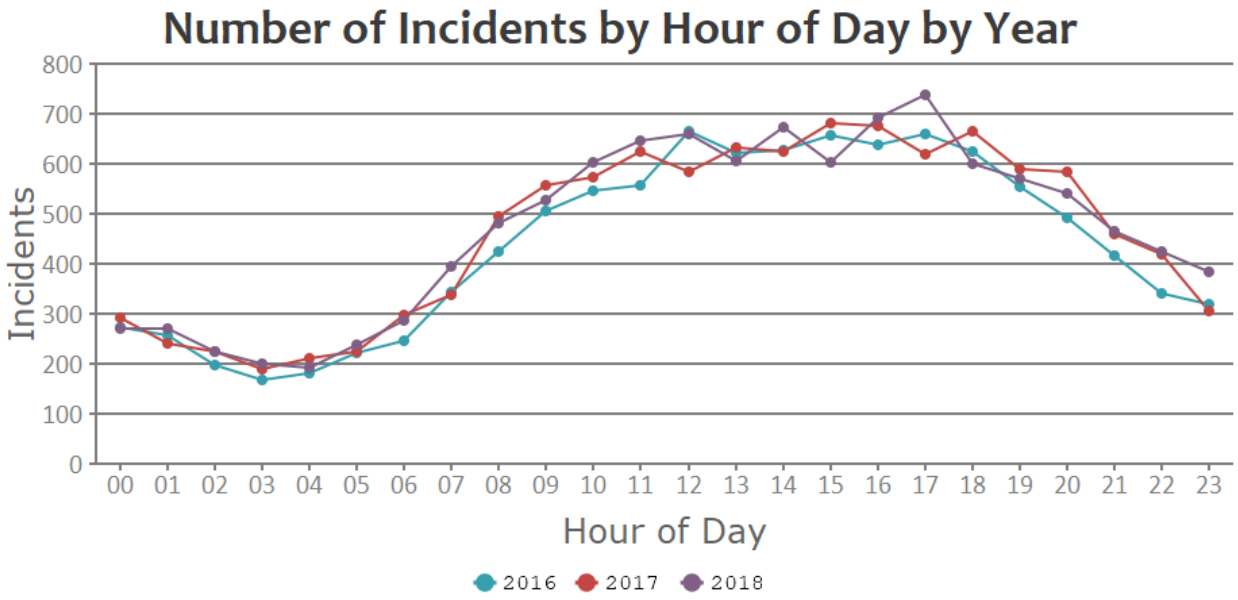


Figure 10 shows service demand by hour of day, illustrating that calls for service occur at every hour of the day and night, requiring fire and EMS response capability 24 hours per day, every day of the year.

Figure 10—Number of Incidents by Hour of Day and Year – 2016–2018



Finding #8:	Service demand occurs across all hours of the day, indicating the need for a 24-hours-per-day, seven-days-per-week fire and EMS emergency response system.

Figure 11 illustrates the number of incidents by station area in 2016–2018. Station GY8 in Gilroy had the highest volume of activity. Station SC3 in the Fire District had the lowest volume.

Figure 11—Number of Incidents by Station – 2016–2018

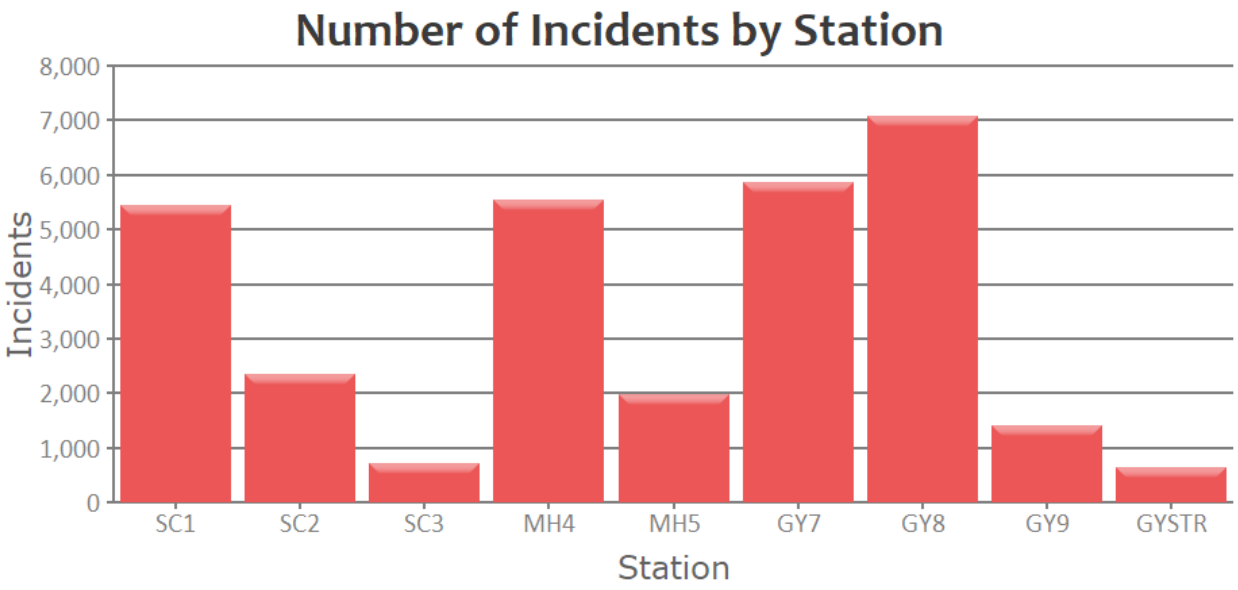


Figure 12 breaks down service demand by station by year. Station GY8 shows the highest activity with a steady increase in overall annual service demand.

Figure 12—Annual Number of Incidents by Station – 2016–2018

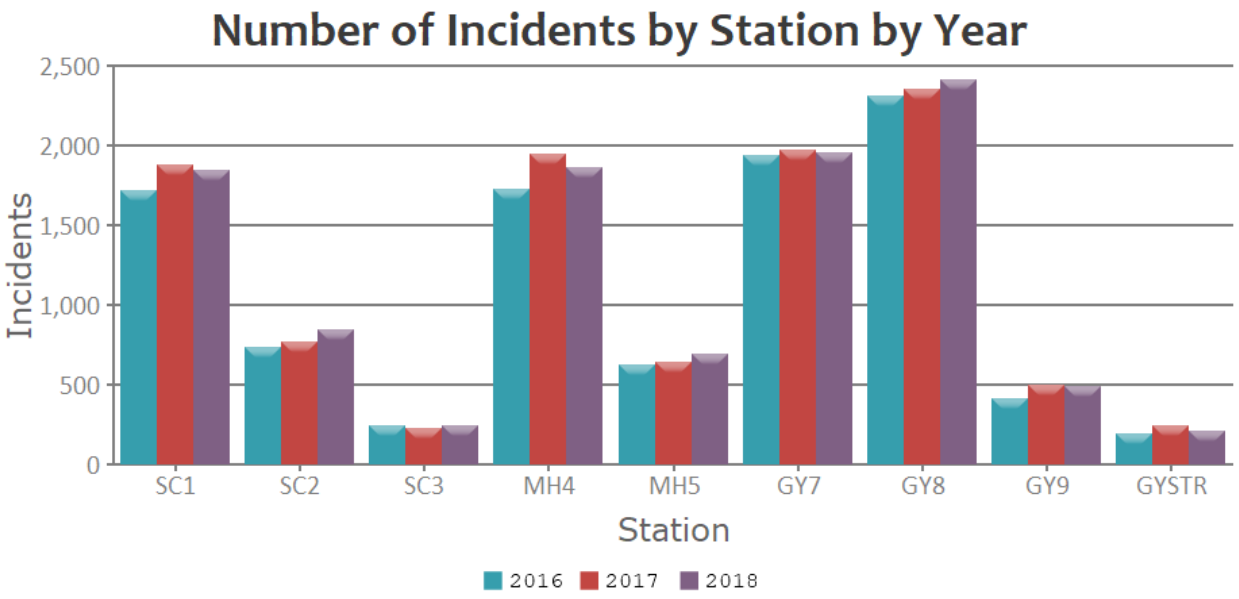


Table 12 lists the rankings of incidents by type for 2018. Only those incident types with more than 50 occurrences are shown. Note the strong ranking for EMS-related incidents.

Table 12—Number of Incidents by Incident Type – 2018

Incident Type	Number of Incidents
321 EMS call, excluding vehicle accident with injury	6,144
611 Dispatched and canceled en route	1,049
322 Vehicle accident with injuries	581
700 False alarm or false call, other	479
311 Medical assist, assist EMS crew	451
324 Motor vehicle accident no injuries	277
554 Assist invalid	156
320 Emergency medical service, other	130
553 Public service	105
600 Good intent call, other	105
550 Public service assistance, other	97
510 Person in distress, other	89
551 Assist police or other governmental agency	83
143 Grass fire	67
111 Building fire	64
622 No incident found on arrival of incident address	64
743 Smoke detector activation, no fire – unintentional	64
531 Smoke or odor removal	58
500 Service call, other	56
131 Passenger vehicle fire	53
733 Smoke detector activation due to malfunction	53

Reference: Fire agencies incident records

Table 13 illustrates the number of incidents by property type. The highest service demand by property type is for residential dwellings. Only those property types with 50 or more incidents are shown.

Table 13—Number of Incidents by Property Type – 2018

Property Type	Number of Incidents
419 1 or 2 family dwelling	4,353
961 Highway or divided highway	895
429 Multifamily dwellings	818
960 Street, other	610
311 24-hour care nursing homes, 4 or more persons	594
963 Street or road in commercial area	311
965 Vehicle parking area	285
962 Residential street, road or residential driveway	262
519 Food and beverage sales, grocery store	170
500 Mercantile, business, other	155
449 Hotel/motel, commercial	133
931 Open land or field	130
340 Clinics, doctors' offices, hemodialysis centers	106
215 High school/junior high school/middle school	85
213 Elementary school, including kindergarten	70
700 Manufacturing, processing	66
321 Mental retardation/development disability facility	66
549 Specialty shop	64
161 Restaurant or cafeteria	63
459 Residential board and care	63
900 Outside or special property, other	55
365 Police station	54
936 Vacant lot	54

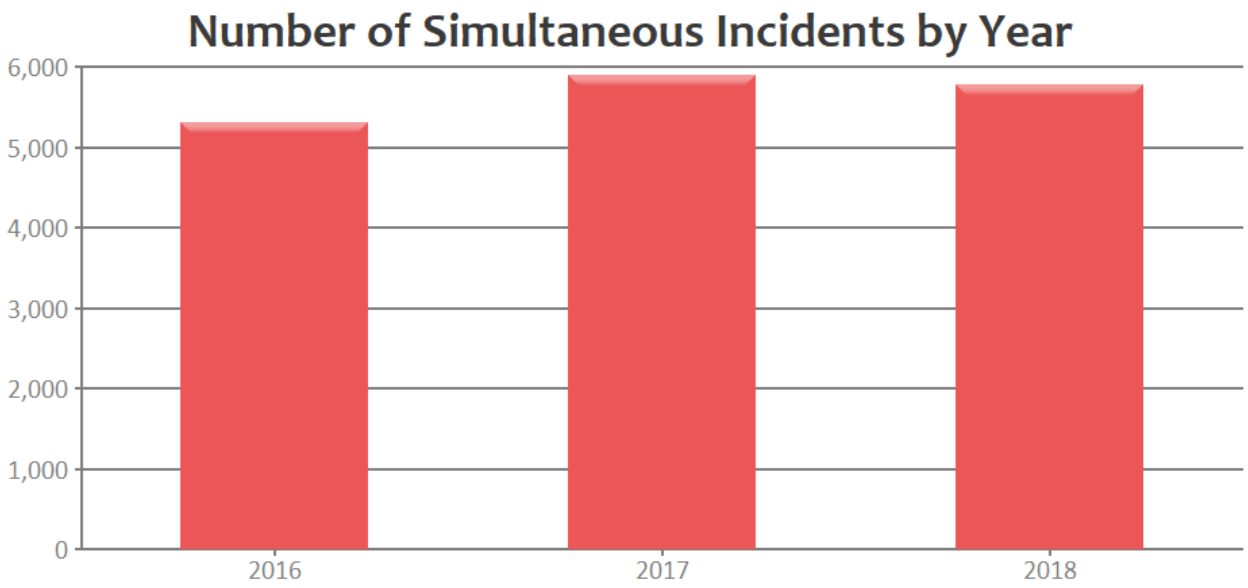
2.7.2 Simultaneous Incident Activity

Simultaneous incidents occur when other incidents are underway at the time. As Table 14 and Figure 13 show, more than 51 percent of incidents occurred while one or more other incidents were underway, while slightly more than 19 percent of incidents occurred while two or more other incidents were underway.

Table 14—Overall Simultaneous Incident Activity – 2018

Number of Simultaneous Incidents	Percentage
1 or more simultaneous incidents	51.28%
2 or more simultaneous incidents	19.35%
3 or more simultaneous incidents	06.22%
4 or more simultaneous incidents	02.06%
5 or more simultaneous incidents	00.78%

Figure 13—Number of Simultaneous Incidents by Year – 2016–2018



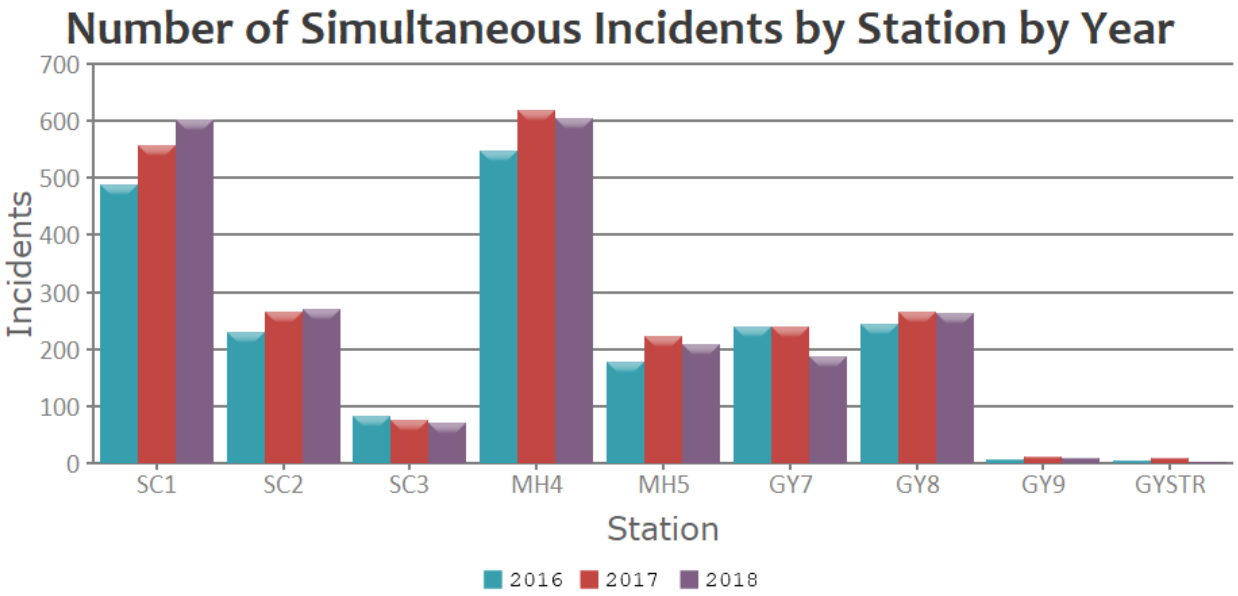
Finding #9: Although the occurrence of simultaneous incidents varies over the three-year study period, a significant percentage of the collective agencies' service demand involves two or more incidents occurring at the same time.

In a larger jurisdiction, simultaneous incidents in different station areas have very little operational consequence. However, when simultaneous incidents occur within a single station area there can be significant delays in response times.

The following figure illustrates the number of single-station simultaneous incidents by station area by year. Station MH4 has the highest number of same-station simultaneous incidents. Closely

following Station MH4 is Station SC1, which is experiencing steady year-to-year growth in simultaneous activity. Station GY9 and proposed station GYSTR have insignificant same-station simultaneous activity.

Figure 14—Same-Station Simultaneous Incident Activity by Year – 2016–2018



Finding #10: Approximately 10 percent of the three Fire District and two Morgan Hill stations' calls for service involve simultaneous incidents within those same station response areas, resulting in a slower response for the second or subsequent incident from another station. Same-station simultaneous incident activity in Gilroy is 3.5 percent or less.

2.7.3 Unit Hour Utilization

Another view of unit workload is the percent of each hour a unit spends annually committed to emergency responses. The utilization percentage for apparatus is calculated by two primary factors, the number of responses and the duration of responses.

For a firefighting unit, during a nine-hour daytime work period, when crews on a 24-hour shift must also pay attention to apparatus checkout, station duties, training, fire prevention inspections, public education, and paperwork, plus required physical training and meal breaks, Citygate believes the maximum unit-hour utilization (UHU) per hour across the workday *should not exceed 30* percent. Beyond that, the most important duties most likely to suffer will be training and fire prevention inspections.

For a dedicated unit, such as an ambulance or low-acuity squad working less than a 24-hour shift, UHU can increase to a maximum of 40–50 percent. At that UHU level, peak-hour squads must have additional duty days for training only, on which they are not responding to incidents, to meet their annual requirements for continuing education and training hours.

Table 15 shows the 2018 utilization summary for engines, with the busiest units listed first, and Table 16 shows the UHU for the Morgan Hill ladder truck.

Table 15—Unit Hour Utilization – Engines – 2018

Hour	GY E48	GY E47	SC E67	SC E68	GY E49	MH E58	MH E57	SC E69
00:00	5.85%	5.14%	6.94%	2.99%	2.51%	4.52%	1.93%	0.70%
01:00	7.01%	5.64%	5.25%	2.59%	3.10%	2.51%	1.51%	1.09%
02:00	6.88%	5.22%	5.02%	1.97%	2.17%	2.55%	1.26%	0.97%
03:00	3.97%	4.44%	10.88%	6.10%	2.38%	3.52%	2.62%	2.05%
04:00	4.94%	4.97%	3.19%	2.63%	2.64%	2.36%	0.76%	1.70%
05:00	4.93%	5.03%	5.53%	3.73%	1.13%	3.90%	1.96%	1.02%
06:00	9.42%	7.69%	5.89%	3.51%	5.20%	3.21%	2.90%	3.52%
07:00	10.59%	9.40%	8.34%	6.26%	3.14%	3.45%	4.33%	1.89%
08:00	9.32%	9.67%	12.64%	6.71%	5.26%	5.59%	5.27%	3.07%
09:00	11.56%	9.31%	12.28%	5.74%	5.72%	5.61%	6.29%	3.14%
10:00	15.06%	18.46%	13.05%	9.16%	9.73%	9.59%	5.20%	4.23%
11:00	15.12%	16.85%	13.64%	7.78%	9.56%	6.86%	3.30%	4.70%
12:00	13.77%	15.41%	14.80%	16.95%	11.14%	9.16%	6.03%	4.74%
13:00	12.36%	11.63%	16.10%	8.58%	4.39%	7.13%	4.52%	2.45%
14:00	17.48%	17.84%	13.44%	12.09%	10.82%	10.11%	4.71%	6.75%
15:00	15.02%	17.46%	10.79%	8.71%	7.16%	7.66%	5.36%	5.58%
16:00	14.17%	15.76%	22.66%	15.30%	12.89%	7.61%	8.14%	4.16%
17:00	19.20%	22.95%	18.06%	12.42%	10.57%	11.74%	6.78%	4.99%
18:00	16.65%	12.22%	12.06%	10.86%	7.66%	7.58%	3.79%	5.10%
19:00	14.22%	13.51%	13.29%	7.62%	8.19%	7.41%	11.11%	5.22%
20:00	14.10%	11.76%	10.89%	7.51%	7.74%	5.86%	3.14%	4.06%
21:00	9.47%	8.14%	11.17%	6.64%	6.76%	6.68%	5.47%	4.83%
22:00	10.66%	9.92%	6.56%	5.19%	6.00%	3.53%	3.86%	4.09%
23:00	8.12%	10.21%	7.12%	4.39%	3.82%	2.35%	2.46%	3.53%

While engine UHU rates have not yet reached the 30 percent per hour saturation rate over multiple hours, Gilroy Engines 47 and 48, and Fire District Engine 67 are very busy in the late afternoon, and their workload should be closely monitored to provide sufficient lead time to plan for a Peak Activity Unit (PAU) or alternative relief solution once the 30 percent threshold is exceeded.

Table 16—Unit Hour Utilization – Morgan Hill Ladder Truck – 2016

Hour	MH TK57
00:00	2.49%
01:00	3.27%
02:00	3.59%
03:00	4.05%
04:00	2.86%
05:00	3.20%
06:00	5.24%
07:00	6.28%
08:00	6.20%
09:00	8.12%
10:00	5.22%
11:00	9.18%
12:00	8.09%
13:00	7.45%
14:00	8.53%
15:00	7.95%
16:00	6.70%
17:00	11.26%
18:00	9.07%
19:00	6.50%
20:00	9.32%
21:00	6.97%
22:00	5.09%
23:00	4.71%

Finding #11: The agencies need to monitor unit hour utilization and simultaneous incident rates of the busiest units on a quarterly basis.

2.7.4 Operational Performance

This section reports performance for the first apparatus to arrive on the scene of *emergency* incidents as the number of minutes and seconds necessary for 90 percent completion of the following components:

- Call processing
- Turnout
- Travel
- Dispatch to arrival
- Call to arrival

Call Processing Performance

Call processing measures the time from the first incident time stamp from the two fire dispatch centers until response crews are notified of the request for assistance. The best practice goal for this measure is 90 seconds with 90 percent or better reliability where there is not a language or location description barrier. Table 17 shows 90th percentile call processing/dispatch performance to fire and EMS incidents over the three-year study period.

Table 17—Call Processing /Dispatch Performance – 2016–2018

Station	90th Percentile Performance
Overall	**2:15**
SC1 – Morgan Hill	1:13
SC2 – Masten	1:33
SC3 – Gilroy Gardens	1:37
MH4 – El Toro	0:56
MH5 – Dunne Hill	0:59
GY7 – Chestnut	2:41
GY8 – Las Animas	2:33
GY9 – Sunrise	2:20
GYSTR – Glen Loma	2:37

Source: Fire Departments' incident records

Finding #12: Across all three agencies, 90th percentile call processing is more than 2:00 minutes. Call processing for Morgan Hill and Fire District incidents *meets* the current NFPA 1221 90-second recommendation, while call processing for Gilroy is about 1:00 minute (67 percent) *slower*.

Crew Turnout Performance

Turnout time measures the time from dispatch notification until the response apparatus starts traveling to the emergency. Given that Citygate finds the NFPA and CFAI recommendations of 60–80 seconds impossible to meet given current safety standards and station designs, a 2:00-minute goal is used for this measurement. Table 18 shows 90th percentile crew turnout performance to fire and EMS incidents over the three-year study period.

Table 18—Crew Turnout Performance – 2016–2018

Station	90th Percentile Performance
Overall	**2:41**
SC1 – Morgan Hill	3:11
SC2 – Masten	3:38
SC3 – Gilroy Gardens	3:25
MH4 – El Toro	2:53
MH5 – Dunne Hill	2:58
GY7 – Chestnut	2:00
GY8 – Las Animas	1:58
GY9 – Sunrise	1:57
GYSTR – Glen Loma	2:00

Source: Fire Departments' incident records

Finding #13: Gilroy's crew turnout performance *meets* a Citygate-recommended goal of 2:00 minutes or less, while Morgan Hill's performance is about 1:00 minute (50 percent) *slower*, and the Fire District's is about 1:30 minutes (75 percent) *slower.*

Travel Time Performance

Travel time measures time for the first-arriving response apparatus to travel to the scene of the emergency. In most urban and suburban fire departments, a 4:00-minute travel time at 90 percent or better reliability would be considered highly desirable. For this study, a travel time of 4:30 minutes is used as the benchmark goal for urban/suburban zones, and 10:30 minutes for rural zones (SC2 and SC3). Table 19 shows 90th percentile first-due travel performance over the three-year study period.

Table 19—First-Due Travel Performance – 2016–2018

Station	90th Percentile Performance
Overall	**6:08**
SC1 – Morgan Hill	6:26
SC2 – Masten[1]	8:50
SC3 – Gilroy Gardens[1]	11:24
MH4 – El Toro	6:01
MH5 – Dunne Hill	7:25
GY7 – Chestnut	5:37
GY8 – Las Animas	5:06
GY9 – Sunrise	5:09
GYSTR – Glen Loma	7:39

Source: Fire Departments' incident records
[1] 10:30-minute travel time goal for rural response areas

Finding #14: First unit travel time for Gilroy is about 1:00 minute (25 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities, but only slightly (11–22 percent) slower than the Department's current 4:30-minute goal except for the Glen Loma / Santa Teresa area, where travel time is more than 3:00 minutes (67 percent) *slower* than the current 4:30-minute goal, and more than 3:30 minutes (87 percent) *slower* than the recommended 4:00-minute goal.

Finding #15: First unit travel time for Morgan Hill is 2:00–3:25 minutes (50–87 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities.

Finding #16: First unit travel time from the Fire District's Masten station *meets* a Citygate-recommended goal of 10:30 minutes or less for rural zones and is 1:00 minute (10 percent) *slower* than the goal from the Gilroy Gardens station. First unit travel time from the Morgan Hill station is 2:26 minutes (62 percent) *slower* than the 4:00-minute goal for urban/suburban population densities.

Call-to-Arrival Performance

Call to arrival measures time from receipt of the 9-1-1 request for assistance until the apparatus arrives. Citygate's recommended goal for urban/suburban response zones is 7:30 minutes or less at 90 percent reliability, which includes 1:30-minute call processing, 2:00-minute turnout, and 4:00-minute travel. For this study, an additional 30 seconds is added to travel time based on Gilroy's current response policy. Table 20 shows call-to-arrival performance to fire and EMS incidents over the three-year study period.

Table 20—Call-to-Arrival Performance – 2016–2018

Station	90th Percentile Performance
Overall	**9:15**
SC1 – Morgan Hill	9:25
SC2 – Masten[1]	12:34
SC3 – Gilroy Gardens[1]	14:06
MH4 – El Toro	8:31
MH5 – Dunne Hill	9:51
GY7 – Chestnut	8:55
GY8 – Las Animas	8:11
GY9 – Sunrise	8:34
GYSTR – Glen Loma	10:51

Source: Fire Departments' incident records
[1] 14:00-minute call-to-arrival goal for rural response areas

Finding #17: Call-to-arrival response performance in Gilroy, Morgan Hill, and the Fire District's Morgan Hill station is nine percent to 45 percent *slower* than Citygate's recommended 7:30-minute goal for urban/suburban response zones. Call-to-arrival performance from the Fire District's Masten and Gilroy Gardens stations *meets* Citygate's recommended 14:00-minute goal for rural areas.

Effective Response Force (First Alarm) Performance

The three agencies' Effective Response Force (ERF) for a building fire is four engines or three engines and one ladder truck, and one Battalion or Division Chief for a total of 14 personnel. Table 21 shows the number of incidents where all dispatched units arrived at the incident. It is important to note that measurements based on 20 or fewer incidents can be very volatile. Citygate's recommended ERF performance goal is 11:30 minutes or less at 90 percent reliability for urban/suburban areas, including 1:30 minutes for call processing, 2:00 minutes for crew turnout, and 8:00 minutes travel time.

Table 21—Effective Response Force Call-to-Arrival Performance – 2016–2018

Station	ERF Performance	No. of Incidents
Overall	**17:07**	**25**
SC1 – Morgan Hill	14:03	7
SC2 – Masten[1]	16:29	7
SC3 – Gilroy Gardens[1]	N/A	0
MH4 – El Toro	19:17	3
MH5 – Dunne Hill	15:56	2
GY7 – Chestnut	17:04	1
GY8 – Las Animas	14:01	4
GY9 – Sunrise	N/A	0
GYSTR – Glen Loma	9:38	1

Source: Fire Departments' incident records
[1] 19:30-minute call-to-arrival goal for rural response areas

Finding #18: Effective Response Force (ERF or First Alarm) call-to-arrival performance is *significantly slower* than the Citygate-recommended goal of 11:30 minutes for urban/suburban areas, except in the Glen Loma station area in Gilroy which is 9:38 minutes. Also, ERF performance *meets* the Citygate-recommended *rural* response goal of 19:30 minutes for the Fire District's Masten station response area.

2.8 OVERALL EVALUATION

SOC ELEMENT 8 OF 8
OVERALL EVALUATION

The Departments collectively serve a diverse urban to rural population with a mixed residential and non-residential land use pattern typical for south Bay Area communities.

While the state fire code now requires fire sprinklers even in residential dwellings, it will be many more decades before the majority of homes are replaced or remodeled with automatic fire sprinklers. If desired outcomes include limiting building fire damage to only part of the inside of an affected building and/or minimizing permanent impairment resulting from a medical emergency, then all three agencies will need both first-due unit and multiple-unit ERF coverage in all *urban/suburban* neighborhoods consistent with a Citygate response performance recommendation of first-due arrival within 7:30 minutes from 9-1-1 dispatch notification and ERF arrival within 11:30 minutes of 9-1-1 notification, all at 90 percent or better reliability.

Call processing and crew turnout performance are longer than recommended best practices in some cases, and when combined with fire stations spaced too far apart, traffic congestion, and simultaneous incidents, the result is significantly longer-than-desirable total response times for first-due and ERF multiple-unit events.

Although Citygate finds the three Departments' resources to be appropriate to protect the respective jurisdictions against the hazards likely to impact their service area, the collective daily staffing of 26 personnel only provides a minimum total response force sufficient for a single emerging to serious fire incident, as discussed in Section 2.2.4, as well as a single one- to five-patient EMS incident. While the three agencies have automatic aid agreements that provide for the dispatch of the closest first-due and ERF response resource(s) regardless of jurisdiction, they are poorly located geographically for prompt additional mutual aid, which cannot realistically be provided from the west, east, or south in a timely manner, and from the north only if southern San Jose units are available and do not encounter traffic congestion on southbound U.S. 101. The three jurisdictions are thus essentially self- or co-reliant to provide the resources needed to resolve all but the most catastrophic emergencies without outside assistance. Citygate further notes that many cities the size of Gilroy and Morgan Hill have more than nine firefighters on duty daily, and that Morgan Hill and the Fire District receive mutual benefit from the cost-shared engine at the Fire District's Morgan Hill station that serves both jurisdictions.

Finding #19: Gilroy and Morgan Hill do not deploy enough firefighters daily to safely resolve even a single serious fire or EMS incident, nor to provide adequate capacity for simultaneous incidents.

Finding #20: Gilroy and Morgan Hill are dependent on Fire District resources to achieve a minimal Effective Response Force staffing of 14 personnel.

Finding #21: Gilroy and the Fire District receive mutual benefit from their current automatic aid agreement.

Finding #22: Morgan Hill and the Fire District receive mutual benefit from their current cost-shared engine and automatic aid agreement.

Finding #23: The three jurisdictions are poorly located geographically for prompt mutual aid other than from each other.

Finding #24: The three jurisdictions are essentially self- or co-reliant to provide the response resources to resolve all but the most catastrophic emergencies without outside assistance.

As the geographic mapping indicates, while the stations are appropriately located in all the major neighborhoods, they are spaced too far apart. The overall longer-than-desired first-due unit travel times are *partially* the result of a lack of fire stations. Other causes are the non-grid street network design in some areas, topography, natural and built barriers (hills and the highways), simultaneous incidents at peak hours of the day, and traffic congestion.

In terms of emergency incident workload per unit, no single fire unit or station area is approaching workload saturation; however, across the entire study area, during peak hours of the day there is a significant simultaneous incident rate of at least three incidents at once 19 percent of the time. When this occurs, 33 percent of the area's fire engines are committed, and should a building fire occur at that point, the Departments would depend on mutual aid assistance from San Jose.

Given increasing service demand and the fact that the area's population is still evolving, Citygate is concerned that the overall staffing per day in the two Cities limits those Departments' abilities to respond with more "weight of attack."

The two Cities are growing past their station spacing, while continuing to be very co-dependent on the Fire District, CAL FIRE, and San Jose. Lowering dispatch processing and turnout time cannot completely negate the long travel times and traffic congestion—only an additional fire station in each City can.

2.8.1 Deployment Recommendations

Based on the technical analysis and findings contained in this SOC assessment, Citygate offers the following deployment recommendations:

Recommendation #1: **Adopt Updated Deployment Policies:** The Departments' elected officials should adopt *updated*, complete performance measures to aid deployment planning and to monitor performance. The measures of time should be designed to deliver outcomes that will save patients when possible upon arrival and to keep small but serious fires from becoming more serious. With this is mind, Citygate recommends the following measures:

1.1 Distribution of Fire Stations: In *urban/suburban* population density areas, to treat pre-hospital medical emergencies and control small fires, the first-due unit should arrive within 7:30 minutes, 90 percent of the time from the receipt of the 9-1-1 call at fire dispatch. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 4:00-minute travel time.

In rural population density areas, the first-due unit should arrive within 14:00 minutes from the receipt of the 9-1-1 call at fire dispatch at 80 percent or better reliability. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 10:30-minute travel time.

1.2 Multiple-Unit Effective Response Force (ERF) for Serious Emergencies: In *urban/suburban* population density areas, to confine building fires near the room of origin, keep vegetation fires under one acre in size, and treat multiple medical patients at a single incident, a multiple-unit ERF of at least 17 personnel, including two Battalion Chiefs, should arrive within 11:30 minutes from the time of 9-1-1 call receipt at fire dispatch 90 percent of the time. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and an 8:00-minute travel time.

For *rural* population density areas, a multiple-unit ERF of at least 13 personnel, including at least one Battalion Chief, should arrive within 19:30 minutes from the time of 9-1-1 call receipt at fire dispatch 80 percent of the time. This equates to a 90-second dispatch time, a 2:00-minute crew turnout time, and a 16:00-minute travel time.

1.3 Hazardous Materials Response: Provide hazardous materials response designed to protect the communities from the hazards associated with uncontrolled release of hazardous and toxic materials. The fundamental mission of the Departments' response is to isolate the hazard, deny entry into the hazard zone, and notify appropriate officials/resources to minimize impacts on the community. This can be achieved with a first-due total response time of 7:30 minutes or less to provide initial hazard evaluation and/or mitigation actions. After the initial evaluation is completed, a determination can be made whether to request additional resources from the regional hazardous materials team.

1.4 Technical Rescue: Respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue with a first-due total response time of 7:30 minutes or less to evaluate the situation and/or initiate rescue actions. Following the initial evaluation, assemble additional resources as needed within a total response time of 11:30 minutes to safely complete rescue/extrication and delivery of the victim to the appropriate emergency medical care facility.

Recommendation #2: Gilroy needs to work to substantially lower dispatch processing times, and Morgan Hill and the Fire District need to work to lower crew turnout times.

SECTION 3—FUTURE SERVICE NEEDS AND ALTERNATIVE SERVICE MODELS

This section contains Citygate's evaluation of projected future population growth and related development within the three fire agency jurisdictions, projected future service demand, and potential alternative fire service models. It should be noted that recent state legislation, which overrides local growth measures, could increase near-term and longer-term growth and related service demand in all three jurisdictions.

3.1 FUTURE GROWTH

3.1.1 City of Gilroy

According to Gilroy's 2040 General Plan Alternatives Report,[6] the Association of Bay Area Governments (ABAG) projects the City's population to grow to 61,000 by 2040, for a relatively slow annual growth rate of 0.8 percent. ABAG's projection, however, is based on regional policies and does not consider projected market demand. Gilroy's Economic Consultant, ADE, produced a range of population growth scenarios based on projected market demand, which range from 69,249 to 79,317 by the year 2040 for an average annual growth rate ranging from 1.5 to 2.2 percent. ADE's median projection calls for a 2040 population of approximately 74,000, which reflects an average annualized growth rate of 1.9 percent. The report further projects 5,600 to more than 9,000 additional housing units over the same period based on the low and high population projections. Citygate further assumes a relatively similar growth in non-residential occupancies to support the growing population of residents, non-residents in the workforce, and daily transients.

Santa Clara County land use policies[7] that promote future growth within existing urban service areas, and long-term voter-approved Urban Growth Boundaries (UGBs), will limit the City's physical expansion through at least 2040, and any population growth will be accommodated through infill and land use intensification within the UGBs. Recent state legislation, which overrides local growth measures, could increase near-term and longer-term growth and related service demand in the City.

3.1.2 City of Morgan Hill

The City of Morgan Hill's 2035 General Plan projects the City's population to increase 35 percent to 58,200 by the year 2035, for an average annualized growth rate of approximately 2.2 percent.[8]

[6] Reference: Gilroy General Plan Alternatives Report (2015) – Table 3-10
[7] Reference: Santa Clara County General Plan (1995–2010), Growth and Development
[8] Reference: City of Morgan Hill 2035 General Plan

The General Plan Housing Element further identifies 1,378 potential additional housing units based on available vacant land and current land use and zoning policies.

Although recent state legislation overrides local growth control measures, local land use policies encourage population growth to be accommodated through infill and land use intensification.

3.1.3 South Santa Clara County Fire District

Given Santa Clara County land use policies, Citygate does not expect the Fire District's population or land use to change significantly over the next 20 years.

Finding #25: Population in the two Cities is projected to increase 1.5 to 2.2 percent annually over the next 16–21 years; population in the Fire District is not expected to change significantly as a result of County land use policies focusing future growth within existing urban service areas.

Finding #26: Projected population growth in Gilroy and Morgan Hill will be accommodated through infill and land use intensification within the existing Urban Growth Boundaries through at least 2040.

3.2 FUTURE SERVICE DEMAND

Table 22 summarizes total service demand over the three-year study period by jurisdiction.

Table 22—Total Service Demand – 2016–2018

Year	Jurisdiction						Total	Percent Change
	Gilroy	Percent Change	Morgan Hill	Percent Change	Fire District	Percent Change		
2016	4,865	n/a	2,361	n/a	2,699	n/a	9,925	n/a
2017	5,079	**4.4%**	2,592	**9.8%**	2,880	**6.7%**	10,551	**6.3%**
2018	5,067	**-.2%**	2,557	**-1.4%**	2,942	**2.2%**	10,556	**.05%**
Total	**15,011**	**4.2%**	**7,510**	**8.3%**	**8,521**	**9.0%**	**31,042**	**6.3%**

As Table 22 illustrates, aggregate total service demand increased 6.3 percent over the three-year period for an average annual increase of 3.2 percent. During that same period, EMS demand, which comprised 68 percent of total aggregate service demand, increased 7.3 percent for an average annual increase of 3.65 percent.

As discussed in Section A.1.12 (**Appendix A—Risk Assessment**), medical emergency service demand in most communities is predominantly a function of population density, demographics, violence, health insurance coverage, and vehicle traffic. In addition, medical emergency risk tends to be higher among older, poorer, less educated, and uninsured populations. According to the U.S. Census Bureau, 10 to 13 percent of the population in the two Cities is 65 and older; 7 to 12 percent is at or below poverty level; 10 to 30 percent over 24 years of age has less than a high school diploma or equivalent; and only 5 to 8 percent do not have health insurance coverage.[9] Given these demographics and the projected population growth discussed in Section 3.1, Citygate projects that overall service demand will increase approximately 2–4 percent annually over the next 15–20 years, with EMS demand projected to increase at a slightly higher rate of 3–6 percent annually.

Finding #27: Annual service demand increased 6.3 percent over the three-year study period.

Finding #28: Citygate projects service demand will continue to increase approximately 2–5 percent annually over the next 16–21 years (2035–2040), with EMS service demand increasing at a slightly higher 3–6 percent annually and comprising an increasing percentage of total service demand.

3.3 Future Facility, Resource, and Staffing Needs

While the three fire agencies' resources are appropriate to protect against the hazards likely to impact their service areas, the collective daily on-duty staffing of 26 personnel only provides a minimum total response force sufficient for a single emerging to serious fire incident, as discussed in Section 2.2.4, as well as a single one- to five-patient EMS incident. Many cities the size of Gilroy and Morgan Hill have more than nine firefighters on duty daily. The two Cities are very dependent on the Fire District's resources for both first-due and ERF capacity and staffing.

As discussed in Section 2.8, although the City stations are appropriately located in all the major neighborhoods, they are spaced too far apart to provide first-due travel times to achieve desirable outcomes in combination with the non-grid street network design in some areas, topography, natural and built barriers (hills and the highways), simultaneous incidents at peak hours of the day, and traffic congestion. Given the projected population and service demand growth discussed previously, Citygate believes that both Cities will require at least one additional fire station in the near future.

[9] Source: U.S. Census Bureau (2016)

3.3.1 Fire Station Siting Guidelines

Over more than a decade of assisting clients in determining where to best site or relocate fire stations, Citygate has developed the following fire station siting guidelines:

1. Serve the most people in the shortest travel time possible
2. Provide a 360-degree first-due service area
3. Avoid political, natural, and human-built barriers within the first-due travel time goal[10]
4. Provide direct access to primary travel routes in all cardinal directions.

3.3.2 City of Gilroy

As discussed in Section 2, Citygate's recommended best practice for total *first-due* response time to achieve desirable outcomes, from receipt of a 9-1-1 call in urban population areas such as Gilroy, is 7:30 minutes or less at 90 percent or better reliability, which includes 1:30 minutes for call processing/dispatch time, 2:00 minutes for crew turnout time, and 4:00 minutes for travel time. More serious emergencies requiring a multiple-unit ERF of at least 17 personnel to achieve desirable outcomes, should arrive within 11:30 minutes or less at 90 percent or better reliability.

Gilroy's three current fire stations, in combination with the Fire District's Station #3 at Gilroy Gardens, provide a daily staffing level of 13 total response personnel, four personnel short of the minimum recommended ERF staffing level for even a single moderate emergency incident. Assuming a 4:00-minute travel time goal to achieve desirable emergency incident outcomes, geographic mapping conducted for a concurrent Gilroy Fire Master Plan Update shows a significant 4:00-minute travel time coverage gap in the southwestern Glen Loma / Eagle Ridge area of the City where new residential development is occurring. Citygate evaluated two sites for a future fire station in this area and recommended a City-owned site at Miller Avenue and West Luchessa Avenue as the preferred alternative, as shown in Map Scenario #1 (**Volume 2—Map Atlas**).

The City implemented the pilot Alternative Service Model (ASM) study in the Glen Loma Ranch area on July 1, 2019, staffing either a Type-1 ambulance or a Type-6 wildland fire engine with two personnel on overtime status daily from 8:00 a.m. to 8:00 p.m. While this ASM pilot study was implemented primarily to provide ALS pre-hospital emergency medical services to this newly developing area of the City beyond 4:00-minute first-due travel time from other existing fire stations, it also provides additional critical Citywide first-due and ERF staffing capacity during peak service demand hours. Although this pilot study is only funded through June 30, 2020, Citygate has recommended that the City continue the ASM, absent any unforeseen adverse

[10] This guideline may not apply in auto-aid or "boundary drop" situations.

impacts, until such time as the City can allocate the funds to construct a station and staff a full-time three-person crew in that area of the City.

As discussed in more detail below, the Fire District is also considering its future options, which could include the relocation of one or more of its existing stations. Should the District decide to relocate the Gilroy Gardens station, it would impact first-due and ERF capacity, staffing, and travel time coverage for the City. Should the District exercise this option, the City should consider relocating the Las Animas station further west toward First Street and Santa Teresa Boulevard, which would in turn create a first-due and ERF coverage gap in the northeast quadrant of the City, potentially requiring a fifth station in that area to ensure equitable delivery of fire and pre-hospital EMS to all areas of the City.

Finding #29: The City of Gilroy is geographically too large to effectively provide recommended service levels from its three existing fire stations and Fire District Station #3 at Gilroy Gardens.

Finding #30: A fourth fire station in southwest Gilroy would improve five deployment needs including first-due travel time coverage, daily Citywide staffing, multiple-unit Effective Response Force (ERF) staffing, travel time coverage during traffic congestion periods, and reduced dependence on the Fire District's Station #3 at Gilroy Gardens for first-due and ERF capacity and staffing.

Finding #31: If the Fire District relocates the Gilroy Gardens station further west, it will impact first-due and Effective Response Force capacity, staffing, and travel time coverage for Gilroy.

Recommendation #3: The City of Gilroy should construct a fourth fire station in the southwest Glen Loma area of the City, and staff it with a full-time three-person crew as soon as fiscally feasible.

Recommendation #4: The City of Gilroy should continue the current pilot Alternative Service Model until such time as the Glen Loma station is constructed and staffed with a full-time crew.

Recommendation #5:	The City of Gilroy and the Fire District should continue to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

3.3.3 City of Morgan Hill

The City of Morgan Hill's two existing fire stations, with a third cost-shared engine[11] stationed at the Fire District Headquarters on Monterey Road in Morgan Hill, provide a combined daily staffing level of 10 response personnel. As discussed in Section 2.8, the City is understaffed to achieve even minimal ERF staffing and is heavily reliant on Fire District and/or mutual aid resources to safely resolve even a single serious fire or EMS incident, or to provide adequate capacity for simultaneous incidents. In Citygate's opinion, the risks within the City, combined with projected future growth, justify a minimum daily staffing level of nine City personnel (12 including shared Fire District Station #1) providing all-risk fire/EMS from three City fire stations plus shared Fire District Station #1. Potential incremental steps to achieve a fully staffed third City station include staffing the truck with three personnel as a third City unit, and/or dynamic deployment of a two-person Type-6[12] all-risk unit in central Morgan Hill during peak service demand hours.

Finding #32:	The City of Morgan Hill is geographically too large to effectively provide recommended service levels from its two existing fire stations and shared Fire District Station #1.
Finding #33:	The risks in Morgan Hill, combined with projected future growth, justify a dedicated minimum daily City staffing level of nine personnel, with 12 total personnel daily including the Fire District's Morgan Hill engine.

[11] Engine crew costs are equally shared between the City of Morgan Hill and the South Santa Clara County Fire District

[12] 18,000–20,000-pound GVW truck chassis with utility body, fire pump, water tank, and hose. May also be equipped to provide ALS/BLS EMS and initial rescue services.

Recommendation #6:	The City of Morgan Hill should construct and staff a third fire station in the central section of the City as soon as fiscally feasible; or incrementally staff the truck with three personnel as a fourth unit, or dynamically deploy a two-person Peak Activity Unit during peak service demand periods.

Assuming a 4:00-minute first-due travel time goal to achieve desirable emergency incident outcomes, geographic mapping shows that only 75 percent of the City's public road network is reachable within 4:00 minutes travel time *without* traffic congestion as summarized in Table 23.

Table 23—Travel Time Coverage – Morgan Hill

Travel Time Measure	Total Public Road Miles	Non-Congested Miles Covered	Non-Congested Percent of Total Miles
4:00-Minute First Due Existing Stations[1]	193.5	144.6	**74.73%**
4:00-Minute First Due with Butterfield Station[1]	193.5	158.7	**82.02%**
8:00-Minute ERF with Existing Stations[1]	193.5	55.8	**28.84%**
8:00-Minute ERF with Butterfield Station[1]	193.5	177.3	**91.63%**

[1] Including shared Fire District Station #1 in Morgan Hill

Citygate evaluated travel time coverage from a potential future third City fire station at Butterfield Boulevard and Diana Avenue at the Department's request. As Map Scenario #2 (**Volume 2—Map Atlas**) and Table 23 show, this location would improve 4:00-minute first-due travel time coverage by approximately 7 percent to 82 percent of total City public road miles, which in Citygate's opinion is good first-due coverage. As Table 23 also shows, a third City station at this location would improve 8:00-minute ERF travel time coverage by nearly 63 percent to more than 91 percent of total public road miles, as shown in Map Scenario #2a, which is excellent coverage.

Finding #34:	A third fire station in central Morgan Hill would improve Citywide daily staffing capacity and both first-due and Effective Response Force travel time coverage.

Recommendation #7:	Morgan Hill and the Fire District should continue to collaborate to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Citygate was also asked to review travel time coverage from the City's El Toro station. As Map Scenario #2 (**Volume 2—Map Atlas**) and Table 23 show, there is a significant 4:00-minute first-due travel time coverage gap in the northeast section of the City even with the recommended third fire station at Butterfield Boulevard and Diana Avenue. Although the scope of work for this study did not include geographic mapping of an alternative El Toro station site, relocation of that station further east to the Cochrane Road corridor would certainly improve 4:00-minute first-due travel time coverage into that northeastern gap area; however, it would reduce first-due travel time coverage to the northwestern Llagas Road neighborhoods. In Citygate's opinion, relocation of the El Toro station would have no to very minimal impact on current 8:00-minute ERF travel time coverage.

Finding #35:	Relocating the Morgan Hill El Toro station east to the Cochrane Road corridor would improve 4:00-minute first-due travel time coverage in the northeast section of the City; however, it would concurrently reduce first-due travel time coverage in the northwestern Llagas Road neighborhoods.
Finding #36:	Relocating the El Toro station east to the Cochrane Road corridor would have no to very minimal impact on current 8:00-minute Effective Response Force travel time coverage.

3.3.4 South Santa Clara County Fire District

Although Santa Clara County land use policies promote future growth within existing urban service areas, there are areas within the Fire District's 306 square mile service area, including San Martin and the unincorporated areas just outside the City of Morgan Hill, with population densities approaching 1,000 per square mile. In addition, western areas of the District along Watsonville Road, and areas east of U.S. 101, have a higher population density than the more rural areas of the District.

Because of these varied population densities, Citygate utilized two response performance expectations for this study: 7:30-minute first-due call-to-arrival and 11:30-minute ERF call-to-arrival goal for the Morgan Hill station given the predominantly urban/suburban population density served by that station, and a 14:00-minute rural first-due call-to-arrival goal for the Masten

and Gilroy Gardens stations given the more suburban/rural population densities served by those stations.

Although response performance for the Masten and Gilroy Gardens stations meets the Citygate-recommended 14:00-minute call-to-arrival goal for rural response zones, District executive staff asked Citygate to identify and evaluate potential alternate sites for these two stations that could enhance first-due and overall regional response performance.

The Masten station, centrally located between Gilroy and Morgan Hill on the east side frontage road of U.S. 101 just south of Masten Avenue, provides relatively good access to east- and west-bound Masten Avenue, as well as northbound U.S. 101. Access to southbound U.S. 101, however, is slower due to the onramp location on the west side of the Masten Avenue overpass.

Considering Citygate's fire station siting guidelines in Section 3.3.1, the only other suitable location for this station in Citygate's opinion is in the vicinity of the U.S. 101 / San Martin Avenue interchange, approximately two miles north of its current location, as shown in Map Scenario #3 (**Volume 2—Map Atlas**). Given the pending closure of Reed Airport in San Jose which is anticipated to increase general aviation activity significantly at the South Santa Clara County Airport in San Martin, a station sited on the north end of the runway with direct access to Murphy Avenue would provide improved response time to the airport, San Martin, and Morgan Hill. However, it would increase response times into Gilroy and Fire District areas east of Gilroy. While there are both advantages and disadvantages to this potential station location, it is ultimately a policy and fiscal decision for consideration by the Fire District Board of Commissioners, ideally in collaboration with the Cities of Gilroy and Morgan Hill.

> **Finding #37:** Relocation of the Fire District's Masten station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

The Gilroy Gardens station is located on the south side of Highway 152 at the entrance to the Gilroy Gardens Family Theme Park on the western edge of Gilroy. While this location provides immediate first-due and ERF coverage into the City, nearly all this station's primary first-due response area lies to the west along Highway 152 and northwest. In Citygate's opinion, considering the fire station siting guidelines in Section 3.3.1, a more suitable location for this station would be in the vicinity of Watsonville Road and Day Road to provide quicker first-due travel time coverage of the more populated portions of its primary response area, as well as good access to the north, south, and east to Santa Teresa Boulevard. As shown in Map Scenario #4 (**Volume 2—Map Atlas**), relocation of this station would also have a significant impact on first-due and ERF capacity and travel time coverage for Gilroy.

Finding #38: Relocation of the Fire District's Gilroy Gardens station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Recommendation #8: The Fire District should collaborate closely with both Cities relative to any potential station relocations.

3.4 ALTERNATIVE SERVICE MODELS

As discussed in Section 2.8 and this section, Gilroy and Morgan Hill do not, in Citygate's opinion, deploy a sufficient number of firefighters daily to safely resolve even a single serious fire or EMS incident, or to provide adequate capacity for simultaneous incidents, and are thus dependent on Fire District resources to achieve a minimal ERF staffing of 14 personnel. In addition, while the three agencies have automatic aid agreements that send the closest first-due and ERF resources regardless of jurisdiction, they are poorly located geographically for prompt mutual aid other than from each other, and are thus essentially self- or co-reliant to provide the response resources to resolve all but the most catastrophic emergencies without outside assistance.

Given the fact that few if any jurisdictions can afford a service level that provides enough resources to handle *all* calls for service, including concurrent calls, cooperative solutions between the three jurisdictions that maximize utilization of their combined resources are the best pathway forward for efficient and cost-effective delivery of fire services. The existing automatic aid agreements that provide for closest first-due and ERF unit response are an excellent first step in this direction, as is Morgan Hill and the Fire District's cost sharing of a fire engine and some administrative support staff to serve both jurisdictions.

As the jurisdiction physically located between the two Cities, the Fire District is *the* key partner to any cooperative fire service solution in south Santa Clara County. In addition to its current cooperative shared services with Morgan Hill, the Fire District and Gilroy could consider similar shared services, including cost-shared or co-located response resource(s), and/or administrative support staff to serve both jurisdictions.

Finding #39: A cooperative fire service model that maximizes utilization of the combined three fire agency jurisdictions' resources is the best alternative going forward for efficient and cost-effective delivery of fire services in south Santa Clara County.

3.5 FUTURE NEEDS SUMMARY

Projected future growth and development in south Santa Clara County will not alter Gilroy, Morgan Hill, and the Fire District's physical isolation from other regional fire service providers, thus continuing to make them self- or co-reliant for many decades for the resources to resolve all but the most catastrophic emergencies without outside assistance. Such physical isolation, in combination with fiscal realities that prevent any one jurisdiction from being able to afford a service level providing enough resources and staffing to handle all calls for service without outside assistance, makes cooperative solution(s) critical that maximize utilization of the combined resources of all three jurisdictions to provide optimal operational and fiscal effectiveness and efficiency going forward.

Given the growth currently occurring in southwestern Gilroy, and the City's current planning for a future fourth fire station in that area, it is essential that the Fire District determine its long-term plans relative to the Gilroy Gardens station as soon as possible given the potential impacts to the City if that station is closed or relocated. Equally important, in Citygate's opinion, is for the Cities' and Fire District's leadership to engage as soon as possible: to (1) establish desire and intent to provide cooperative fire services for many decades, perhaps through a formal Memorandum of Understanding (MOU); and (2) to establish a joint planning team to work through the detailed planning for such future cooperative services for consideration by each jurisdiction's policy-making body.

Finding #40: Close collaboration between Gilroy, Morgan Hill, and the Fire District is critical to establishing and maintaining a cooperative regional fire service delivery model that maximizes utilization of the combined jurisdictions' resources to provide long-term operational and fiscal efficiencies.

Recommendation #9: Gilroy, Morgan Hill, and Fire District leadership should establish desire and intent as soon as possible to provide cooperative fire services for many decades, perhaps through a formal Memorandum of Understanding.

Recommendation #10:	Given the desire and intent to jointly provide cooperative fire services for many decades, the three jurisdictions should establish a joint strategic planning team with policy-level direction to evaluate potential cooperative service elements for approval by the respective policy bodies, and then to conduct the detailed implementation planning necessary.

SECTION 4—FINDINGS AND RECOMMENDATIONS

This section contains all the findings and recommendations found throughout this report in sequential order.

4.1 FINDINGS

Finding #1: None of the three agencies have elected-official-approved response performance objectives meeting all best practice elements for time and desired outcomes. Some of the departmental policies have a portion of the elements of best practices-based response time and outcomes desired policies.

Finding #2: All three agencies have, over the last decade or more, completed a fire master plan, Standards of Response Cover assessment, or a contract for services agreement, yet the elected officials have not clearly adopted the response time policies as recommended in prior studies.

Finding #3: The three fire agencies have a standard response plan that considers risk and establishes an appropriate initial response for each incident type. Each type of call for service receives the combination of engines, trucks, specialty units, and command officers customarily needed to effectively control that type of incident based on each agency's experience.

Finding #4: During traffic congestion periods, there are multiple underserved core areas in Morgan Hill, suggesting the three stations are spaced too far apart. In Gilroy, the edge areas and new development beyond the current *non-congested* coverage area also suggests the need for an additional station.

Finding #5: Given that only nine firefighters are on-duty in each City, if *both* Cities added a fourth fire station, raising daily staffing to 12, they would be less dependent on the Fire District's staffing for serious emergencies requiring a multiple-unit response.

Finding #6: The Fire District's Station #3 in west Gilroy serves mostly Gilroy within its 4:30-minute first-due travel coverage. It would provide better rural area coverage if moved northwest of its current location.

Finding #7: Even if all three agencies' fire stations are available, neither north Morgan Hill nor south and eastern Gilroy can receive a minimum multiple-unit Effective Response Force of 12 firefighters within 8:00 minutes travel time.

Finding #8: Service demand occurs across all hours of the day, indicating the need for a 24-hours-per-day, seven-days-per-week fire and EMS emergency response system.

Finding #9: Although the occurrence of simultaneous incidents varies over the three-year study period, a significant percentage of the collective agencies' service demand involves two or more incidents occurring at the same time.

Finding #10: Approximately 10 percent of the three Fire District and two Morgan Hill stations' calls for service involve simultaneous incidents within those same station response areas, resulting in a slower response for the second or subsequent incident from another station. Same-station simultaneous incident activity in Gilroy is 3.5 percent or less.

Finding #11: The agencies need to monitor unit hour utilization and simultaneous incident rates of the busiest units on a quarterly basis.

Finding #12: Across all three agencies, 90th percentile call processing is more than 2:00 minutes. Call processing for Morgan Hill and Fire District incidents *meets* the current NFPA 1221 90-second recommendation, while call processing for Gilroy is about 1:00 minute (67 percent) *slower*.

Finding #13: Gilroy's crew turnout performance *meets* a Citygate-recommended goal of 2:00 minutes or less, while Morgan Hill's performance is about 1:00 minute (50 percent) *slower*, and the Fire District's is about 1:30 minutes (75 percent) *slower*.

Finding #14: First unit travel time for Gilroy is about 1:00 minute (25 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities, but only slightly (11–22 percent) slower than the Department's current 4:30-minute goal except for the Glen Loma / Santa Teresa area, where travel time is more than 3:00 minutes (67 percent) *slower* than the current 4:30-minute goal, and more than 3:30 minutes (87 percent) *slower* than the recommended 4:00-minute goal.

Finding #15: First unit travel time for Morgan Hill is 2:00–3:25 minutes (50–87 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities.

Finding #16: First unit travel time from the Fire District's Masten station *meets* a Citygate-recommended goal of 10:30 minutes or less for rural zones and is 1:00 minute (10 percent) *slower* than the goal from the Gilroy Gardens station. First unit travel time

from the Morgan Hill station is 2:26 minutes (62 percent) *slower* than the 4:00-minute goal for urban/suburban population densities.

Finding #17: Call-to-arrival response performance in Gilroy, Morgan Hill, and the Fire District's Morgan Hill station is nine percent to 45 percent *slower* than Citygate's recommended 7:30-minute goal for urban/suburban response zones. Call-to-arrival performance from the Fire District's Masten and Gilroy Gardens stations *meets* Citygate's recommended 14:00-minute goal for rural areas.

Finding #18: Effective Response Force (ERF or First Alarm) call-to-arrival performance is *significantly slower* than the Citygate-recommended goal of 11:30 minutes for urban/suburban areas, except in the Glen Loma station area in Gilroy which is 9:38 minutes. Also, ERF performance *meets* the Citygate-recommended *rural* response goal of 19:30 minutes for the Fire District's Masten station response area.

Finding #19: Gilroy and Morgan Hill do not deploy enough firefighters daily to safely resolve even a single serious fire or EMS incident, nor to provide adequate capacity for simultaneous incidents.

Finding #20: Gilroy and Morgan Hill are dependent on Fire District resources to achieve a minimal Effective Response Force staffing of 14 personnel.

Finding #21: Gilroy and the Fire District receive mutual benefit from their current automatic aid agreement.

Finding #22: Morgan Hill and the Fire District receive mutual benefit from their current cost-shared engine and automatic aid agreement.

Finding #23: The three jurisdictions are poorly located geographically for prompt mutual aid other than from each other.

Finding #24: The three jurisdictions are essentially self- or co-reliant to provide the response resources to resolve all but the most catastrophic emergencies without outside assistance.

Finding #25: Population in the two Cities is projected to increase 1.5 to 2.2 percent annually over the next 16–21 years; population in the Fire District is not expected to change significantly as a result of County land use policies focusing future growth within existing urban service areas.

Finding #26: Projected population growth in Gilroy and Morgan Hill will be accommodated through infill and land use intensification within the existing Urban Growth Boundaries through at least 2040.

Finding #27: Annual service demand increased 6.3 percent over the three-year study period.

Finding #28: Citygate projects service demand will continue to increase approximately 2–5 percent annually over the next 16–21 years (2035–2040), with EMS service demand increasing at a slightly higher 3–6 percent annually and comprising an increasing percentage of total service demand.

Finding #29: The City of Gilroy is geographically too large to effectively provide recommended service levels from its three existing fire stations and Fire District Station #3 at Gilroy Gardens.

Finding #30: A fourth fire station in southwest Gilroy would improve five deployment needs including first-due travel time coverage, daily Citywide staffing, multiple-unit Effective Response Force (ERF) staffing, travel time coverage during traffic congestion periods, and reduced dependence on the Fire District's Station #3 at Gilroy Gardens for first-due and ERF capacity and staffing.

Finding #31: If the Fire District relocates the Gilroy Gardens station further west, it will impact first-due and Effective Response Force capacity, staffing, and travel time coverage for Gilroy.

Finding #32: The City of Morgan Hill is geographically too large to effectively provide recommended service levels from its two existing fire stations and shared Fire District Station #1.

Finding #33: The risks in Morgan Hill, combined with projected future growth, justify a dedicated minimum daily City staffing level of nine personnel, with 12 total personnel daily including the Fire District's Morgan Hill engine.

Finding #34: A third fire station in central Morgan Hill would improve Citywide daily staffing capacity and both first-due and Effective Response Force travel time coverage.

Finding #35: Relocating the Morgan Hill El Toro station east to the Cochrane Road corridor would improve 4:00-minute first-due travel time coverage in the northeast section of the City; however, it would concurrently reduce first-due travel time coverage in the northwestern Llagas Road neighborhoods.

Finding #36: Relocating the El Toro station east to the Cochrane Road corridor would have no to very minimal impact on current 8:00-minute Effective Response Force travel time coverage.

Finding #37: Relocation of the Fire District's Masten station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Finding #38: Relocation of the Fire District's Gilroy Gardens station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Finding #39: A cooperative fire service model that maximizes utilization of the combined three fire agency jurisdictions' resources is the best alternative going forward for efficient and cost-effective delivery of fire services in south Santa Clara County.

Finding #40: Close collaboration between Gilroy, Morgan Hill, and the Fire District is critical to establishing and maintaining a cooperative regional fire service delivery model that maximizes utilization of the combined jurisdictions' resources to provide long-term operational and fiscal efficiencies.

4.2 RECOMMENDATIONS

Recommendation #1: **Adopt Updated Deployment Policies:** The Departments' elected officials should adopt *updated*, complete performance measures to aid deployment planning and to monitor performance. The measures of time should be designed to deliver outcomes that will save patients when possible upon arrival and to keep small but serious fires from becoming more serious. With this is mind, Citygate recommends the following measures:

1.1 Distribution of Fire Stations: In *urban/suburban* population density areas, to treat pre-hospital medical emergencies and control small fires, the first-due unit should arrive within 7:30 minutes, 90 percent of the time from the receipt of the 9-1-1 call at fire dispatch. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 4:00-minute travel time.

In rural population density areas, the first-due unit should arrive within 14:00 minutes from the receipt of the 9-1-1 call at fire dispatch at 80 percent or better reliability. This equates to a 90-

second dispatch time, a 2:00-minute company turnout time, and a 10:30-minute travel time.

1.2 Multiple-Unit Effective Response Force (ERF) for Serious Emergencies: In *urban/suburban* population density areas, to confine building fires near the room of origin, keep vegetation fires under one acre in size, and treat multiple medical patients at a single incident, a multiple-unit ERF of at least 17 personnel, including two Battalion Chiefs, should arrive within 11:30 minutes from the time of 9-1-1 call receipt at fire dispatch 90 percent of the time. This equates to a 90-second dispatch time, 2:00-minute company turnout time, and 8:00-minute travel time.

For *rural* population density areas, a multiple-unit ERF of at least 13 personnel, including at least one Battalion Chief, should arrive within 19:30 minutes from the time of 9-1-1 call receipt at fire dispatch 80 percent of the time. This equates to a 90-second dispatch time, 2:00-minute crew turnout time, and 16:00-minute travel time.

1.3 Hazardous Materials Response: Provide hazardous materials response designed to protect the communities from the hazards associated with uncontrolled release of hazardous and toxic materials. The fundamental mission of the Departments' response is to isolate the hazard, deny entry into the hazard zone, and notify appropriate officials/resources to minimize impacts on the community. This can be achieved with a first-due total response time of 7:30 minutes or less to provide initial hazard evaluation and/or mitigation actions. After the initial evaluation is completed, a determination can be made whether to request additional resources from the regional hazardous materials team.

1.4 Technical Rescue: Respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue with a first-due total response time of 7:30 minutes or less to evaluate the situation and/or initiate rescue actions. Following the initial evaluation, assemble additional resources as needed within a total response time of 11:30 minutes to safely complete rescue/extrication and delivery of the victim to the appropriate emergency medical care facility.

Recommendation #2: Gilroy needs to work to substantially lower dispatch processing times, and Morgan Hill and the Fire District need to work to lower crew turnout times.

Recommendation #3: The City of Gilroy should construct a fourth fire station in the southwest Glen Loma area of the City, and staff it with a full-time three-person crew as soon as fiscally feasible.

Recommendation #4: The City of Gilroy should continue the current pilot Alternative Service Model until such time as the Glen Loma station is constructed and staffed with a full-time crew.

Recommendation #5: The City of Gilroy and the Fire District should continue to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Recommendation #6: The City of Morgan Hill should construct and staff a third fire station in the central section of the City as soon as fiscally feasible; or incrementally staff the truck with three personnel as a fourth unit, or dynamically deploy a two-person Peak Activity Unit during peak service demand periods.

Recommendation #7: Morgan Hill and the Fire District should continue to collaborate to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Recommendation #8: The Fire District should collaborate closely with both Cities relative to any potential station relocations.

Recommendation #9: Gilroy, Morgan Hill, and Fire District leadership should establish desire and intent as soon as possible to provide cooperative fire services for many decades, perhaps through a formal Memorandum of Understanding.

Recommendation #10: Given the desire and intent to jointly provide cooperative fire services for many decades, the three jurisdictions should establish a joint strategic planning team with policy-level direction to evaluate potential cooperative service elements for approval by the respective policy bodies, and then to conduct the detailed implementation planning necessary.

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SECTION 5—NEXT STEPS

Citygate's recommended immediate next steps for Gilroy, Morgan Hill, and the Fire District are:

- Review and absorb the content, findings, and recommendations of this study
- Prepare a staff report and draft Resolution for each City Council and the Fire District Board of Commissioners to adopt the included recommended response performance goals
- Determine interest and intent to provide long-term joint cooperative fire services in south Santa Clara County
  - Consider a Memorandum of Understanding to memorialize such intent.

Recommended intermediate-term next steps include:

- Monitor response performance and unit workload at least annually
- Establish a joint agency strategic planning team with policy-level direction to evaluate potential cooperative service opportunities, including, but not limited to, fire crew staffing, deployment, cost sharing, and fire dispatch services, with the intent to develop a mutually beneficial long-term commitment and solution that optimizes the use of all three jurisdictions' resources to provide efficient and cost-effective fire services in south Santa Clara County.

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APPENDIX A—COMMUNITY RISK ASSESSMENT

A.1 COMMUNITY RISK ASSESSMENT

SOC ELEMENT 3 OF 8
COMMUNITY RISK ASSESSMENT

The third element of the Standards of Coverage (SOC) process is a community risk assessment. Within the context of an SOC study, the objectives of a community risk assessment are to:

1. Identify the values at risk to be protected within the community or service area.
2. Identify the hazards with potential to adversely impact the community or service area.
3. Quantify the overall risk associated with each hazard.
4. Establish a foundation for current/future deployment decisions and risk-reduction/hazard mitigation planning and evaluation.

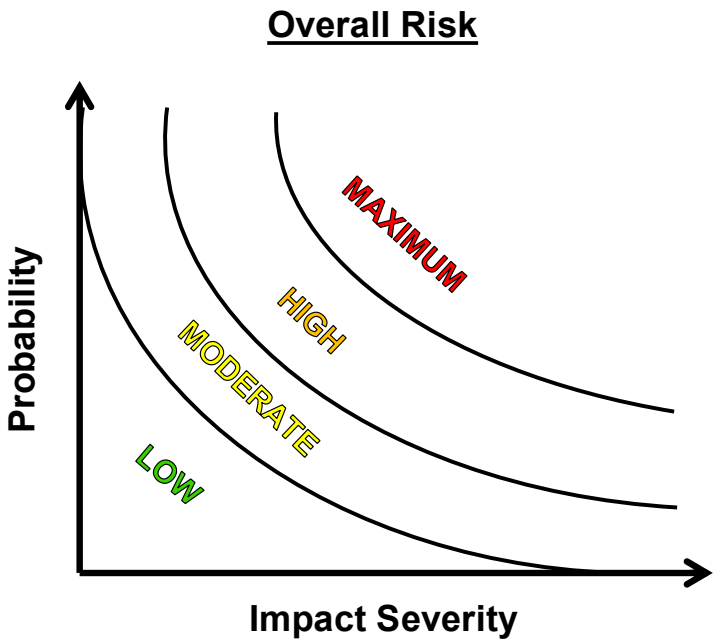
A *hazard* is a situation or condition that can cause or contribute to harm. Examples include fire, medical emergency, vehicle collision, earthquake, flood, etc. *Risk* is the *probability of hazard occurrence* in combination with the *likely severity of resultant impacts* to people, property, and the community as a whole.

A.1.1 Risk Assessment Methodology

The methodology employed by Citygate to assess community risks as an integral element of an SOC study incorporates the following elements:

- Identification of geographic risk planning sub-zones appropriate to the community or jurisdiction.
- Identification and quantification, to the extent data is available, of the specific values at risk to various hazards within the community or service area.
- Identification of the fire and non-fire hazards to be evaluated.
- Determination of the probability of occurrence for each hazard based on recent historical service demand by hazard type.
- Identification and evaluation of multiple relevant impact severity factors for each hazard by planning zone using agency/jurisdiction-specific data and information.
- Quantification of overall risk for each hazard based on probability of occurrence in combination with probable impact severity, as shown in Figure 15.

Figure 15—Overall Risk



Source: Commission on Fire Accreditation International (CFAI): *Community Risk Assessment: Standards of Cover (Sixth Edition)*

Citygate referenced multiple data sources for this study to understand the hazards and values to be protected within the three South Santa Clara County jurisdictions as follows:

- U.S. Census Bureau population and demographic data
- Fire agency data and information, including geographical information systems (GIS) data
- City and Santa Clara County data and information, including General Plan and zoning information
- 2017 Santa Clara County Operational Area Hazard Mitigation Plan

Although not utilized for this study to ensure equitable assessment of risk across all three agency jurisdictions, Citygate acknowledges that the City of Gilroy Fire Department has implemented a Citywide risk assessment of all non-single-family residential buildings using a two-factor life safety and community risk scoring scale. Citygate commends the Department for this innovative program that identifies specific higher-risk buildings and occupancies within the City, which also provides information to modify emergency responses to these buildings to mitigate additional risk. Citygate suggests that the Department consider modifying the scoring scales to allow a finer differentiation of the risk factors and resultant overall risk scores and category, and to also

potentially consider other risk factors such as occupancy classification, built-in fire protection and alarm systems, required fire flow, historic service demand, and ERF response capacity.

A.1.2 Risk Assessment Summary

Citygate's evaluation of the values at risk and hazards likely to impact the three study jurisdictions yields the following:

- The study area has a diverse urban/suburban population density, with rural population densities in the outlying areas.
- The three jurisdictions have a mix of residential, office, commercial, light industrial, and other non-residential building occupancies.
- The study area includes economic and natural resource values to be protected, as identified in this assessment.
- There are varying probabilities of occurrence and probable resultant impact severity associated with the following five hazards relating to services provided by the three fire agencies:
  - Building Fire
  - Vegetation/Wildland Fire
  - Medical Emergency
  - Hazardous Materials Release/Spill
  - Technical Rescue
- Overall risk for the five hazards ranges from ***Low*** to ***High***, as summarized in Table 24 by planning zone.

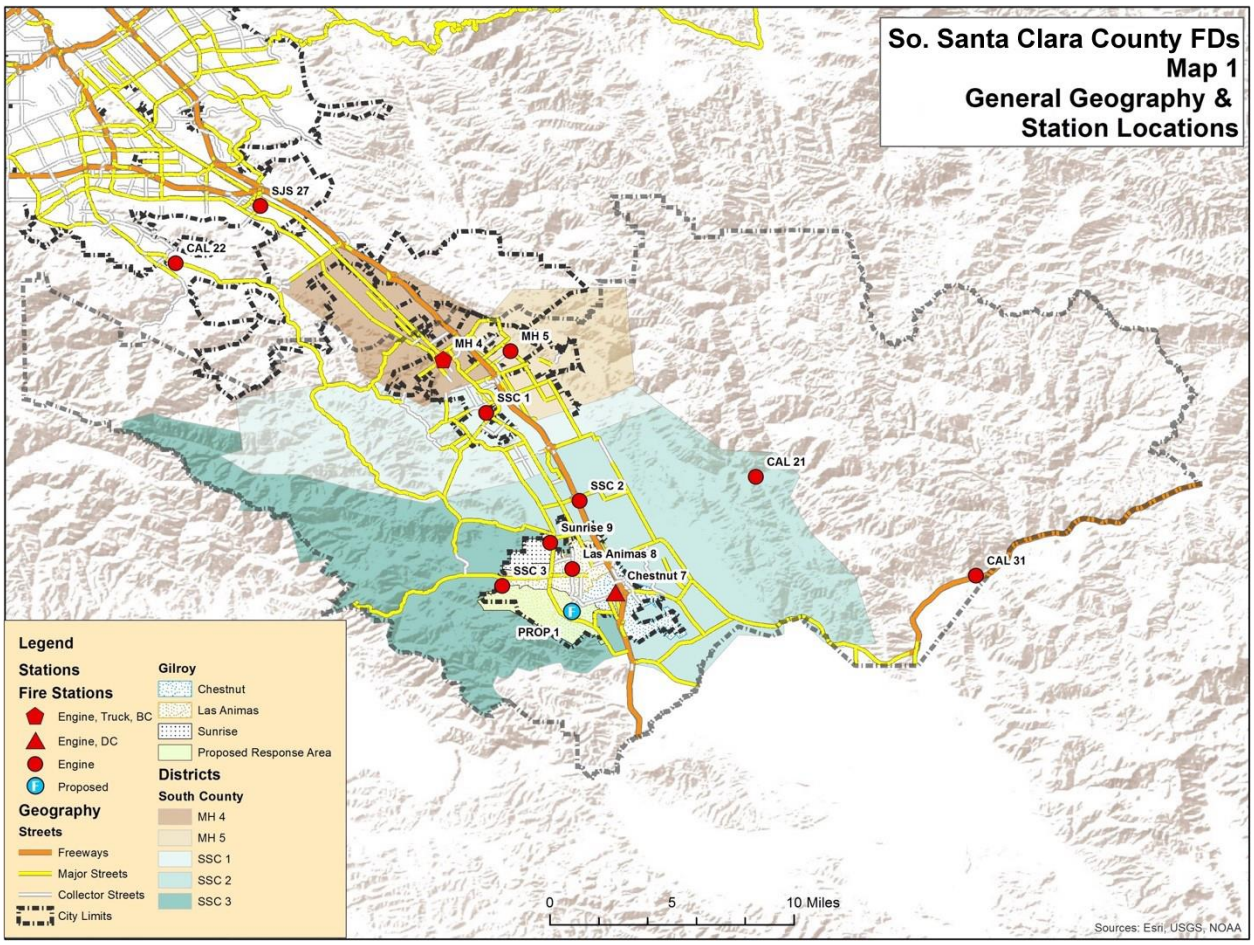
Table 24—Overall Risk by Hazard

Hazard	Risk Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Building Fire	*Moderate*	*Low*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*
Vegetation/Wildland Fire	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*	*Low*	*Low*	*Moderate*	*Moderate*
Medical Emergency	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*
Hazardous Material	*Moderate*	*Moderate*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*
Technical Rescue	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*

A.1.3 Risk Planning Zones

The Commission on Fire Accreditation International (CFAI) recommends that jurisdictions establish geographic planning zones to better understand risk at a sub-jurisdictional level. For example, portions of a jurisdiction may contain predominantly moderate-risk building occupancies, such as detached single-family residences, while other areas contain high- or maximum-risk occupancies, such as commercial and industrial buildings with a high hazard fire load. If risk were to be evaluated on a jurisdiction-wide basis, the predominant moderate risk could outweigh the high or maximum risk and may not be a significant factor in an overall assessment of risk. If, however, those high- or maximum-risk occupancies are a larger percentage of the risk in a smaller planning zone, then it becomes a more significant risk factor. Another consideration in establishing risk planning zones is that the jurisdiction's record management system must also track the specific zone for each incident to be able to appropriately evaluate service demand and response performance relative to each specific zone. For this assessment, Citygate utilized nine risk planning zones corresponding to each fire agency's first-due response areas, as shown in Figure 16.

Figure 16—Risk Planning Zones



A.1.4 Values at Risk to Be Protected

Broadly defined, *values at risk* are tangibles of significant importance or value to the community or jurisdiction potentially at risk of harm or damage from a hazard occurrence. Values at risk typically include people, critical facilities/infrastructure, buildings, and key economic, cultural, historic, and/or natural resources.

People

Residents, employees, visitors, and travelers through a community or jurisdiction are vulnerable to harm from a hazard occurrence. Particularly vulnerable are specific at-risk populations, including those unable to care for themselves or self-evacuate in the event of an emergency. At-risk populations typically include children younger than 10 years of age, the elderly, and people housed in institutional settings. Key demographic data for Gilroy and Morgan Hill is summarized in Table 25 and Table 26. *No separate demographic data was available for just the South Santa Clara County Fire District's service area.*

Table 25—Key Demographic Data – City of Gilroy

Demographic	2017	Percentage
Population	**54,159**	
Under 10 years	7,936	**14.65%**
10–19 years	9,355	**17.27%**
20–64 years	31,572	**58.30%**
65–74 years	3,012	**5.56%**
75 years and older	2,284	**4.22%**
Median age	**34.1**	**N/A**
Housing Units	**16,145**	
Owner-Occupied	9,201	**56.99%**
Renter-Occupied	6,673	**41.33%**
Average Household Size	**3.41**	**N/A**
Ethnicity		
Caucasian (includes White and Hispanic/Latino)	41,964	**77.48%**
Hispanic/Latino	32,820	**60.60%**
Asian	4,856	**8.97%**
Black / African American	1,187	**2.19%**
Other	6,152	**11.36%**
Education (population over 24 years of age)	**33,185**	**61.27%**
High School Graduate	26,150	**78.80%**
Undergraduate Degree	5,617	**16.93%**
Graduate/Professional Degree	2,921	**8.80%**
Employment (population over 15 years of age)	**40,279**	**74.37%**
In Labor Force	28,441	**70.61%**
Unemployed	1,746	**6.14%**
Population below Poverty Level	6,445	**11.90%**
Population without Health Insurance Coverage	4,560	**8.42%**

Source: US Census Bureau (2017 data)

Of note from Table 25 is:

- More than 24 percent of the City's population is under 10 or over 65 years of age.
- The City's population is predominantly Hispanic (61 percent), followed by White (16.9 percent), Asian (9 percent), Black / African American (2 percent), and Other ethnic origins (11 percent).
- Of the City population over 24 years of age, nearly 79 percent has completed high school or higher.
- Of the City population over 24 years of age, nearly 26 percent has an undergraduate, graduate, or professional degree.
- Nearly 71 percent of the City population 16 years of age or older is in the workforce; of those, slightly more than 6 percent are unemployed.
- The total City population below the federal poverty level is nearly 12 percent.
- Just less than 8.5 percent of the City population does not have health insurance coverage.

According to Gilroy's 2040 General Plan Alternatives Report,[13] the Association of Bay Area Governments (ABAG) projects the City's population to grow to 61,000 by 2040, for a relatively slow annual growth rate of 0.8 percent. ABAG's projection, however, is based on regional policies and does not consider projected market demand. Gilroy's Economic Consultant, ADE, produced a range of population growth scenarios based on projected market demand, which range from 69,249 to 79,317 by the year 2040 for average annual growth rate ranging from 1.5 to 2.2 percent. ADE's median projection calls for a 2040 population of approximately 74,000, which reflects an average annualized growth rate of 1.9 percent.

[13] Reference: Gilroy General Plan Alternatives Report (2015) – Table 3-10

Table 26—Key Demographic Data – City of Morgan Hill

Demographic	2017	Percentage
Population	**43,136**	
Under 10 years	6,295	**14.59%**
10–19 years	6,292	**14.59%**
20–64 years	25,099	**58.19%**
65–74 years	3,335	**7.73%**
75 years and older	2,115	**4.90%**
Median age	**38.4**	**N/A**
Housing Units	**14,516**	
Owner-Occupied	10,257	**70.66%**
Renter-Occupied	3,948	**27.20%**
Average Household Size	**3.05**	**N/A**
Ethnicity		
Caucasian (includes White and Hispanic/Latino)	33,225	**77.02%**
Asian	6,344	**14.71%**
Black / African American	1,290	**2.99%**
Other	2,277	**5.28%**
Education (population over 24 years of age)	**28,033**	**64.99%**
High School Graduate	25,286	**90.20%**
Undergraduate Degree	7,400	**26.40%**
Graduate/Professional Degree	3,958	**14.12%**
Employment (population over 15 years of age)	**32,772**	**75.97%**
In Labor Force	22,103	**67.44%**
Unemployed	1,046	**4.73%**
Population below Poverty Level	2,847	**6.60%**
Population without Health Insurance Coverage	2,269	**5.26%**

Source: US Census Bureau (2017 data)

Of note from Table 26 is:

- More than 27 percent of the City population is under 10 or over 65 years of age.
- The City's population is predominantly Caucasian (77 percent), followed by Asian (15 percent), Black / African American (3 percent), and Other ethnic origins (5 percent).

- Of the City population over 24 years of age, 90 percent has completed high school or higher.
- Of the City population over 24 years of age, slightly more than 40 percent has an undergraduate, graduate, or professional degree.
- More than 67 percent of the City population 16 years of age or older is in the workforce; of those, nearly 5 percent are unemployed.
- The total City population below the federal poverty level is 6.6 percent.
- Slightly more than 5 percent of the City population does not have health insurance coverage.

In addition, over the next 16 years, the City of Morgan Hill is projected to grow by nearly 13 percent to nearly 48,500 by 2035, or an average annualized growth rate of 0.8 percent. Housing units are projected to increase 6.9 percent over the same period to 15,500, for an average annualized rate of 0.4 percent.[14]

Buildings

The study area contains a large inventory of housing units and non-residential occupancies, including office, professional services, retail/wholesale sales, restaurants/bars, hotels/motels, churches, schools, government facilities, healthcare facilities, and other non-residential uses.

Building Occupancy Risk Categories

The CFAI identifies four risk categories that relate to building occupancy as follows:

Low Risk – includes detached garages, storage sheds, outbuildings, and similar building occupancies that pose a relatively low risk of harm to humans or the community if damaged or destroyed by fire.

Moderate Risk – includes detached single-family or two-family dwellings; mobile homes; commercial and industrial buildings less than 10,000 square feet without a high hazard fire load; aircraft; railroad facilities; and similar building occupancies where loss of life or property damage is limited to the single building.

High Risk – includes apartment/condominium buildings; commercial and industrial buildings more than 10,000 square feet without a high hazard fire load; low-occupant load buildings with high fuel loading or hazardous materials; and similar occupancies with potential for substantial loss of life or unusual property damage or financial impact.

[14] Reference: City of Morgan Hill General Plan, Housing Element, Table 1-1

Maximum Risk – includes buildings or facilities with unusually high risk requiring an Effective Response Force involving a significant augmentation of resources and personnel and where a fire would pose the potential for a catastrophic event involving large loss of life and/or significant economic impact to the community.

Critical Facilities

Critical facilities typically include structures or other improvements, both public and private, that, due to function, size, service area, or uniqueness, have the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if damaged or destroyed, or if their functionality is significantly impaired. Critical facilities may include, but are not limited to, health and public safety facilities, utilities, government facilities, hazardous materials sites, or vital community economic facilities.

The 2017 Santa Clara County Operational Area Hazard Mitigation Plan (HMP) identifies 187 critical facilities for Gilroy and Morgan Hill, a Fire District staff identified 71 similar facilities within the District as summarized in Table 27. A hazard occurrence with significant impact severity affecting one or more of these facilities would likely adversely impact critical public or community services.

Table 27—Critical Facilities

Jurisdiction	Facility Category					Total
	Emergency Response / Public Health & Safety	Infrastructure Lifeline	Recovery Facilities	Socio-Economic	Hazardous Materials	
City of Gilroy	15	45	1	50	7	**118**
City of Morgan Hill	9	14	0	39	7	**69**
Fire District	4	19	8	29	11	**71**
Total	**28**	**78**	**9**	**118**	**25**	**258**

Source: 2017 Santa Clara County Operational Area Hazard Mitigation Plan, Table 4-4, and Fire District staff

Economic Resources

Gilroy:

Key economic resources within the City of Gilroy include:

- Gilroy Premium Outlets (145 retail stores)
- Olam Spices and Vegetables
- Costco

- Auto dealerships
- Walmart
- Christopher Ranch Foods

Morgan Hill:

Key economic resources within the City of Morgan Hill include:

- Anritsu
- Cal Door & Drawer
- NxEdge
- Paramit Corporation
- Specialized Bicycle Components
- Lusamerica Foods
- Mission Bell Manufacturing
- Toray Advanced Composites
- Infineon Technologies
- Safeway
- Velodyne LiDAR

Natural Resources

Natural resources within the study area include Debell Uvas Creek Preserve, Coyote Lake, Coyote Lake Harvey Bear Ranch County Park, Anderson Lake, Anderson Lake County Park, Uvas Canyon County Park, Chesbro Reservoir, Pajaro River watershed, Uvas Reservoir, and multiple neighborhood parks and open spaces.

Cultural/Historic Resources

There are numerous cultural and historic resources to be protected throughout the three-agency service area.

A.1.5 Hazard Identification

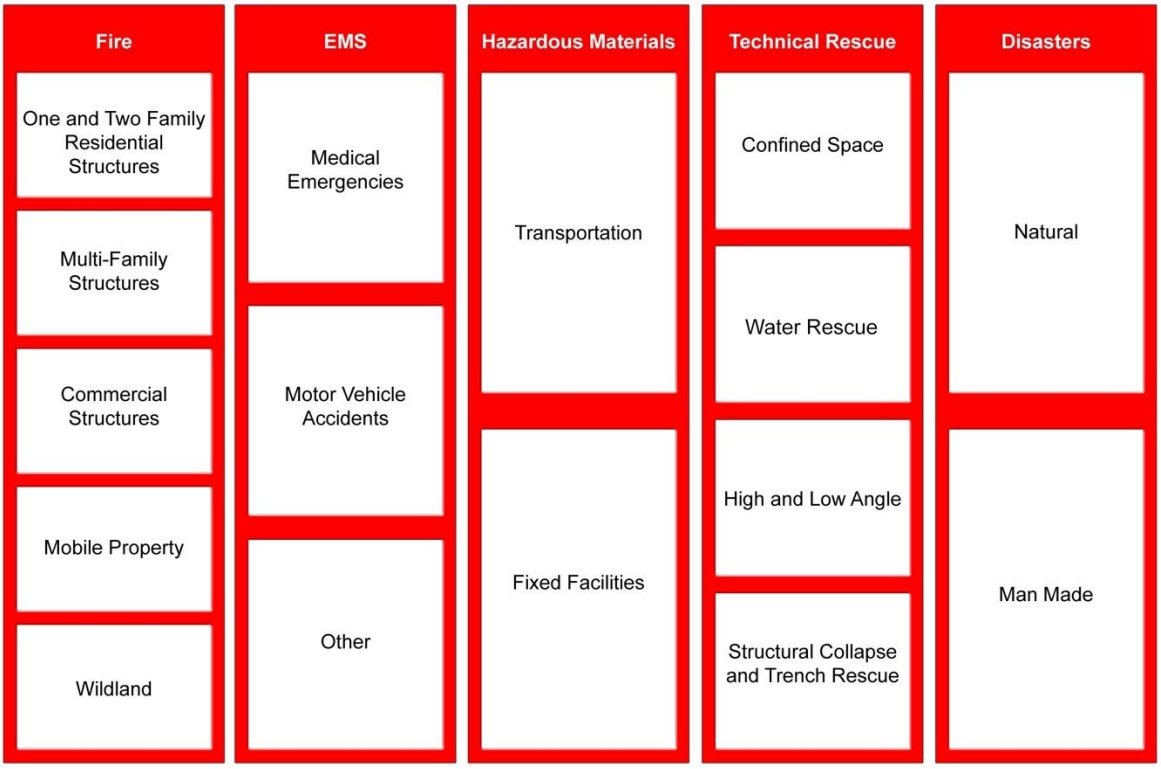
Citygate utilizes prior risk studies where available, fire and non-fire hazards as identified by the CFAI, and agency/jurisdiction-specific data and information to identify the hazards to be evaluated for this study. The 2017 Santa Clara County Operational Area Hazard Mitigation Plan identifies the following nine hazards of concern:

1. Climate change / sea level rise
2. Dam/levee failure
3. Drought
4. Earthquake
5. Flood
6. Landslide
7. Severe weather
8. Tsunami
9. Wildfire

Although the three fire agencies have no legal authority or responsibility to mitigate any of these hazards other than perhaps wildfire, they all provide services related to each of these hazards, including fire suppression, emergency medical services, technical rescue, and hazardous materials response.

The CFAI groups hazards into fire and non-fire categories, as shown in Figure 17. Identification, qualification, and quantification of the various fire and non-fire hazards are important factors in evaluating how resources are or can be deployed to mitigate those risks.

Figure 17—CFAI Hazard Categories



Source: CFAI *Standards of Cover* (Fifth Edition)

Subsequent to evaluation of the hazards identified in the Santa Clara County HMP, and the fire and non-fire hazards as identified by the CFAI as they relate to services provided by the three fire agencies, Citygate evaluated the following five hazards for this risk assessment:

1. Building Fire
2. Vegetation/Wildland Fire
3. Medical Emergency
4. Hazardous Materials Release/Spill
5. Technical Rescue

A.1.6 Service Capacity

Service capacity refers to an agency's available response force; the size, types, and condition of its response fleet and any specialized equipment; core and specialized performance capabilities and competencies; resource distribution and concentration; availability of automatic and/or mutual aid; and any other agency-specific factors influencing the agency's ability to meet current and prospective future service demand relative to the risks to be protected.

The City of Gilroy's service capacity for building fire, vegetation/wildland fire, medical emergency, hazardous material, and technical rescue risk consists of a minimum daily on-duty response force of nine personnel staffing three Type-1 fire engines, and one Division Chief, from the Department's three fire stations. The City of Morgan Hill's service capacity for the same five risks consists of a minimum daily on-duty response force of nine personnel staffing three Type-1 fire engines, and one Battalion Chief, from the Department's three fire stations.[15] South Santa Clara County Fire District's service capacity for those same five risks consists of a minimum daily on-duty response force of nine personnel staffing three Type-1 fire engines, and one Battalion Chief, from the District's three fire stations. The three agencies have a boundary drop automatic mutual aid agreement that provides a minimum Effective Response Force (ERF) of 12 personnel staffing four apparatus, plus one Chief Officer, for more serious emergencies.

All three agency response personnel are trained and certified to either the Emergency Medical Technician (EMT) level to provide Basic Life Support (BLS) pre-hospital emergency medical care or to the EMT-Paramedic (Paramedic) level to provide Advanced Life Support (ALS) pre-hospital emergency medical care. All staffed response apparatus include at least one Paramedic. Ground paramedic ambulance service is provided by Rural/Metro/AMR Ambulance of Northern California, a private-sector ambulance provider operating under a non-exclusive agreement administered by the Santa Clara County Emergency Medical Services Agency. In addition, the Gilroy Fire Department has a Type-1 ambulance that can be cross-staffed as needed for BLS or ALS ground transportation. Air ambulance services, when needed, are provided by CALSTAR/Reach Air Medical Services (Gilroy) or Life Flight (Palo Alto). There are four hospitals with emergency services within the region, including Saint Louise Regional Hospital in Gilroy, two in San Jose, and one in Palo Alto, all of which are also trauma centers.

All response personnel are further trained to the U.S. Department of Transportation Hazardous Material First Responder Operational (FRO) level to provide initial hazardous material incident assessment, hazard isolation, and support for a hazardous material response team. The Gilroy Fire Department cross-staffs a Hazardous Materials Decontamination Unit as needed from the Sunrise station to support the City of San Jose Hazardous Materials Response Team.

Response personnel are also trained to the Confined Space Awareness level as required by Cal/OSHA. In addition, South Santa Clara County Fire District cross-staffs a Type-2 technical rescue trailer from its Gilroy Gardens station as needed. This resource is also available to other regional agencies/jurisdictions through the County mutual aid system.

[15] The Type-1 engine at the South Santa Clara County Fire District headquarters in Morgan Hill is cost-shared between the City of Morgan Hill and the Fire District, and serves both jurisdictions.

A.1.7 Probability of Occurrence

Probability of occurrence refers to the likelihood of a future hazard occurrence during a specific period. Because the CFAI agency accreditation process requires annual review of an agency's risk assessment and baseline performance measures, Citygate recommends using the 12 months following completion of an SOC study as an appropriate period for the probability of occurrence evaluation. Table 28 describes the five probability of occurrence categories and related scoring criteria used for this analysis.

Table 28—Probability of Occurrence Scoring Criteria

Score	Probable Occurrence	Description	General Criteria	Average Frequency
0–1.0	***Very Low***	**Improbable**	Hazard occurrence is ***unlikely***	Annually or less
1.1–2.0	***Low***	**Rare**	Hazard ***could occur***	1-4 times per year
2.1–3.0	***Moderate***	**Infrequent**	Hazard ***should occur*** infrequently	Bi-monthly to monthly
3.1–4.0	***High***	**Likely**	Hazard is ***likely to occur*** regularly	Bi-weekly to weekly
4.1–5.0	***Very High***	**Frequent**	Hazard is ***expected*** to occur frequently	Several times per week or more

Citygate's SOC assessments use recent multiple-year hazard response data to determine the probability of hazard occurrence for the ensuing 12-month period.

A.1.8 Impact Severity

Impact severity refers to the extent a hazard occurrence impacts people, buildings, lifeline services, the environment, and the community as a whole. Table 29 describes the five impact severity categories and related scoring criteria used for this analysis.

Table 29—Impact Severity Scoring Criteria

Score	Impact Severity	General Criteria
0–1.0	Insignificant	• No serious injuries or fatalities • Few persons displaced for only a short duration • No or inconsequential damage • No or very minimal disruption to community • No measurable environmental impacts • Little or no financial loss
1.25–2.0	Minor	• Some minor injuries; no fatalities expected • Some persons displaced for less than 24 hours • Some minor damage • Minor community disruption; no loss of lifeline services • Minimal environmental impacts with no lasting effects • Minor financial loss
2.25–3.0	Moderate	• Some hospitalizations; some fatalities expected • Localized displacement of persons for up to 24 hours • Localized damage • Normal community functioning with some inconvenience • Minor loss of lifeline services • Some environmental impacts with no lasting effects, or small environmental impact with long-term effect • Moderate financial loss
3.25–4.0	Major	• Extensive serious injuries; significant number of persons hospitalized • Many fatalities expected • Significant displacement of many people for more than 24 hours • Significant damage requiring external resources • Community services disrupted; some lifeline services potentially unavailable • Some environmental impacts with long-term effects • Major financial loss
4.25–5.0	Catastrophic	• Large number of severe injuries and fatalities • Local/regional hospitals impacted • Large number of persons displaced for an extended duration • Extensive damage • Widespread loss of critical lifeline services • Community unable to function without significant support • Significant environmental impacts and/or permanent environmental damage • Catastrophic financial loss

A.1.9 Overall Risk

Overall hazard risk is determined by multiplying the *probability of occurrence score* by the *impact severity score*. The resultant total score determines the overall *risk ranking*, as described in Table 30.

Table 30—Overall Risk Score and Rating

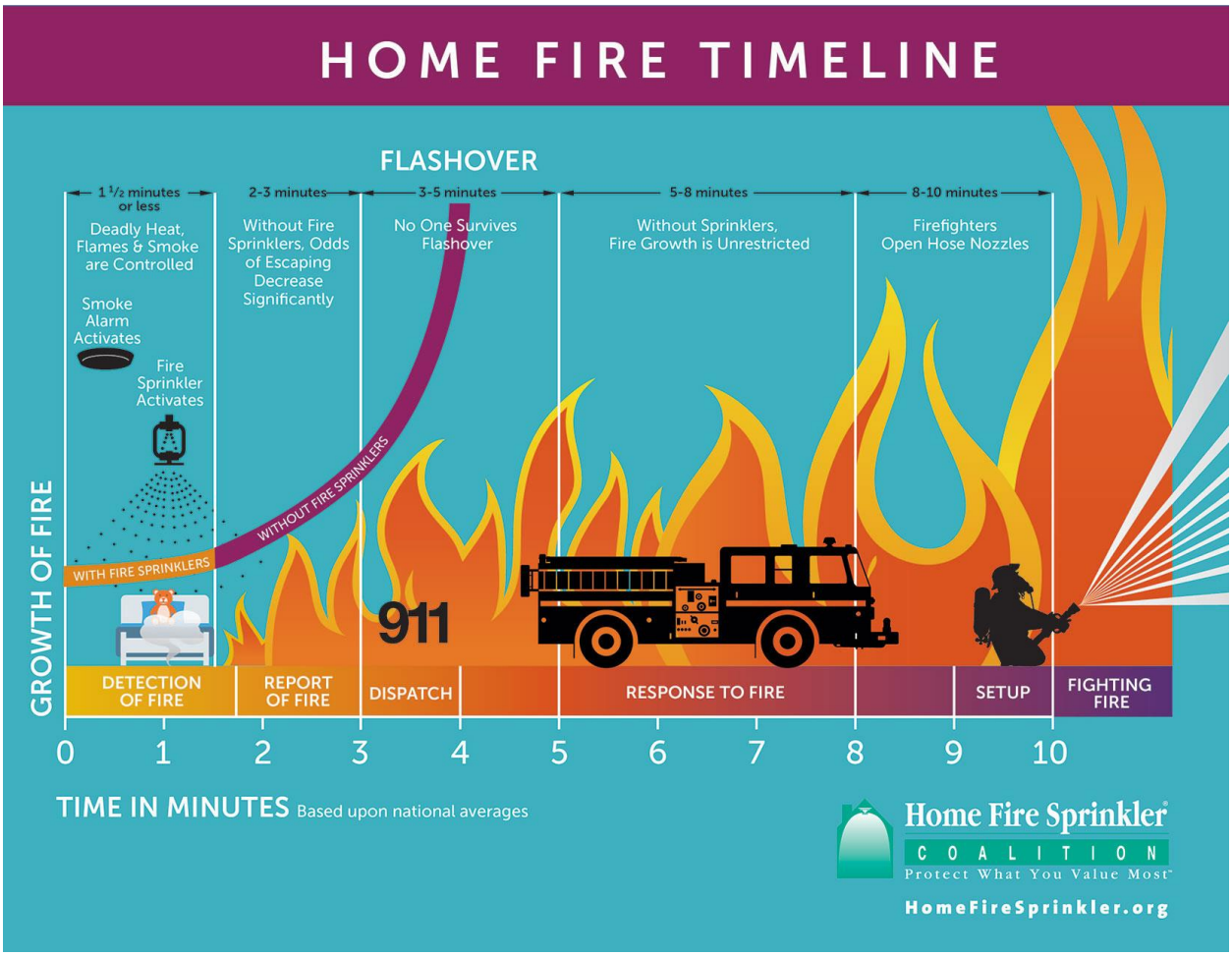
Overall Risk Score	Overall Risk Rating
0–5.99	LOW
6.0–11.99	MODERATE
12.0–19.99	HIGH
20.0–25	MAXIMUM

A.1.10 Building Fire Risk

One of the primary hazards in any community is building fire. Building fire risk factors include building size, density, age, occupancy, and construction materials and methods, as well as the number of stories, required fire flow, proximity to other buildings, built-in fire protection/alarm systems, available fire suppression water supply, building fire service capacity, fire suppression resource deployment (distribution/concentration), staffing, and response time. Citygate used available data from the three agencies and the U.S. Census Bureau to assist in determining each jurisdiction's building fire risk.

Figure 18 illustrates the building fire progression timeline and shows that flashover, which is the point at which an entire room erupts into fire after all the combustible objects in that room reach their ignition temperature, can occur as early as three to five minutes from the initial ignition. Human survival in a room after flashover is extremely improbable.

Figure 18—Building Fire Progression Timeline

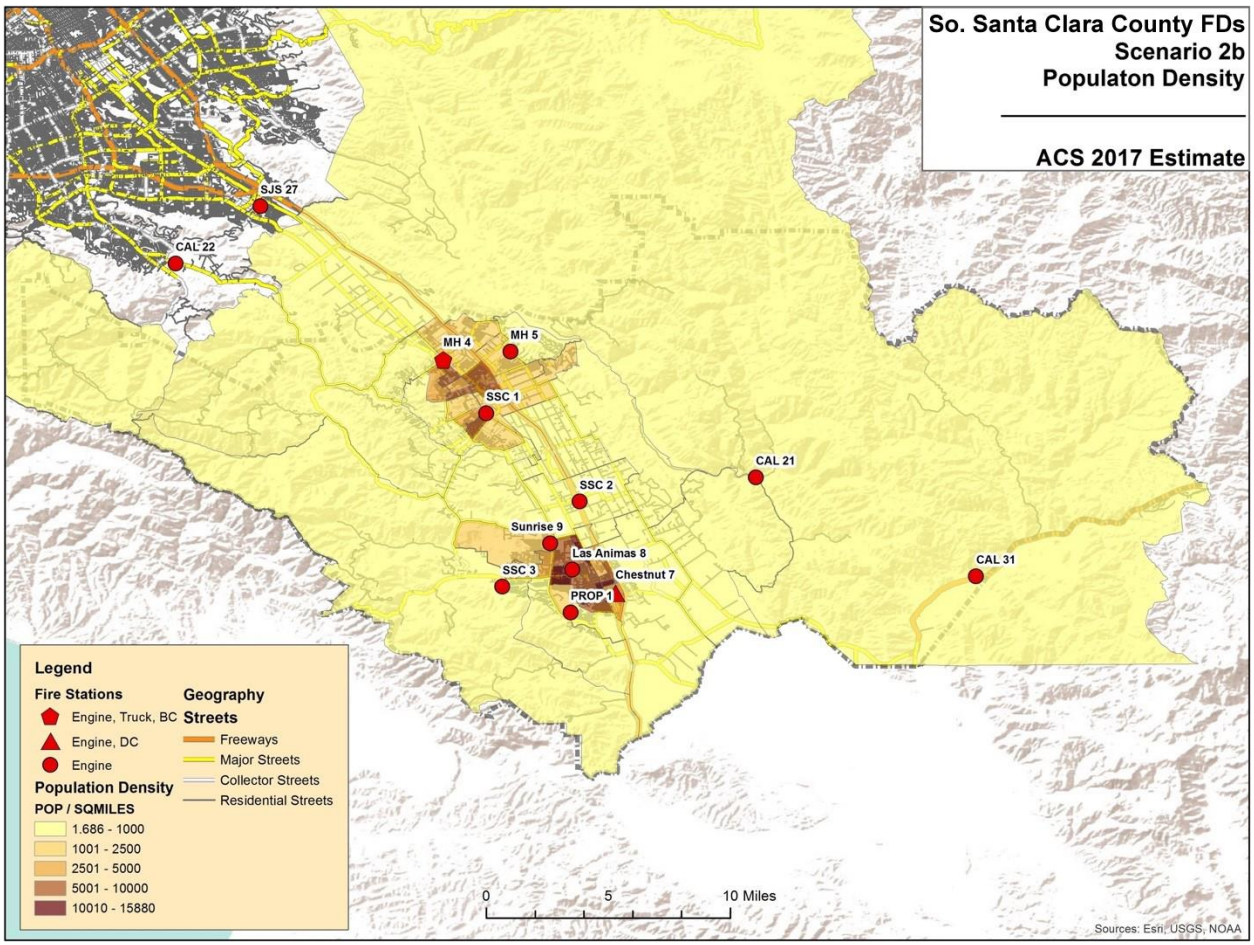


Source: http://www.firesprinklerassoc.org

Population Density

Population density within each agency's service area ranges from less than 1,000 to more than 15,000 people per square mile, as illustrated in Figure 19. Although risk analysis across a wide spectrum of other Citygate clients shows no direct correlation between population density and building fire *occurrence*, it is reasonable to conclude that building fire *risk* relative to potential impact on human life is greater as population density increases, particularly in areas with high density, multiple-story buildings.

Figure 19—Population Density



Water Supply

A reliable public water system providing adequate volume, pressure, and flow duration near all buildings is a critical factor in mitigating the potential impact severity of a community's building fire risk. The Cities of Gilroy and Morgan Hill each provide their own water service and, according to Fire Department staff, available fire flow is adequate throughout each City. Water service in the Fire District is provided by multiple water districts and private wells. According to District staff, available fire flow is inadequate throughout most of the service area.

Building Fire Service Demand

Table 31, Table 32, and Table 33 summarize building fire service demand by jurisdiction for the three-year period from January 1, 2016, through December 31, 2018.

Table 31—Building Fire Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Building Fire	2016	45	2	38	5	90
	2017	21	3	28	6	58
	2018	33	3	25	10	71
	Total	99	8	91	21	219
Percent of Total Service Demand		1.69%	1.22%	1.28%	1.50%	1.46%

Source: Gilroy FD incident data

Table 32—Building Fire Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Building Fire	2016	8	8	16
	2017	11	3	14
	2018	8	2	10
	Total	27	13	40
Percent of Total Service Demand		0.49%	0.66%	0.53%

Source: Morgan Hill FD incident data

Table 33—Building Fire Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	
Building Fire	2016	7	15	12	34
	2017	13	14	7	34
	2018	13	11	4	28
	Total	33	40	23	96
Percent of Total Service Demand		0.61%	1.70%	3.18%	1.13%

Source: South Santa Clara County Fire District incident data

As these tables show, building fire service demand varies by jurisdiction and has been relatively consistent in each jurisdiction over the three-year study period, ranging from 0.5 percent of total service demand in Morgan Hill to 1.5 percent in Gilroy. Overall, building fire service demand is low for all three agencies, which is typical of other Citygate client jurisdictions of similar size and demographics.

Probability of Building Fire Occurrence

Table 34 summarizes Citygate's scoring of building fire probability by planning zone based on recent historic building fire service demand from Table 31, Table 32, and Table 33

Table 34—Building Fire Probability Scoring

Building Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	3.0	2.25	2.25	2.5	2.25	3.5	3.5	2.5	2.25

Building Fire Impact Severity

Table 35 summarizes Citygate's scoring of the probable building fire impact severity by planning zone.

Table 35—Building Fire Impact Severity Scoring

Building Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	2.5	2.5	2.5	3.0	3.0	3.0	3.0	2.75	2.25

Overall Building Fire Risk

Table 36 summarizes overall building fire risk by planning zone.

Table 36—Overall Building Fire Risk

Building Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	7.5	5.625	5.625	7.5	6.75	10.5	10.5	6.875	5.063
Risk Rating	*Moderate*	*Low*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*

A.1.11 Vegetation/Wildland Fire Risk

Factors influencing vegetation/wildland fire risk include vegetative fuel features, weather, topography, fire history, service capacity, water supply, and vegetation/wildland fire service demand.

Vegetative Fuels

Vegetative fuel factors influencing fire intensity and spread include fuel type (vegetation species), height, arrangement, density, and moisture. Vegetative fuels within the three jurisdictions consist of a mix of annual grasses and weeds, brush, and deciduous and conifer tree species. Once ignited, vegetation/wildland fires can burn intensely and contribute to rapid fire spread under the right fuel, weather, and topographic conditions.

Weather

Weather elements, including temperature, relative humidity, wind, and lightning, also affect vegetation/wildland fire potential and behavior. High temperatures and low relative humidity dry out vegetative fuels, creating a situation where fuels will ignite more readily and burn more intensely. Wind is the most significant weather factor influencing vegetation/wildland fire behavior, and the predominant diurnal winds in the Santa Clara Valley tend to cause elevated speed and spread on the valley floor and wind exposed foothills during the summer afternoons when sea breezes are strongest. With summer temperatures averaging in the 80s and reaching into the 100s, and annual rainfall averaging approximately 15 inches, weather factors are conducive to vegetation/wildland fires from about May through October.

Topography

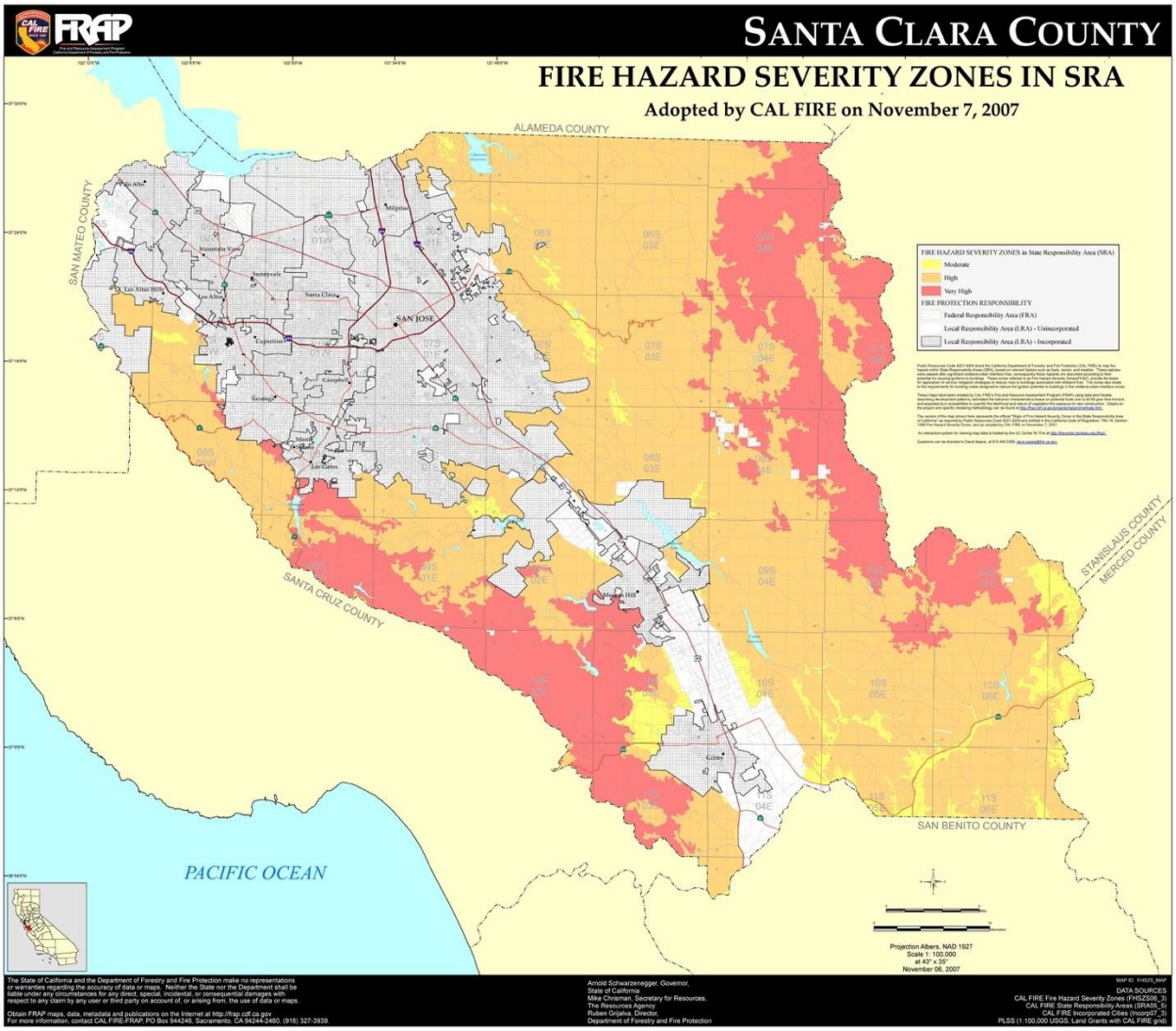
The study area's topography can significantly influence vegetation/wildland fire behavior and spread in those areas beyond the flat Santa Clara Valley floor, as fires tend to burn more intensely

and spread faster when burning uphill and up-canyon, except for a wind-driven downhill or down-canyon fire.

Wildland Fire Hazard Severity Zones

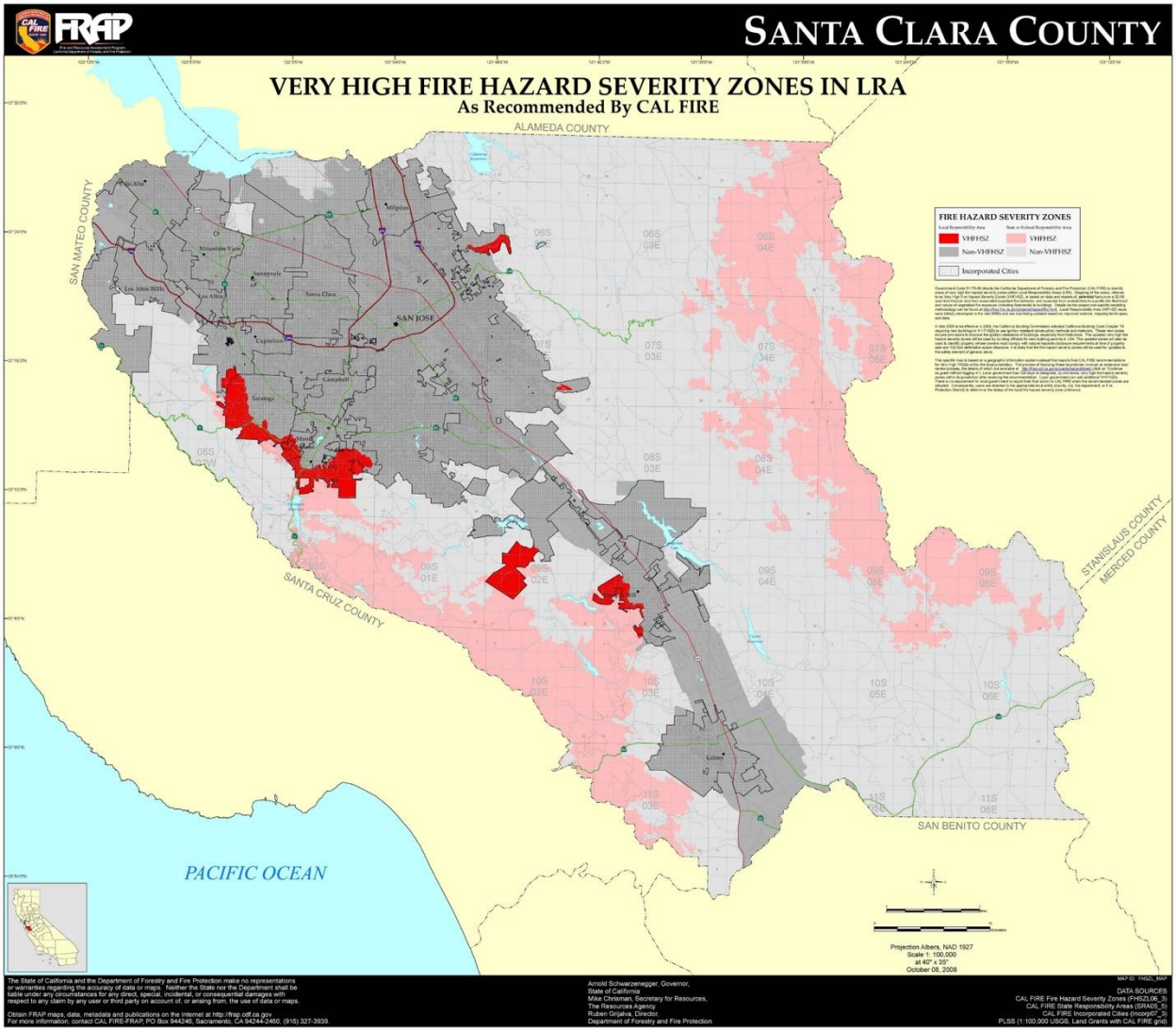
The California Department of Forestry and Fire Protection (CAL FIRE) designates wildland Fire Hazard Severity Zones (FHSZ) throughout the State based on analysis of multiple wildland fire hazard factors and modeling of potential wildland fire behavior. For State Responsibility Areas (SRAs) where CAL FIRE has fiscal responsibility for wildland fire protection, CAL FIRE designates **Moderate**, **High**, and **Very High** FHSZs by county, as shown in Figure 20 for Santa Clara County. Note particularly the *Moderate*, *High*, and *Very High* FHSZs in the vicinity of the three study jurisdictions west of U.S. Route 101, and the *Moderate* and *High* FHSZs east of U.S. 101.

Figure 20—SRA Fire Hazard Severity Zones – Santa Clara County



CAL FIRE also identifies recommended Very High FHSZs for Local Responsibility Areas (LRAs), where a local jurisdiction bears the fiscal responsibility for wildland fire protection, including incorporated cities, as shown in Figure 21. Note particularly the *Very High* FHSZ on the west side of Morgan Hill.

Figure 21—LRA Fire Hazard Severity Zones – Santa Clara County

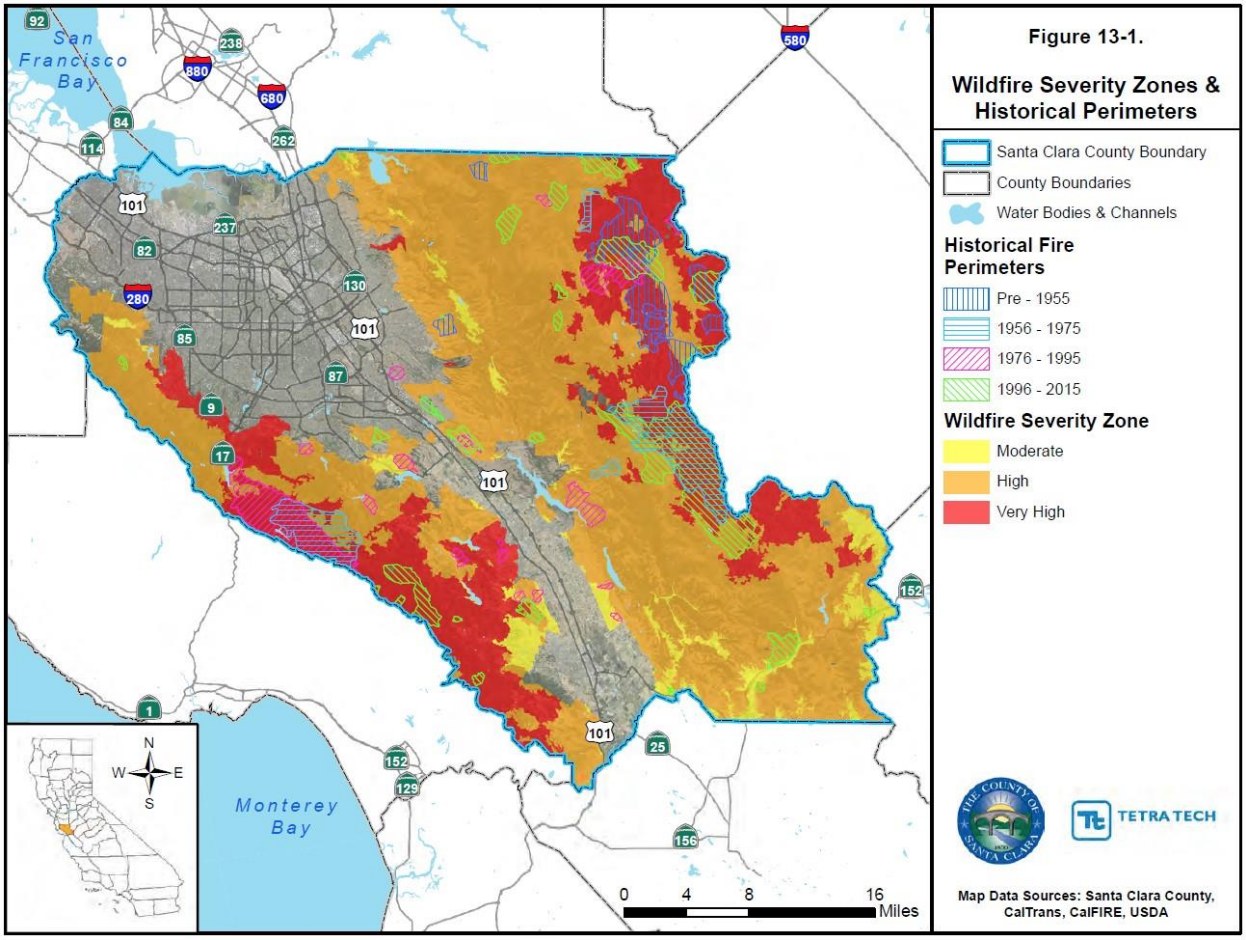


Wildland Fire History

Santa Clara County has a history of significant wildland fires as illustrated in Figure 22.[16]

[16] Reference: 2017 Santa Clara County Operational Area Hazard Mitigation Plan

Figure 22—Wildland Fires – Santa Clara County



Water Supply

Another vegetation/wildland fire impact severity factor is water supply immediately available for fire suppression in areas where vegetation fires are likely to occur. According to fire agency staff, adequate fire flow is available throughout the Cities of Gilroy and Morgan Hill but is inadequate throughout most of the Fire District.

Vegetation/Wildland Fire Service Demand

Table 37, Table 38, and Table 39 summarize vegetation/wildland fire service demand by jurisdiction for the three-year study period.

Table 37—Vegetation/Wildland Fire Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Vegetation/Wildland Fire	2016	25	7	12	5	49
	2017	17	8	6	9	40
	2018	29	3	15	9	56
	Total	71	18	33	23	145
Percent of Total Service Demand		1.21%	2.75%	0.47%	1.64%	0.97%

Source: Gilroy FD incident data

Table 38—Vegetation/Wildland Fire Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Vegetation/Wildland Fire	2016	10	4	14
	2017	14	7	21
	2018	4	6	10
	Total	28	17	45
Percent of Total Service Demand		0.51%	0.86%	0.60%

Source: Morgan Hill FD incident data

Table 39—Vegetation/Wildland Fire Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD Morgan Hill	SSCCFD Masten	SSCCFD Gilroy Gardens	
Vegetation/Wildland Fire	2016	15	23	4	42
	2017	22	15	3	40
	2018	12	22	2	36
	Total	49	60	9	118
Percent of Total Service Demand		0.90%	2.55%	1.24%	1.38%

Source: South Santa Clara County Fire District incident data

As these tables illustrate, vegetation/wildland fire service demand varies by jurisdiction and has been relatively consistent in each jurisdiction over the three-year study period, ranging from 0.6 percent of total service demand in Morgan Hill to 1.4 percent in the Fire District. Overall, vegetation/wildland fire service demand is low for all three agencies, which is typical of other Citygate client jurisdictions of similar size and demographics.

Probability of Vegetation/Wildland Fire Occurrence

Table 40 summarizes Citygate's scoring of vegetation/wildland fire probability by planning zone based on recent historic vegetation/wildland service demand from Table 37, Table 38, and Table 39.

Table 40—Vegetation/Wildland Fire Probability Scoring

Vegetation / Wildland Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	3.0	3.25	2.25	2.5	2.25	3.25	2.75	2.5	2.25

Vegetation/Wildland Fire Impact Severity

Table 41 summarizes Citygate's scoring of probable vegetation/wildland impact severity by planning zone.

Table 41—Vegetation/Wildland Fire Impact Severity Scoring

Vegetation / Wildland Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	3.25	3.0	3.25	3.0	2.25	1.0	1.0	2.5	3.0

Overall Vegetation/Wildland Fire Risk

Table 42 summarizes overall vegetation/wildland fire risk by planning zone.

Table 42—Overall Vegetation/Wildland Fire Risk

Vegetation / Wildland Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	**9.75**	**9.75**	**7.3125**	**7.5**	**5.063**	**3.25**	**2.75**	**6.25**	**6.75**
Risk Rating	***Moderate***	***Moderate***	***Moderate***	***Moderate***	***Low***	***Low***	***Low***	***Moderate***	***Moderate***

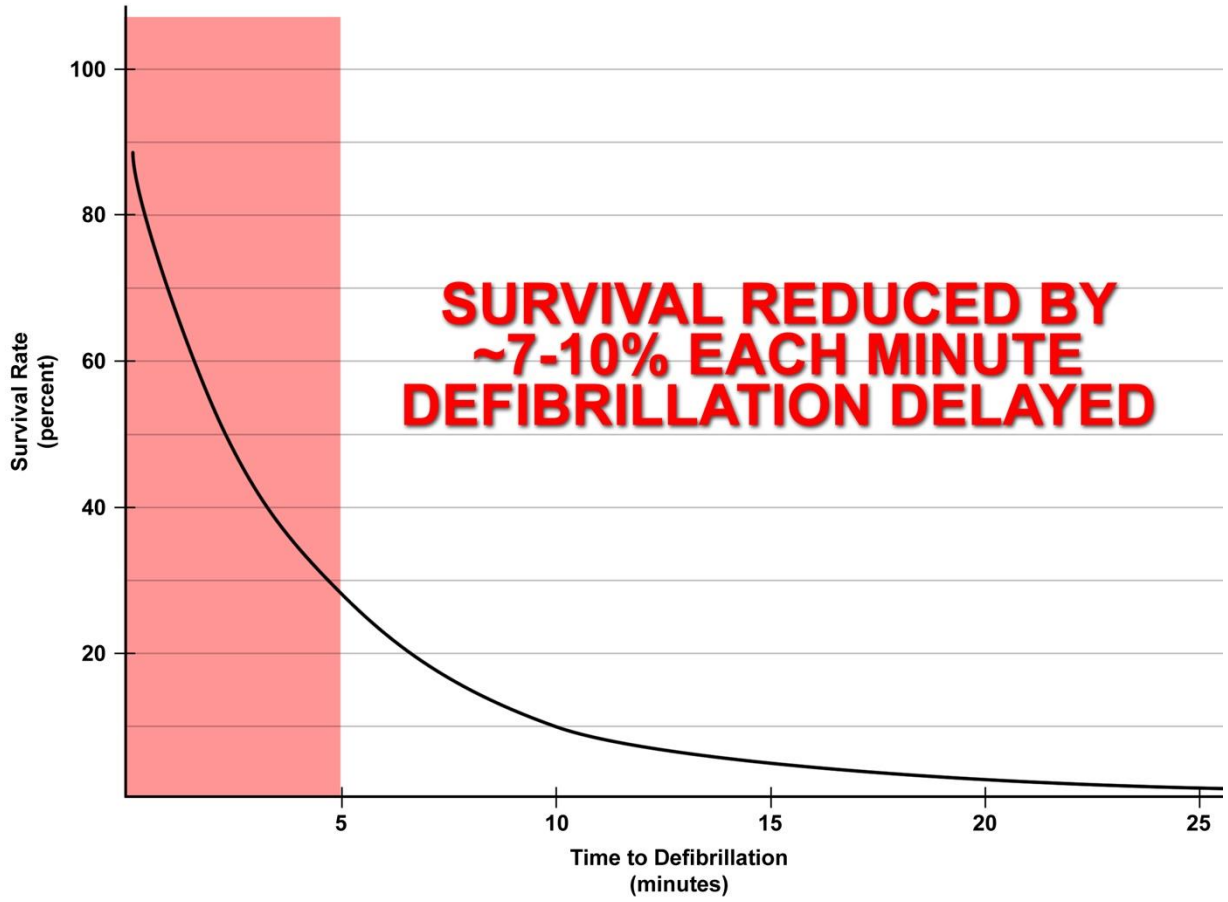
A.1.12 Medical Emergency Risk

Medical emergency risk in most communities is predominantly a function of population density, demographics, violence, health insurance coverage, and vehicle traffic.

Medical emergency risk can also be categorized either as a medical emergency resulting from a health-related condition or event or as a traumatic injury. One serious medical emergency is cardiac arrest or some other event where there is an interruption or blockage of oxygen to the brain.

Figure 23 illustrates the reduced survivability of a cardiac arrest victim as time to defibrillation increases. While early defibrillation is one factor in cardiac arrest survivability, other factors can influence survivability as well, such as early CPR and pre-hospital advanced life support interventions.

Figure 23—Survival Rate versus Time of Defibrillation



Source: www.suddencardiacarrest.com

Population Density

Because medical emergencies involve people, it seems logical that higher population densities generate higher medical emergency service demand than lower population densities. In Citygate's experience, this is particularly true for urban population densities. As illustrated in Figure 19, population density in the study area ranges from less than 1,000 per square mile to more than 15,000 per square mile.

Demographics

Medical emergency risk tends to be higher among older, poorer, less-educated, and uninsured populations. According to the U.S. Census Bureau, 10 to 13 percent of the population in the two Cities is 65 and older; 7 to 12 percent is at or below poverty level; 10 to 30 percent over 24 years

of age has less than a high school diploma or equivalent; and 5 to 8 percent do not have health insurance coverage.[17]

Vehicle Traffic

Medical emergency risk tends to be higher in those areas of a community with high daily vehicle traffic volume, particularly those areas with high traffic volume traveling at high speeds. The transportation network in the study area includes State Routes 25 and 152 and U.S. Route 101, which carry an aggregate annual average daily traffic volume of 164,000 vehicles, with more than 14,000 at peak hour traffic.[18]

Medical Emergency Service Demand

Table 43, Table 44, and Table 45 summarize medical emergency service demand by jurisdiction for the three-year study period.

Table 43—Medical Emergency Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Medical Emergency	2016	1,289	140	1,640	223	3,292
	2017	1,352	136	1,717	269	3,474
	2018	1,298	161	1,819	275	3,553
	Total	3,939	437	5,176	767	10,319
Percent of Total Service Demand		67.10%	66.82%	73.05%	54.75%	68.74%

Source: Gilroy FD incident data

[17] Source: U.S. Census Bureau (2016)

[18] Source: California Department of Transportation (2017 data)

Table 44—Medical Emergency Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Medical Emergency	2016	1,242	451	1,693
	2017	1,352	423	1,775
	2018	1,318	464	1,782
	Total	3,912	1,338	5,250
Percent of Total Service Demand		70.61%	67.92%	69.91%

Source: Morgan Hill FD incident data

Table 45—Medical Emergency Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD Morgan Hill	SSCCFD Masten	SSCCFD Gilroy Gardens	
Medical Emergency	2016	1,211	439	125	1,775
	2017	1,297	471	102	1,870
	2018	1,272	521	125	1,918
	Total	3,780	1,431	352	5,563
Percent of Total Service Demand		69.40%	60.87%	48.69%	65.29%

Source: South Santa Clara County Fire District incident data

As these tables show, medical emergency service demand varies significantly by planning zone, increasing annually an average of approximately 2.5 to 4 percent. Overall, medical emergencies represent the largest percentage of all calls for service, which is typical of other jurisdictions of similar size and demographics.

Probability of Medical Emergency Occurrence

Table 46 summarizes Citygate's scoring of medical emergency probability by planning zone based on recent medical emergency service demand history from Table 43,Table 44, and Table 45.

Table 46—Medical Emergency Probability Scoring

Medical Emergency	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	5.0	4.5	4.0	5.0	4.5	5.0	5.0	4.25	4.0

Medical Emergency Impact Severity

Table 47 summarizes Citygate's scoring of probable medical emergency impact severity by planning zone.

Table 47—Medical Emergency Impact Severity Scoring

Medical Emergency	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Overall Medical Emergency Risk

Table 48 summarizes overall medical emergency risk scores and ratings by planning zone.

Table 48—Overall Medical Emergency Risk

Medical Emergency	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	15.0	13.5	12.0	15.0	13.5	15.0	15.0	12.75	12.0
Risk Rating	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*

A.1.13Hazardous Material Risk

Hazardous material risk factors include fixed facilities that store, use, or produce hazardous chemicals or waste; underground pipelines conveying hazardous materials; aviation, railroad,

maritime, and vehicle transportation of hazardous materials into or through a jurisdiction; vulnerable populations; emergency evacuation planning and related training; and specialized hazardous material service capacity.

The Santa Clara County Department of Environmental Health, serving as the State-designated Certified Unified Program Agency for the County, identified 682 facilities within the study area requiring a State or County hazardous material operating permit or Hazardous Materials Business Plan, as summarized in Table 49.

Table 49—Fixed Hazardous Materials Facilities

Risk	Jurisdiction			Total
	Gilroy	Morgan Hill	Fire District	
Fixed Hazardous Materials Facilities	104	484	94	682

Source: Santa Clara County Department of Environmental Health

High-pressure natural gas transmission pipelines are also located along the eastern edge of Santa Clara Valley extending west into the major population centers, including the Cities of Gilroy, Morgan Hill, and San Martin.

Transportation-related hazardous material risk includes vehicles and/or trains transporting hazardous materials into, from, or through a jurisdiction. Southern Santa Clara County highways carry more than 11,500 trucks daily, many transporting hazardous materials, as summarized in Table 50.

Table 50—Average Annual Truck Traffic Volume

Highway	Crossing	AADT[1]
Hwy. 25	Junction Hwy. 101	1,549
U.S. 101	Junction Hwy. 152	7,360
Hwy. 152	Junction Hwy. 101	2,699
Total		**11,608**

Source: California Department of Transportation (2017 data)

In addition, Union Pacific railroad tracks run north/south through the three jurisdictions, with more than 12 train movements daily,[19] many transporting hazardous materials.

Population Density

Because hazardous material emergencies have the potential to adversely impact human health, it is logical that the higher the population density, the greater the potential population exposed to a hazardous material release or spill. As illustrated in Figure 19, population density ranges from less than 1,000 per square mile to more than 15,000 per square mile in the study area.

Vulnerable Populations

Persons vulnerable to a hazardous material release/spill include those individuals or groups unable to self-evacuate, generally including children under the age of 10, the elderly, and persons confined to an institution or other setting where they are either physically unable to or otherwise prevented from self-evacuating. Nearly 25 percent of the population is under age 10 or is 65 years of age and older in the City of Gilroy; in the City of Morgan Hill, these age groups constitute just over 27 percent.

Emergency Evacuation Planning, Training, Implementation, and Effectiveness

Another significant hazardous material impact severity factor is a jurisdiction's shelter-in-place / emergency evacuation planning and training. In the event of a hazardous material release or spill, time can be a critical factor in notifying potentially affected persons, particularly at-risk populations, to either shelter-in-place or evacuate to a safe location. Essential to this process is an effective emergency plan that incorporates one or more mass emergency notification capabilities, as well as pre-established evacuation procedures. It is also essential to conduct regular, periodic exercises involving these two emergency plan elements to evaluate readiness and to identify and remediate any planning and/or training gaps to ensure ongoing emergency incident readiness and effectiveness.

Although neither City has a formal written emergency evacuation plan, both are members of the Santa Clara County Alert System (AlertSCC) administered and operated by the Santa Clara County Office of Emergency Services. AlertSCC is a free, subscription-based, mass emergency notification system that can provide emergency alerts, notifications, and other emergency information to email accounts, cell phones, smartphones, tablets, and landline telephones. Within either City, AlertSCC notifications can be initiated by designated Fire or Police Department personnel.

[19] Reference: U.S. Department of Transportation, Federal Railroad Administration (2016 data)

Hazardous Material Service Demand

Table 51, Table 52, and Table 53 summarize hazardous material service demand by jurisdiction over the three-year study period.

Table 51—Hazardous Material Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Hazardous Materials	2016	11	2	17	4	34
	2017	9	2	25	6	42
	2018	5	2	14	4	25
	Total	25	6	56	14	101
Percent of Total Service Demand		0.43%	0.92%	0.79%	1.00%	0.67%

Source: Gilroy FD incident data

Table 52—Hazardous Materials Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Hazardous Materials	2016	11	1	12
	2017	13	5	18
	2018	7	8	15
	Total	31	14	45
Percent of Total Service Demand		0.56%	0.71%	0.60%

Source: Morgan Hill FD incident data

Table 53—Hazardous Materials Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD Morgan Hill	SSCCFD Masten	SSCCFD Gilroy Gardens	
Hazardous Materials	2016	10	1	1	12
	2017	19	4	1	24
	2018	15	6	0	21
	Total	44	11	2	57
Percent of Total Service Demand		0.81%	0.47%	0.28%	0.67%

Source: South Santa Clara County Fire District incident data

As these tables illustrate, hazardous material service demand varies by planning zone and has been consistent in each jurisdiction over the three-year study period. Overall, hazardous material service demand is very low in all three jurisdictions.

Probability of Hazardous Material Occurrence

Table 54 summarizes Citygate's scoring of hazardous materials probability by planning zone based on recent hazardous material service demand from Table 51, Table 52, and Table 53.

Table 54—Hazardous Material Probability Scoring

Hazardous Materials	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	3.0	2.25	1.25	2.75	2.25	2.5	3.0	2.25	2.0

Hazardous Material Impact Severity

Table 55 summarizes Citygate's scoring of probable hazardous material impact severity by planning zone.

Table 55—Hazardous Material Impact Severity Scoring

Hazardous Materials	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Overall Hazardous Material Risk

Table 56 summarizes overall hazardous material risk scores and ratings by planning zone.

Table 56—Overall Hazardous Material Risk

Hazardous Materials	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	9.0	6.75	3.75	8.25	6.75	7.5	9.0	6.75	6.0
Risk Rating	*Moderate*	*Moderate*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*

A.1.14Technical Rescue Risk

Technical rescue risk factors include active construction projects; structural collapse potential; confined spaces, such as tanks and underground vaults; bodies of water and rivers or streams; industrial machinery; transportation volume; and earthquake, flood, and landslide potential.

Construction Activity

There is ongoing residential, commercial, industrial, and/or infrastructure construction activity occurring within the three jurisdictions.

Confined Spaces

There are multiple confined spaces within the study area, including tanks, vaults, open trenches, etc.

Waterways and Bodies of Water

There are multiple waterways and bodies of water within the study area, including Anderson and Coyote Lakes, Chesbro and Uvas Reservoirs, and numerous creeks and smaller bodies of water.

Transportation Volume

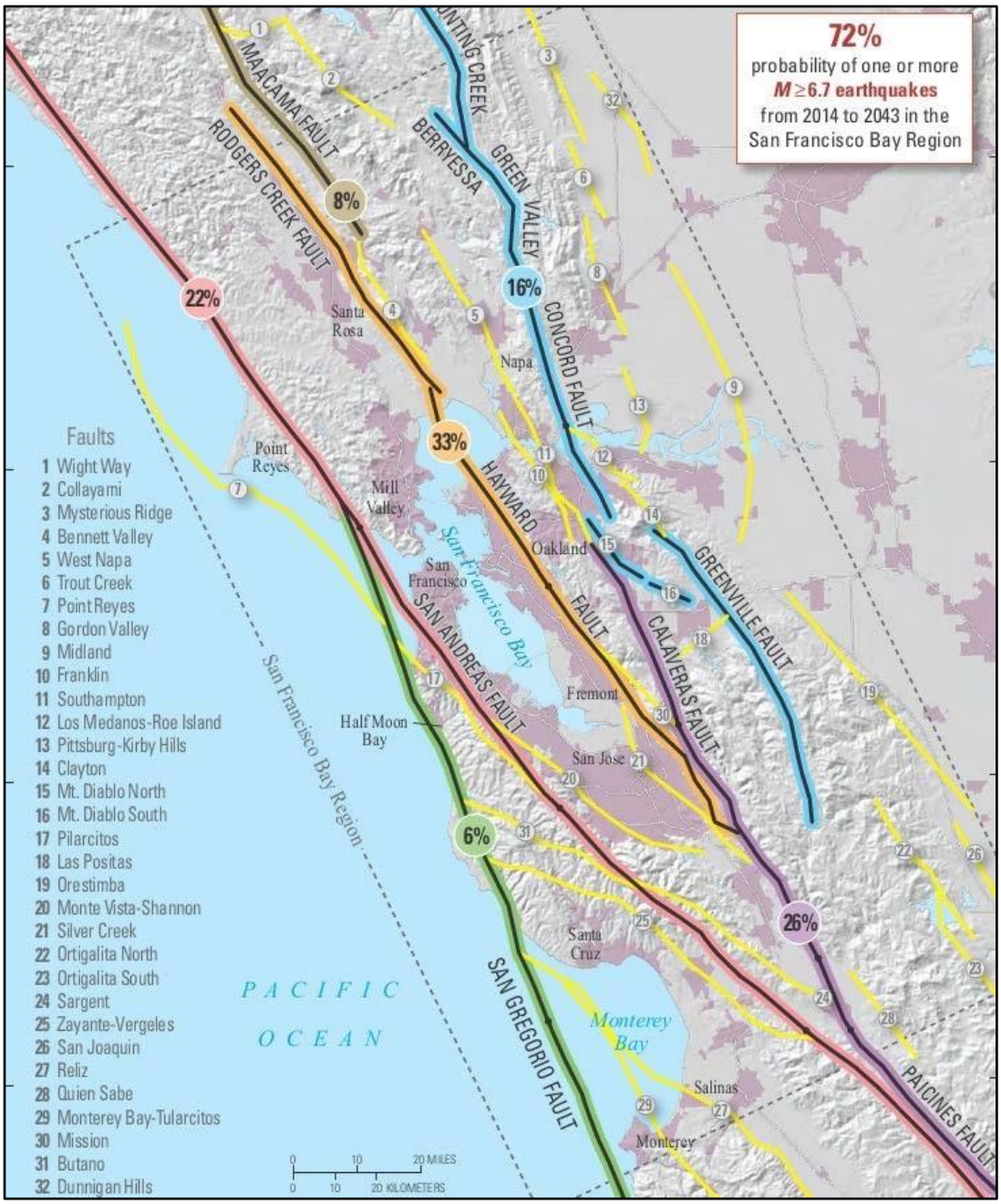
Another factor is transportation-related incidents requiring technical rescue. This risk factor is primarily a function of vehicle, railway, maritime, and aviation traffic. Vehicle traffic volume is the greatest of these factors within the study area, with U.S. 101 and State Routes 25 and 152 carrying an aggregate average of 164,000 vehicles daily. Railway traffic includes more than 12 train movements daily. General aviation traffic, into and from the San Martin Airport, is an additional risk factor.

Earthquake Risk[20]

Three major seismic faults within the region have the potential to impact the study area, including the Calaveras, Hayward, and San Andreas Faults. Significant historical seismic activity includes 14 earthquakes with a magnitude of 5.0 or greater within 100 miles of Santa Clara County since 1985. According to the U.S.G.S., there is a 72 percent probability of a magnitude 6.7 or greater earthquake in the San Francisco Bay Area region within the next 25 years. Figure 24 shows the location of the various Bay Area seismic faults.

[20] Reference: 2017 Santa Clara County Operational Area Hazard Mitigation Plan, Section 8

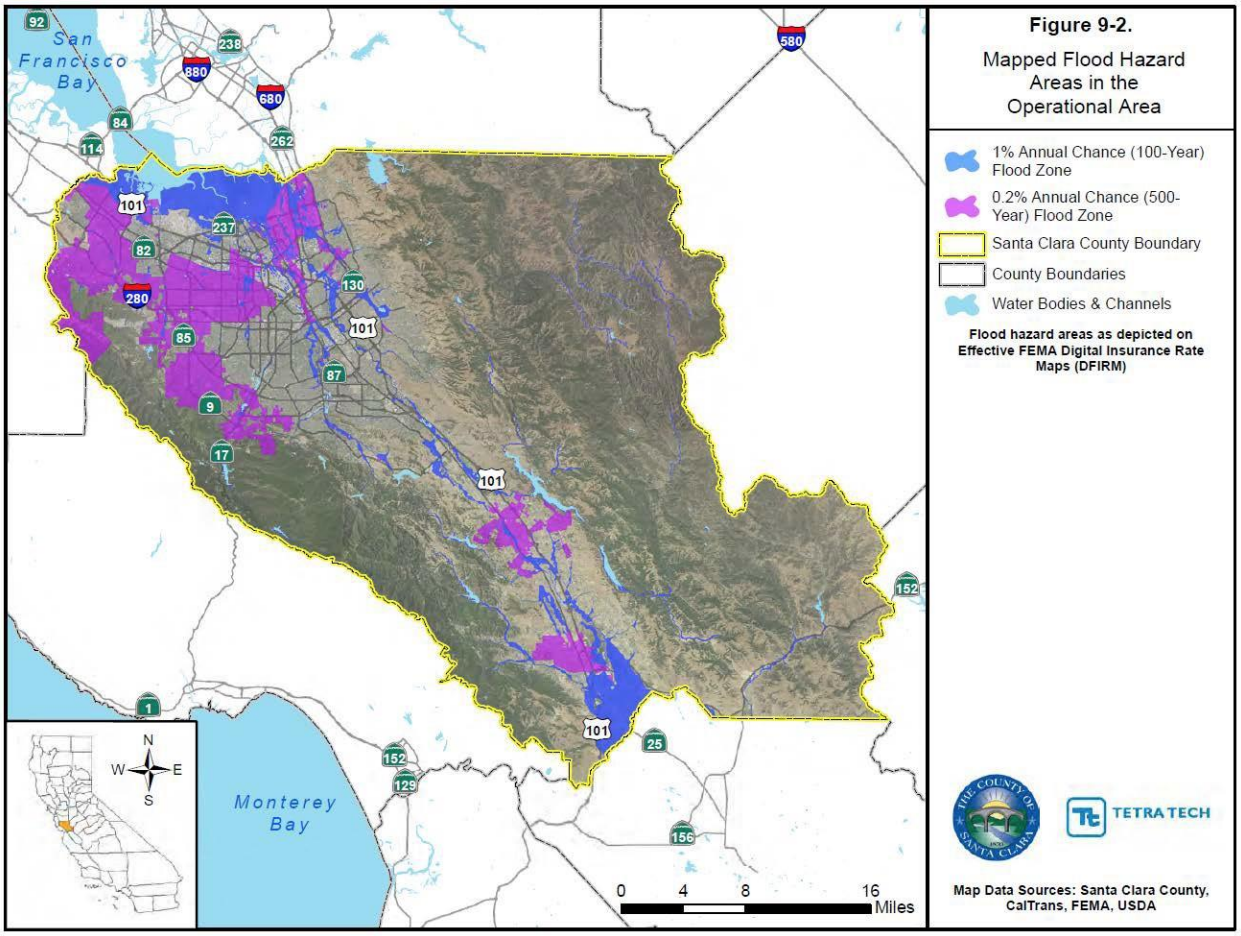
Figure 24—Earthquake Faults



Flood Risk[21]

Figure 25 shows the flood hazard areas for Santa Clara County as identified by the Federal Emergency Management Agency.

Figure 25—Flood Hazard Areas – Santa Clara County



Technical Rescue Service Demand

Table 57, Table 58, and Table 59 summarize technical rescue service demand by jurisdiction over the three-year study period.

[21] Reference: 2017 Santa Clara County Operational Area Hazard Mitigation Plan, Section 9

Table 57—Technical Rescue Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Technical Rescue	2016	2	0	0	0	2
	2017	3	0	0	0	3
	2018	1	1	0	0	2
	Total	6	1	0	0	7
Percent of Total Service Demand		0.10%	0.15%	0.00%	0.00%	0.05%

Source: Gilroy FD incident data

Table 58—Technical Rescue Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Technical Rescue	2016	2	1	3
	2017	3	1	4
	2018	1	0	1
	Total	6	2	8
Percent of Total Service Demand		0.11%	0.10%	0.11%

Source: Morgan Hill FD incident data

Table 59—Technical Rescue Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD Morgan Hill	SSCCFD Masten	SSCCFD Gilroy Gardens	
Technical Rescue	2016	1	2	0	3
	2017	3	2	0	5
	2018	1	1	2	4
	Total	5	5	2	12
Percent of Total Service Demand		0.09%	0.21%	0.28%	0.14%

Source: South Santa Clara County Fire District incident data

As these tables show, technical rescue service demand is very low and relatively consistent across all three jurisdictions over the three-year study period.

Probability of Technical Rescue Occurrence

Table 60 summarizes Citygate's technical rescue probability scoring by planning zone based on recent technical rescue service demand history from Table 57, Table 58, and Table 59.

Table 60—Technical Rescue Probability Scoring

Technical Rescue	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	1.5	1.5	1.25	1.5	1.25	1.5	1.25	1.25	1.25

Technical Rescue Impact Severity

Table 61 summarizes Citygate's scoring of probable technical rescue impact severity by planning zone.

Table 61—Technical Rescue Impact Severity Scoring

Technical Rescue	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Overall Technical Rescue Risk

Table 62 summarizes overall technical rescue risk scores and ratings by planning zone.

Table 62—Overall Technical Rescue Risk

Technical Rescue	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	3.75	3.75	3.125	3.75	3.125	3.75	3.125	3.125	3.125
Risk Rating	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*

CITYGATE ASSOCIATES, LLC
PUBLIC SAFETY SERVICES

STANDARDS OF COVERAGE ASSESSMENT

VOLUME 2 OF 2: MAP ATLAS

CITY OF GILROY
CITY OF MORGAN HILL
SOUTH SANTA CLARA COUNTY FIRE DISTRICT

NOVEMBER 14, 2019

CITYGATE ASSOCIATES, LLC
WWW.CITYGATEASSOCIATES.COM
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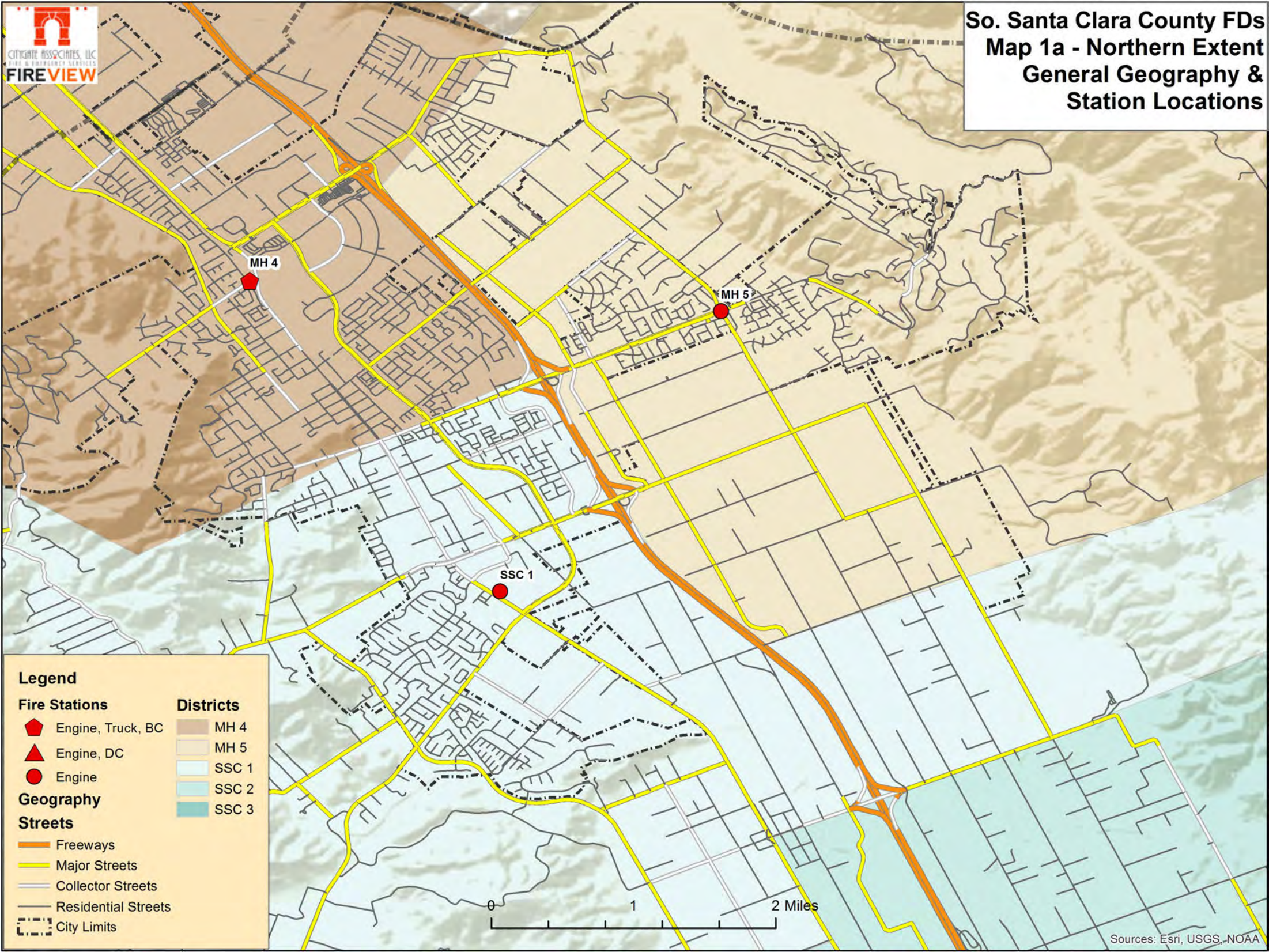
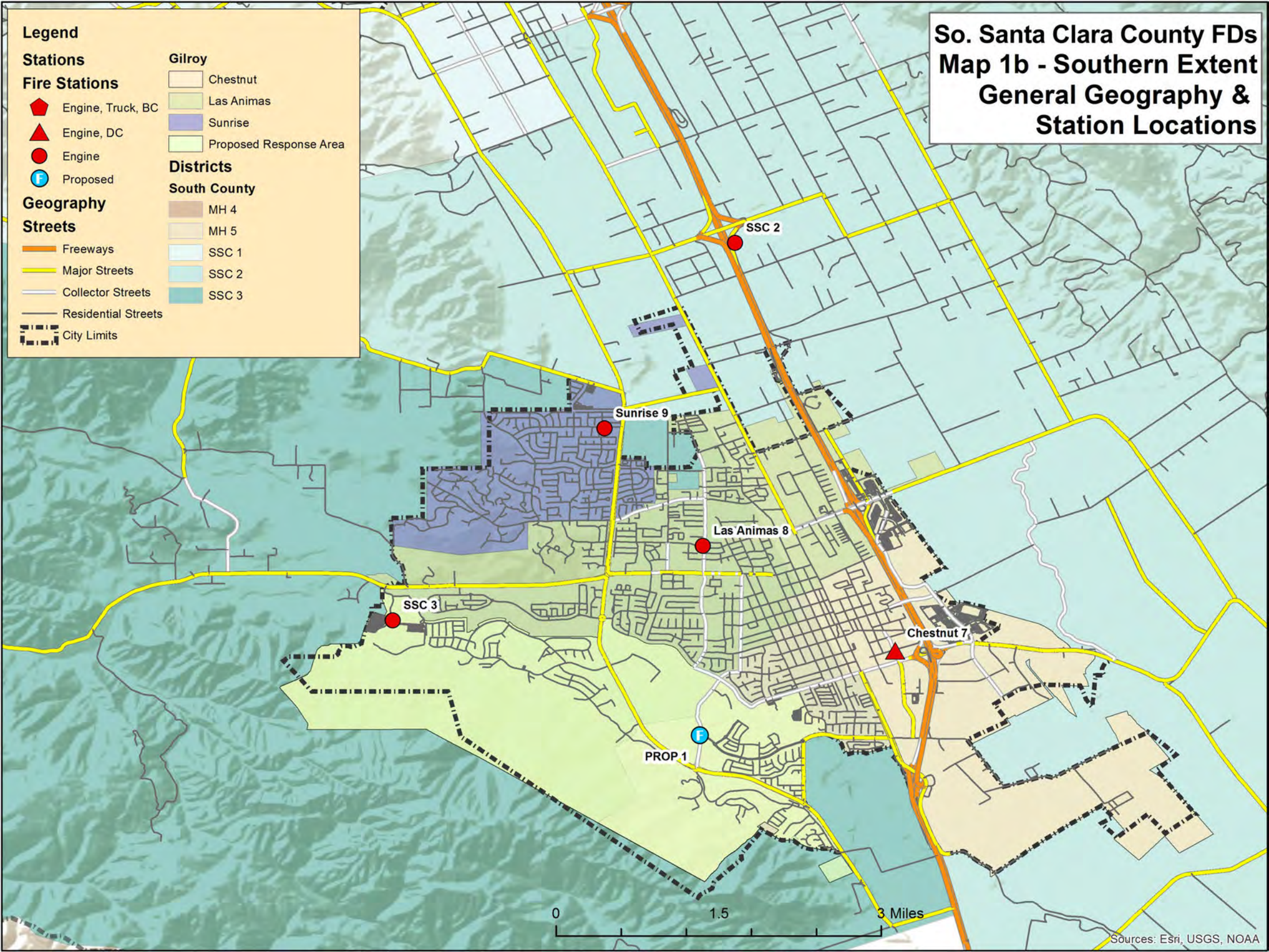
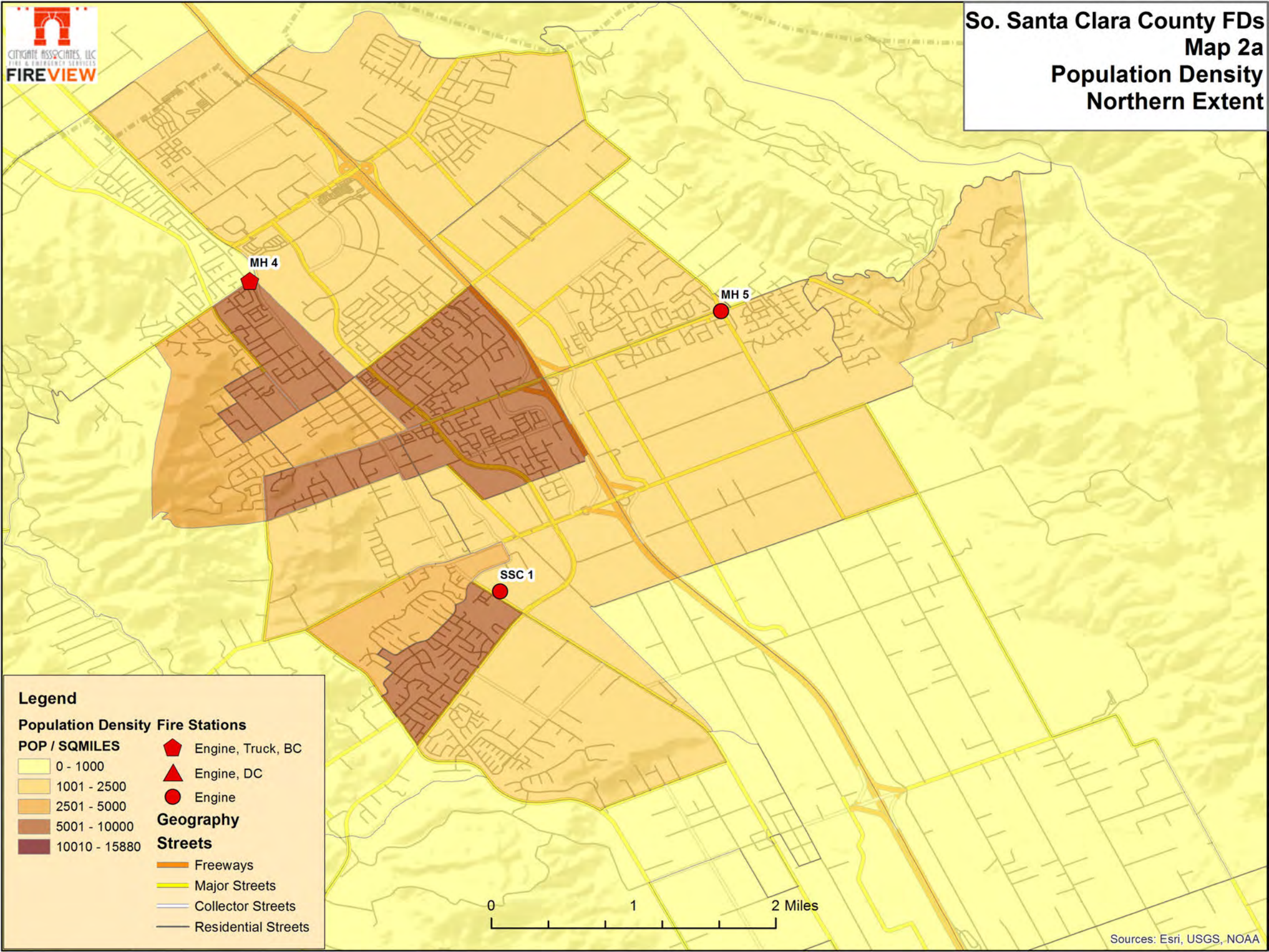
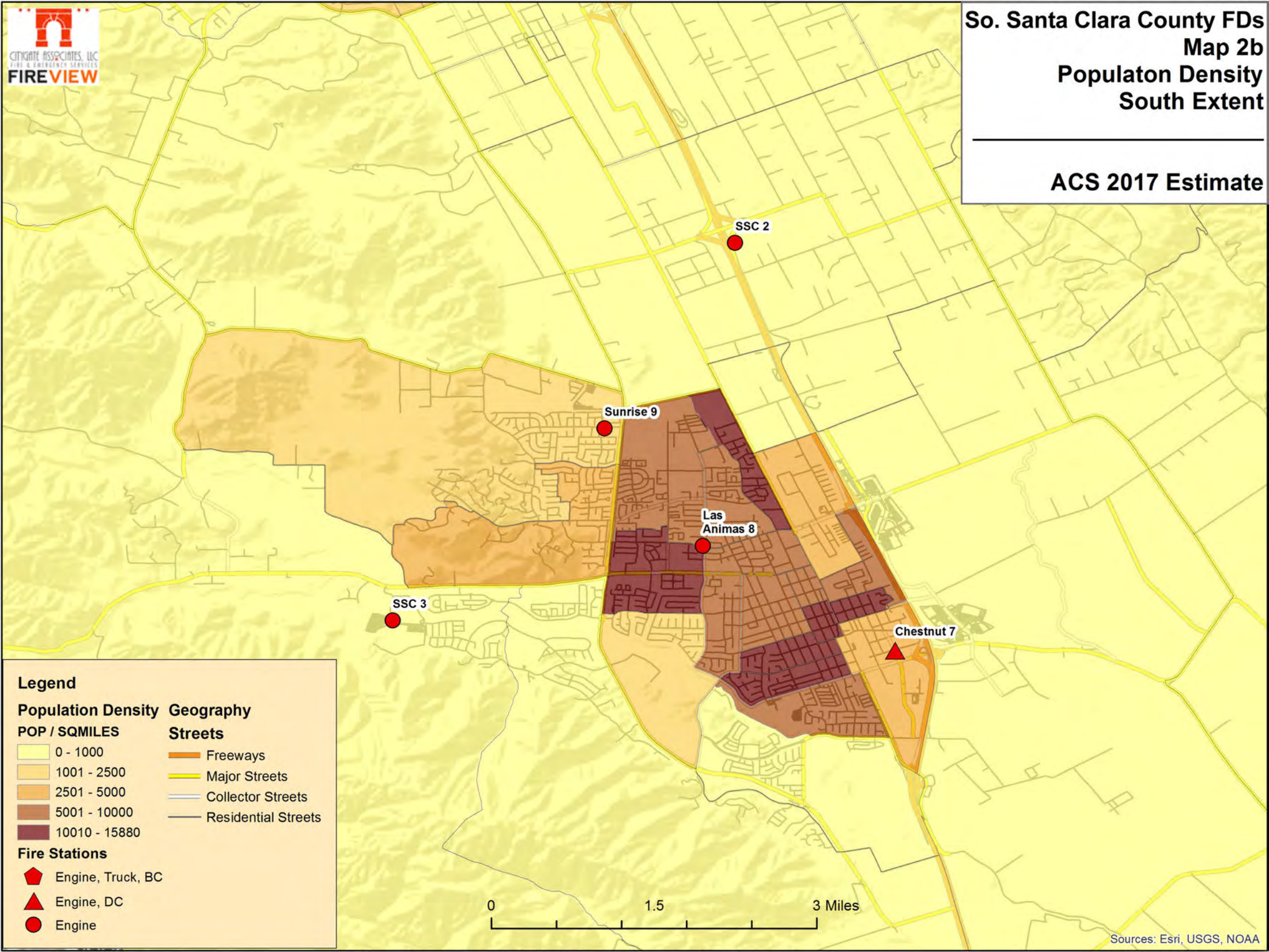
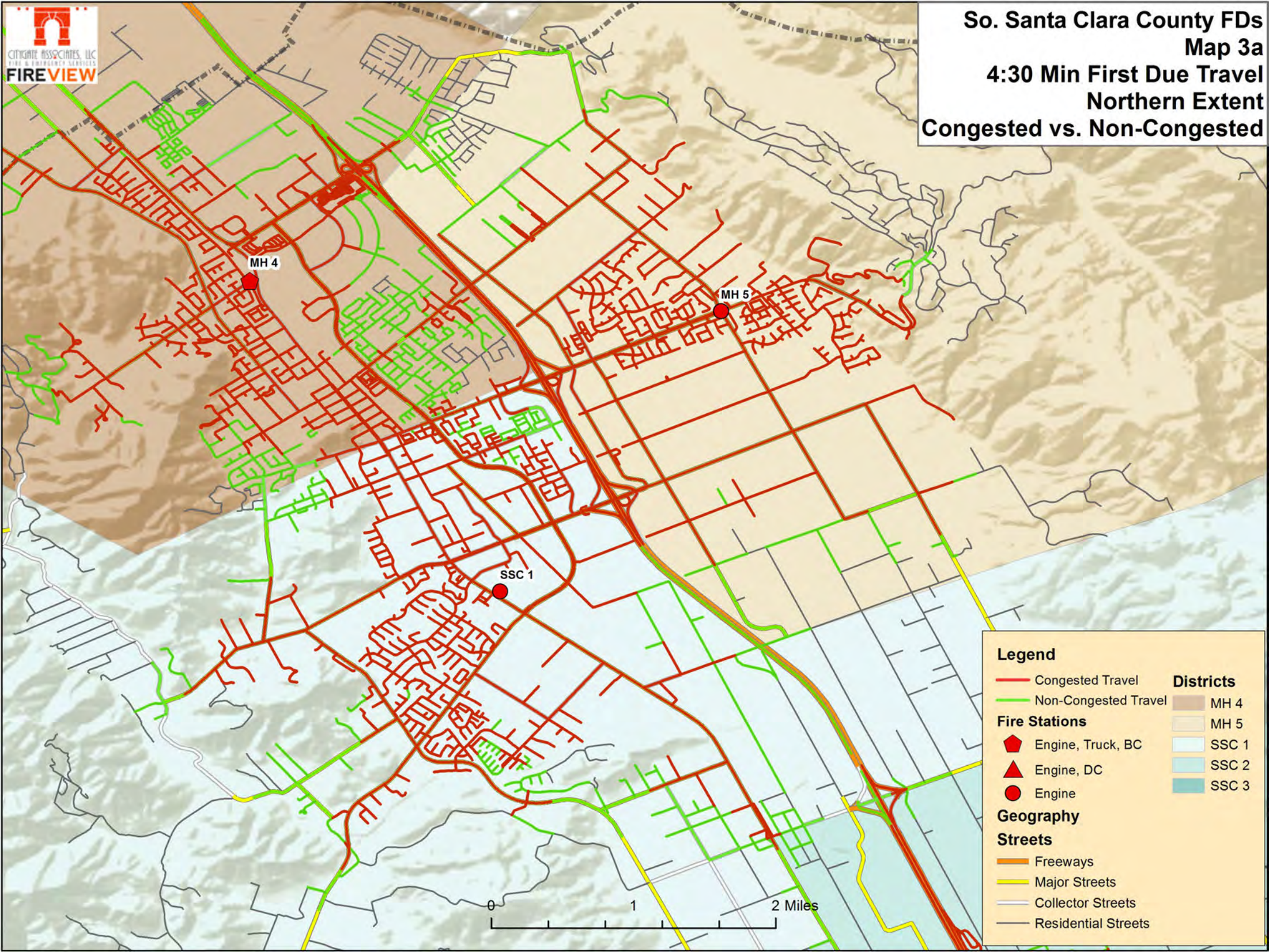
gilroy
CITY OF MORGAN HILL

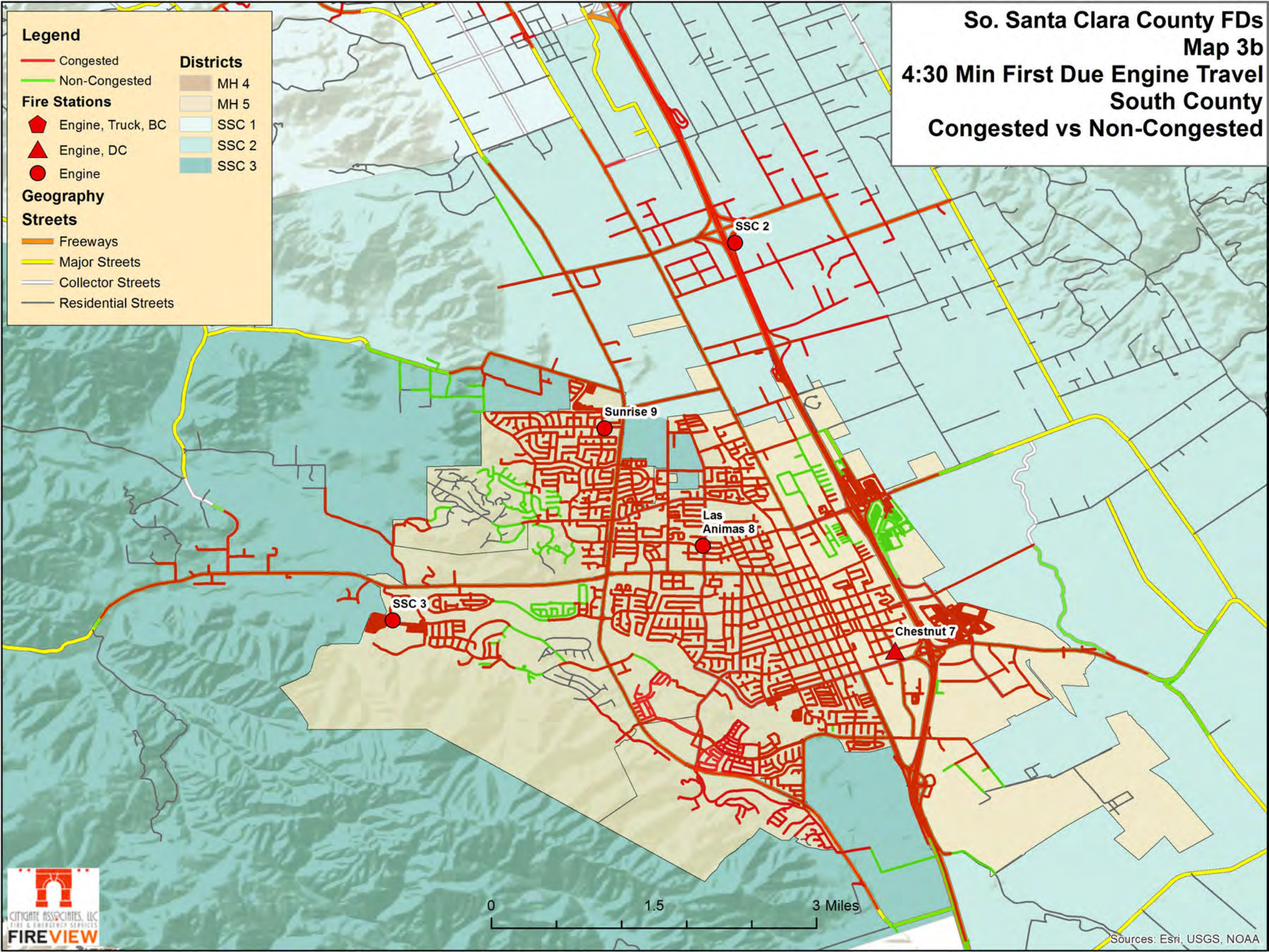

So. Santa Clara County FDs
Map 1a - Northern Extent
General Geography &
Station Locations
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
MH 4
MH 5
SSC 1
Legend
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1
2 Miles
Sources: Esri, USGS, NOAA

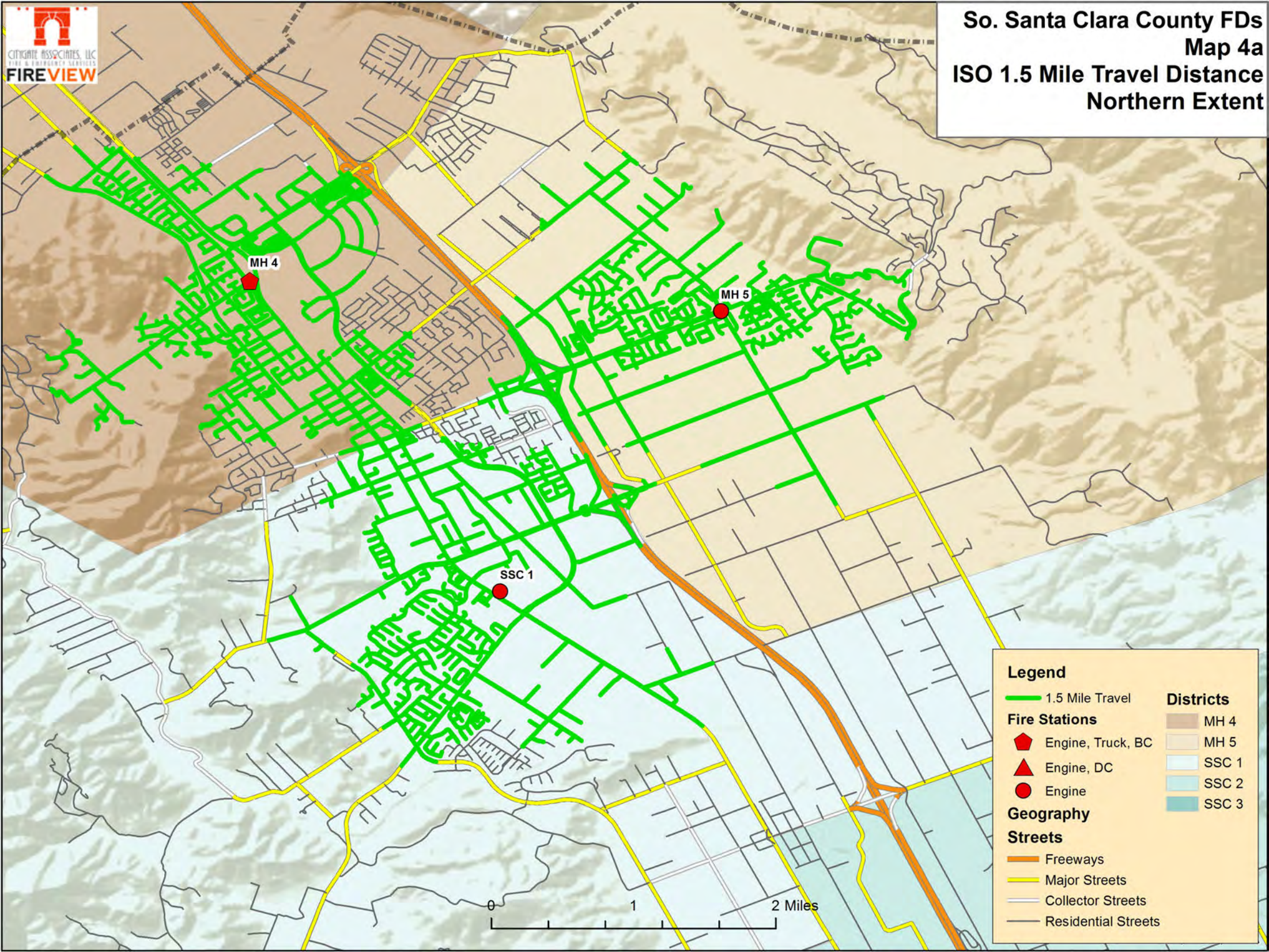

Legend
Stations
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Proposed
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Gilroy
Chestnut
Las Animas
Sunrise
Proposed Response Area
Districts
South County
MH 4
MH 5
SSC 1
SSC 2
SSC 3
So. Santa Clara County FDs
Map 1b - Southern Extent
General Geography &
Station Locations
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
PROP 1
0
1.5
3 Miles
Sources: Esri, USGS, NOAA

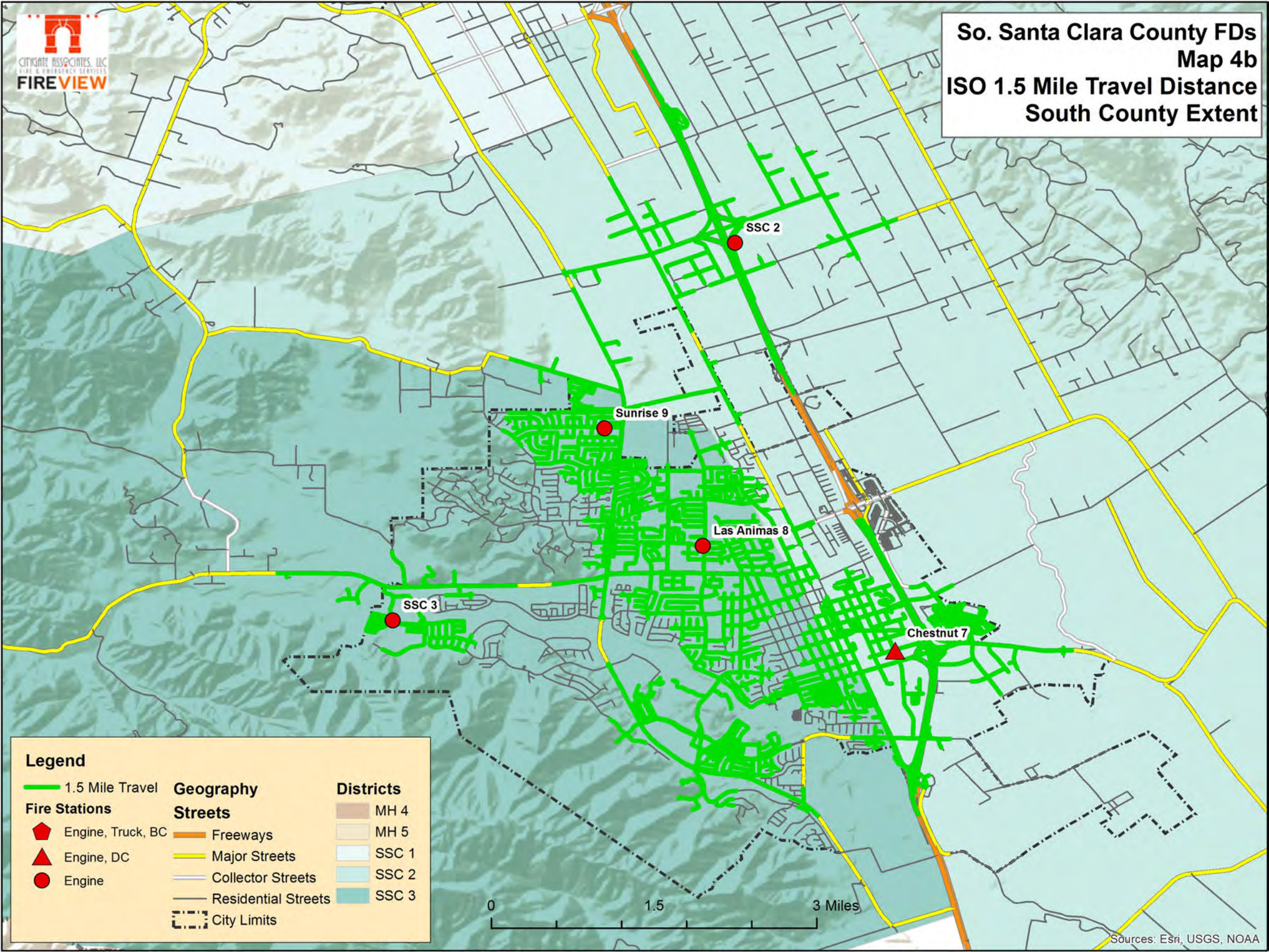

So. Santa Clara County FDs
Map 2a
Population Density
Northern Extent
CITIGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
MH 4
MH 5
SSC 1
Legend
Population Density
POP / SQMILES
0 - 1000
1001 - 2500
2501 - 5000
5001 - 10000
10010 - 15880
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
0
1
2 Miles
Sources: Esri, USGS, NOAA

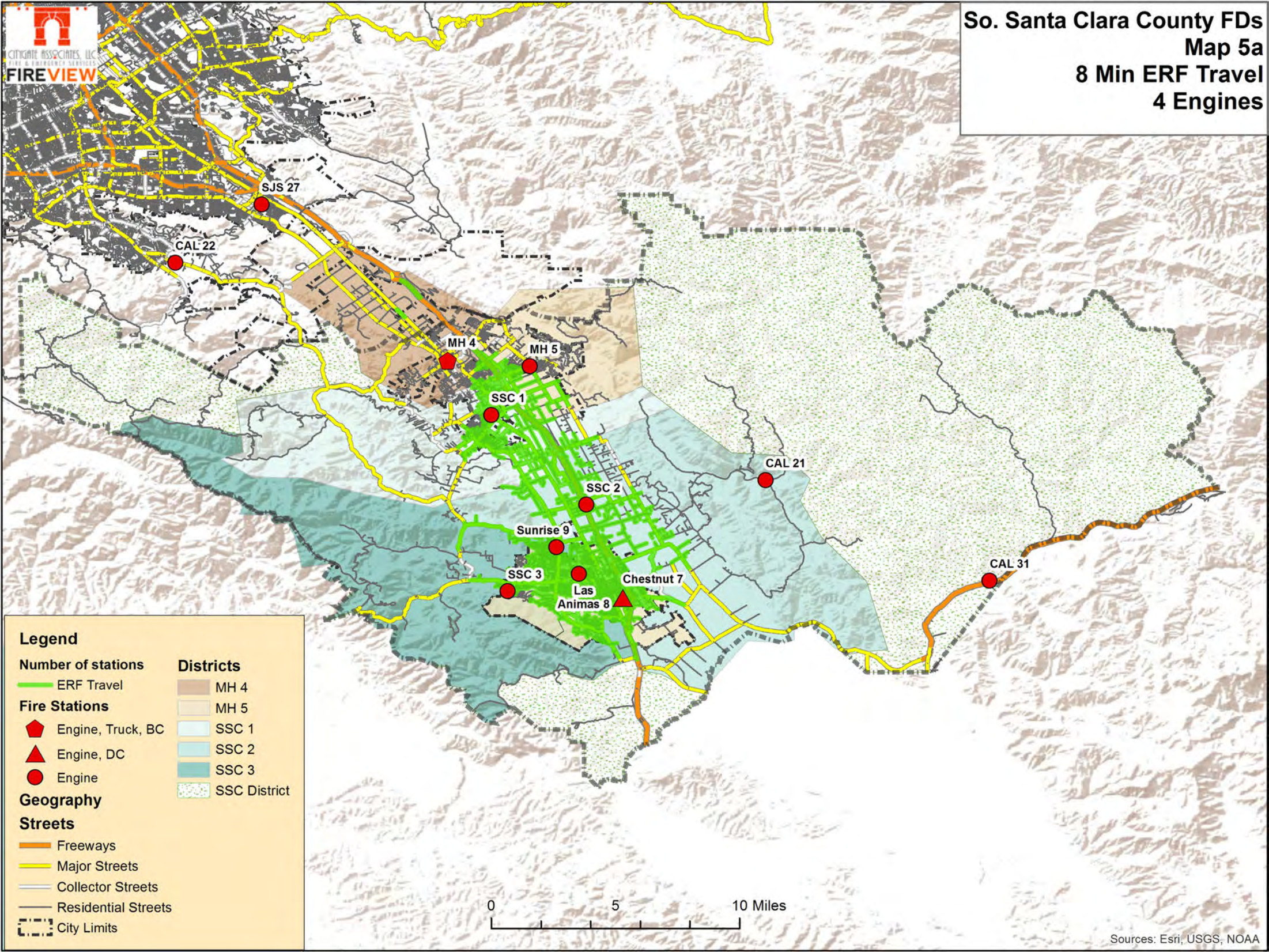

So. Santa Clara County FDs
Map 2b
Populaton Density
South Extent
ACS 2017 Estimate
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
Legend
Population Density
POP / SQMILES
0 - 1000
1001 - 2500
2501 - 5000
5001 - 10000
10010 - 15880
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
0
1.5
3 Miles
Sources: Esri, USGS, NOAA

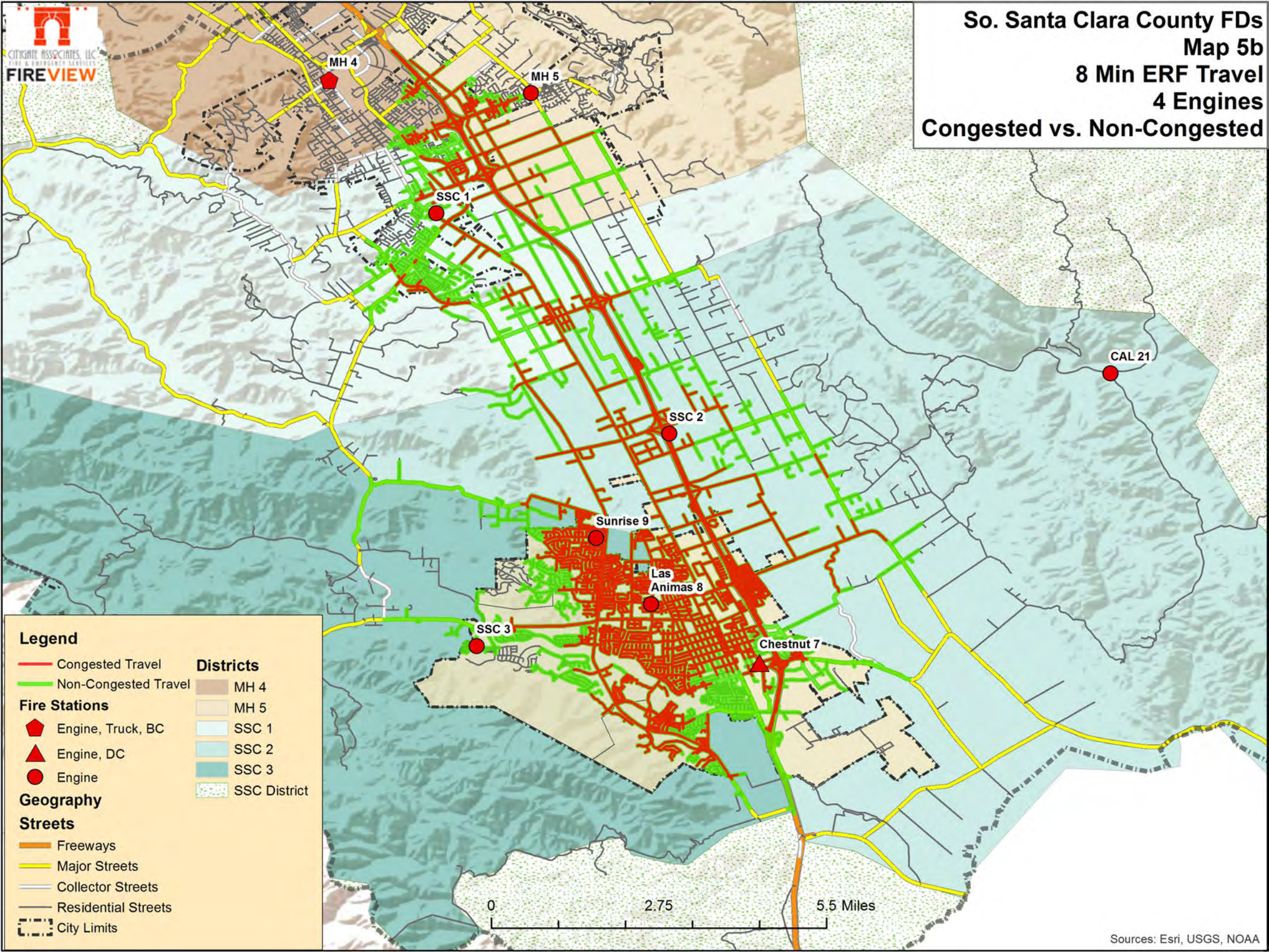

So. Santa Clara County FDs
Map 3a
4:30 Min First Due Travel
Northern Extent
Congested vs. Non-Congested
CITIGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
MH 4
MH 5
SSC 1
Legend
Congested Travel
Non-Congested Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1
2 Miles

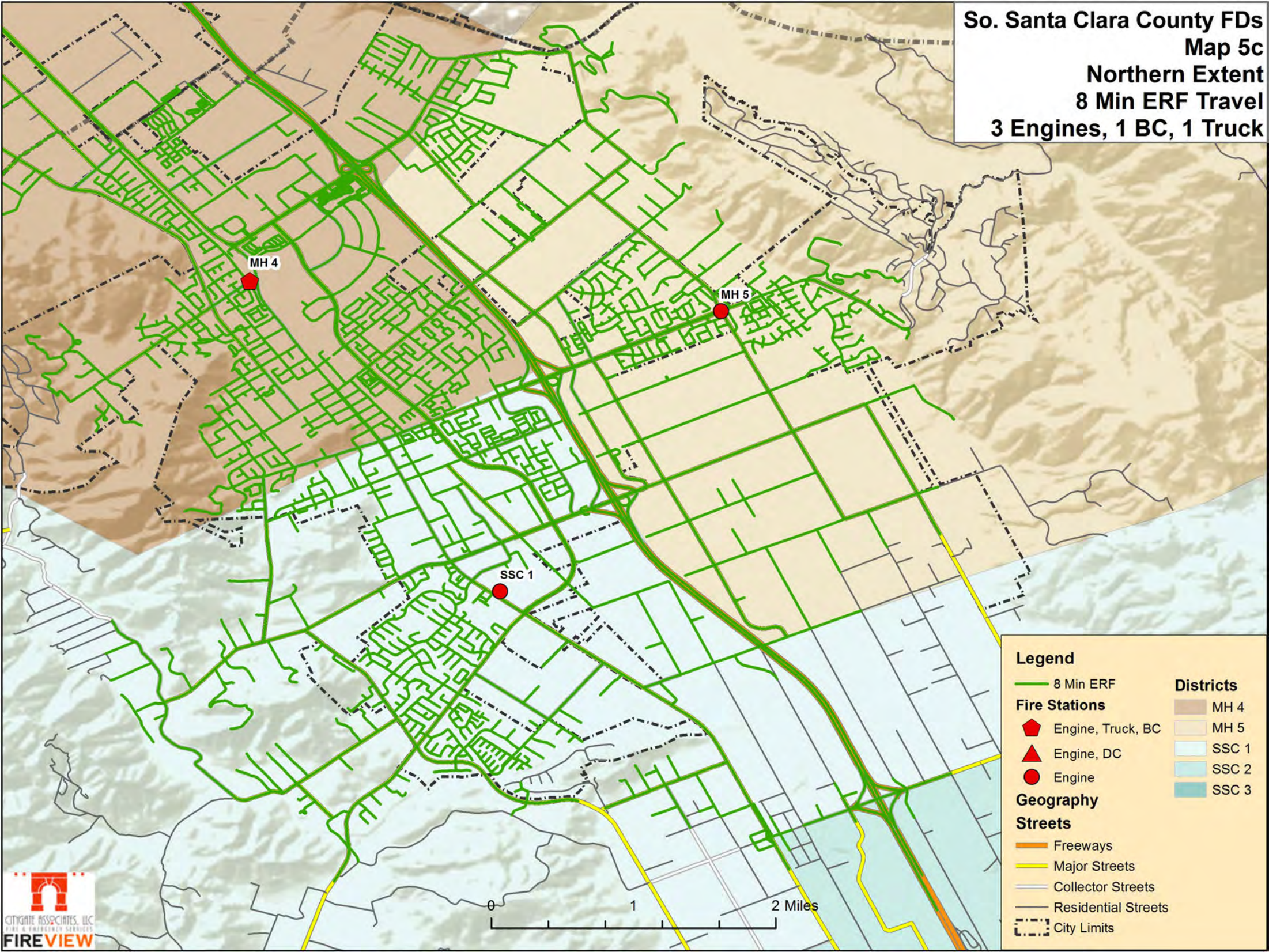

Legend
Congested
Non-Congested
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
So. Santa Clara County FDs
Map 3b
4:30 Min First Due Engine Travel
South County
Congested vs Non-Congested
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
0
1.5
3 Miles
CITIGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
Sources: Esri, USGS, NOAA

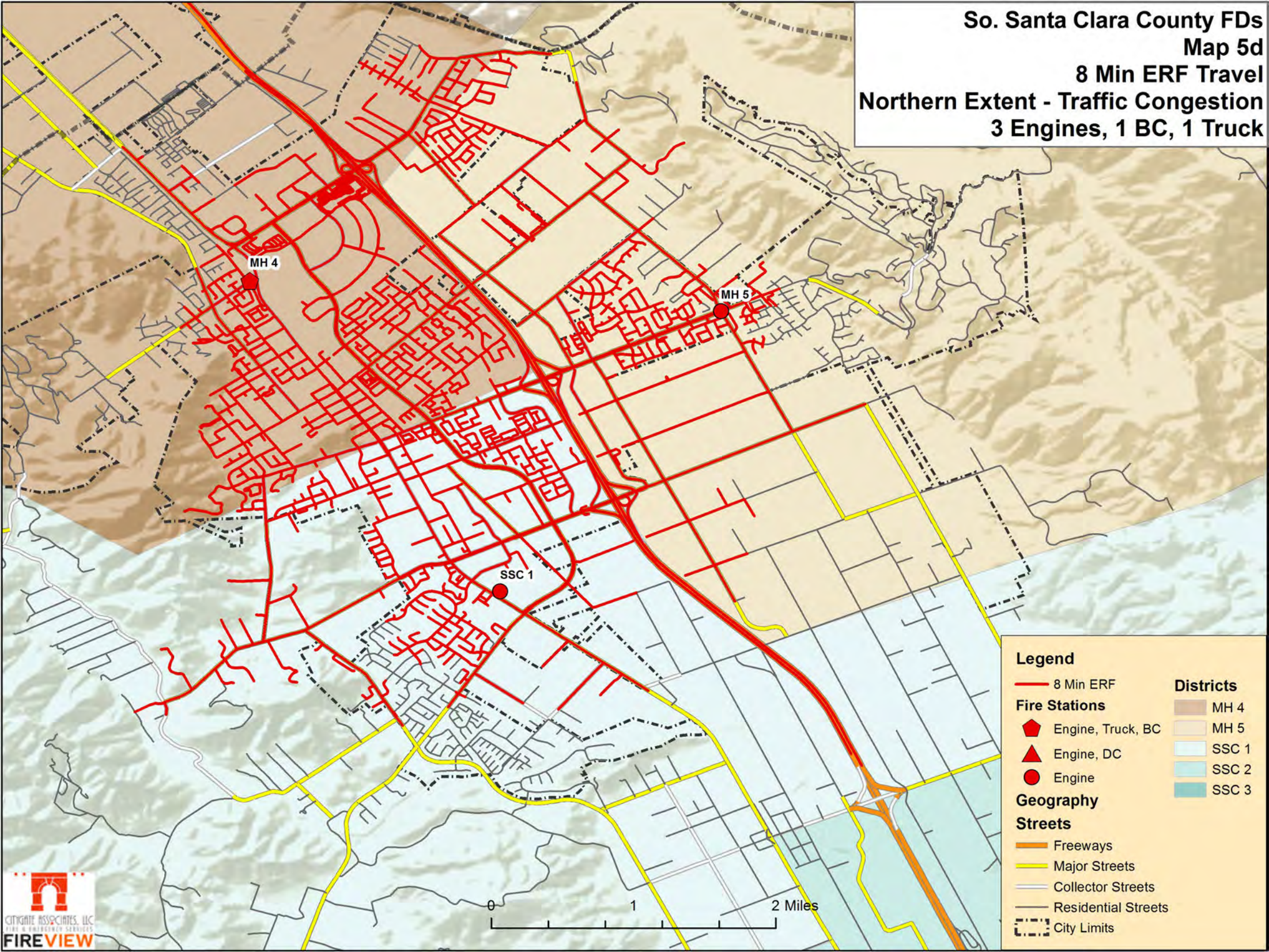

So. Santa Clara County FDs
Map 4a
ISO 1.5 Mile Travel Distance
Northern Extent
CITIGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
MH 4
MH 5
SSC 1
Legend
1.5 Mile Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1
2 Miles

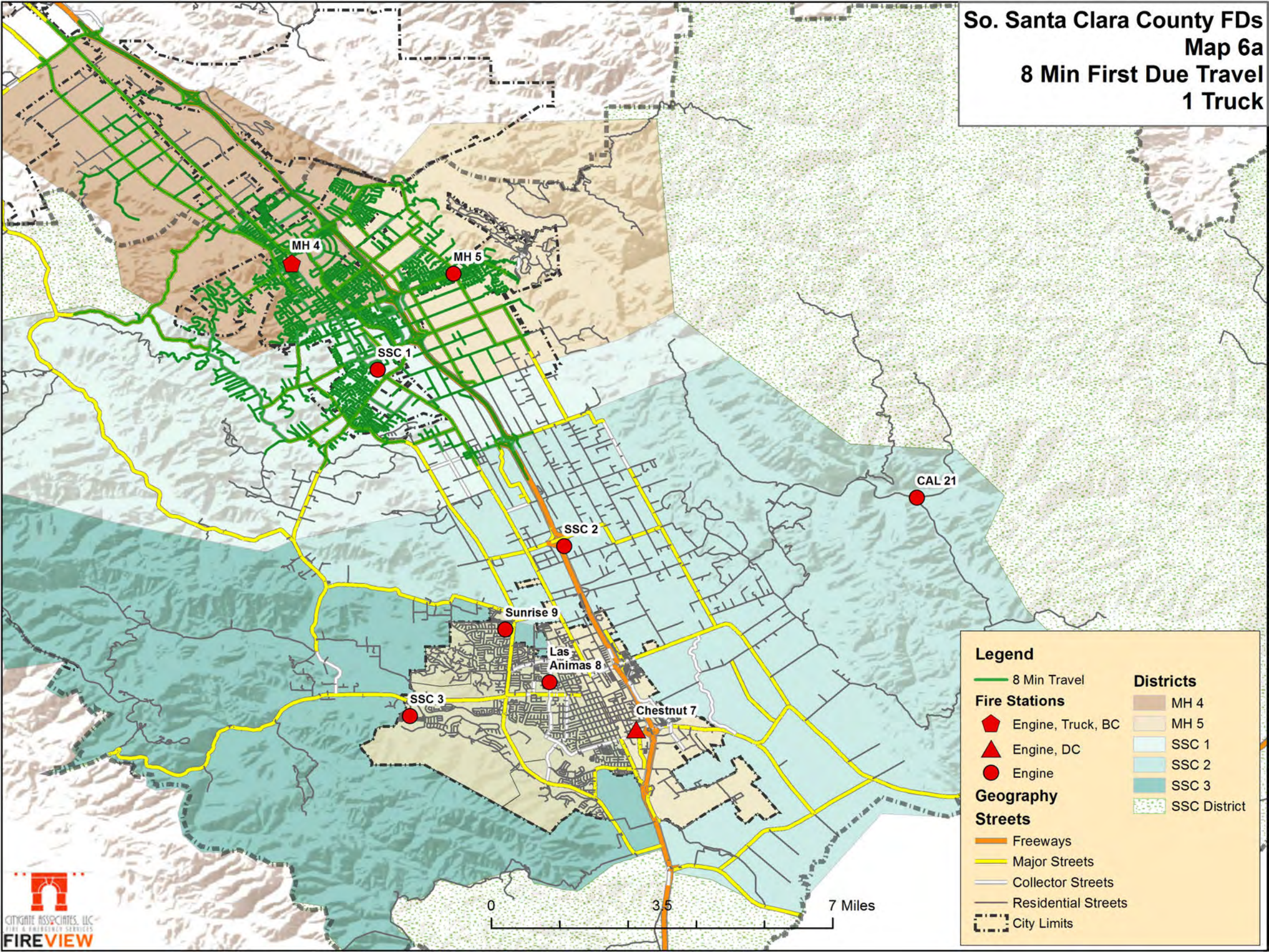

So. Santa Clara County FDs
Map 4b
ISO 1.5 Mile Travel Distance
South County Extent
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
Legend
1.5 Mile Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1.5
3 Miles
Sources: Esri, USGS, NOAA

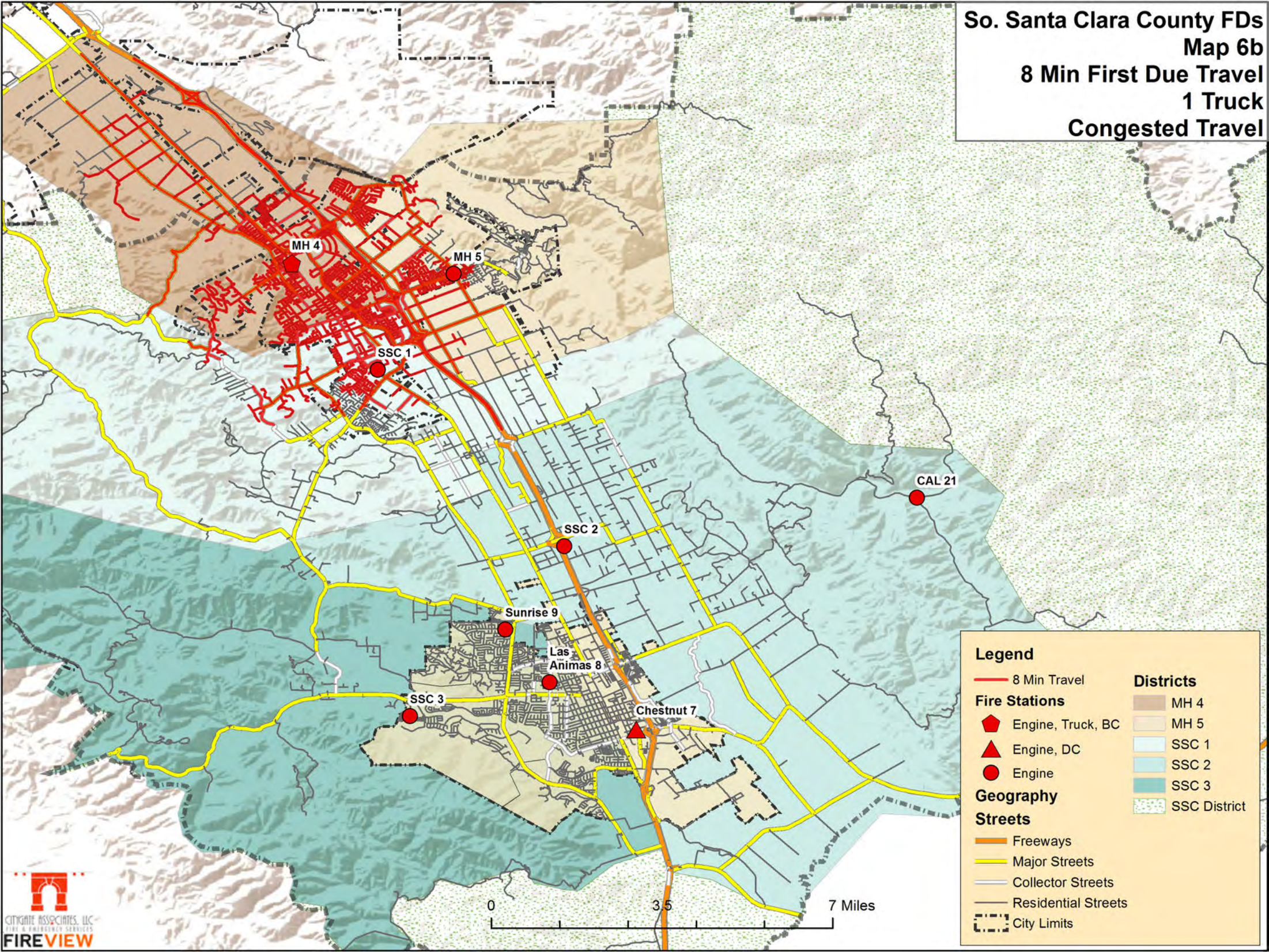

So. Santa Clara County FDs
Map 5a
8 Min ERF Travel
4 Engines
FIREVIEW
SJS 27
CAL 22
MH 4
MH 5
SSC 1
CAL 21
SSC 2
Sunrise 9
CAL 31
SSC 3
Chestnut 7
Las Animas 8
Legend
Number of stations
ERF Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
SSC District
0
5
10 Miles
Sources: Esri, USGS, NOAA

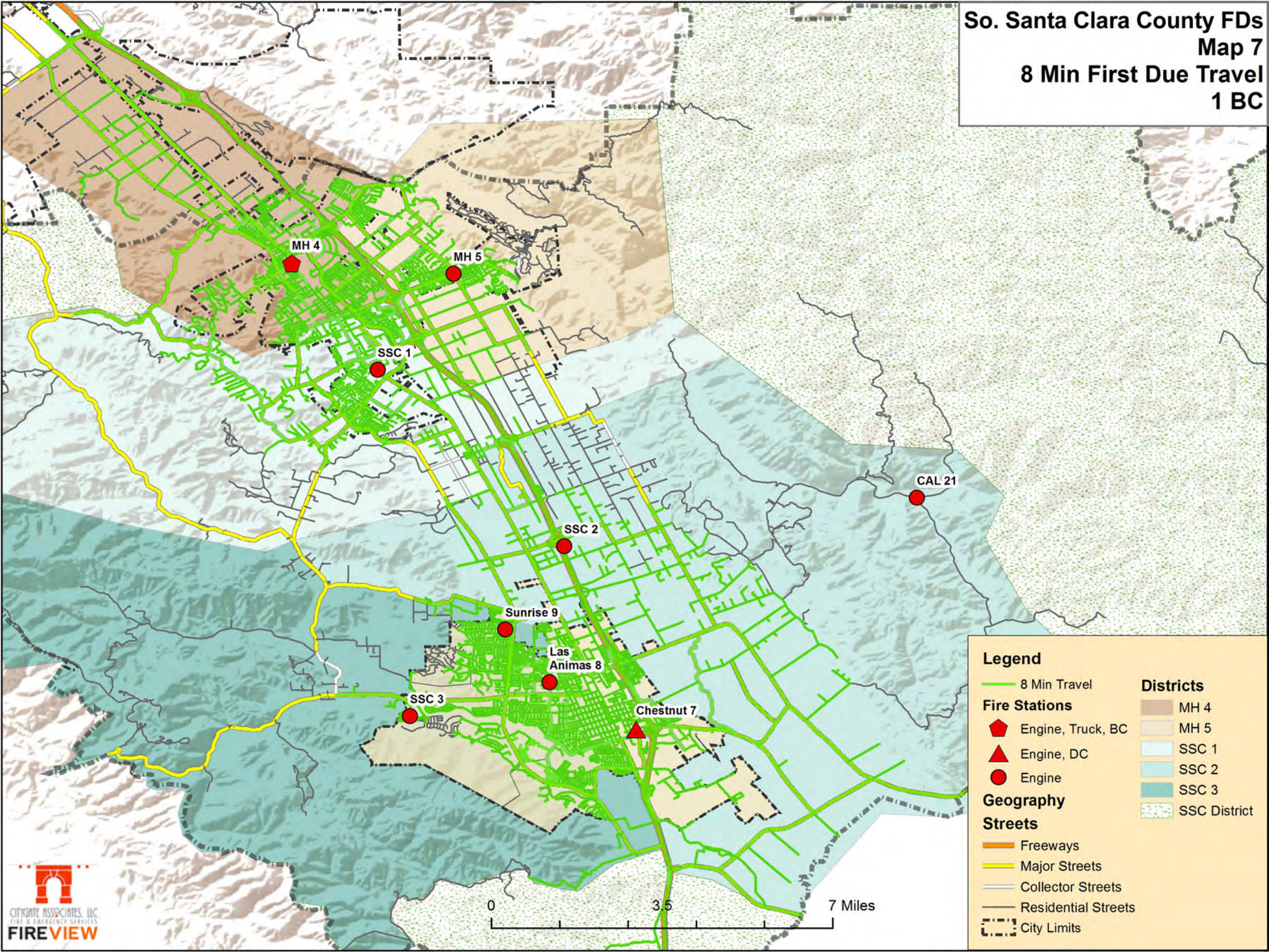

So. Santa Clara County FDs
Map 5b
8 Min ERF Travel
4 Engines
Congested vs. Non-Congested
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
MH 4
MH 5
SSC 1
SSC 2
SSC 3
CAL 21
Sunrise 9
Las Animas 8
Chestnut 7
Legend
Congested Travel
Non-Congested Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
SSC District
0
2.75
5.5 Miles
Sources: Esri, USGS, NOAA

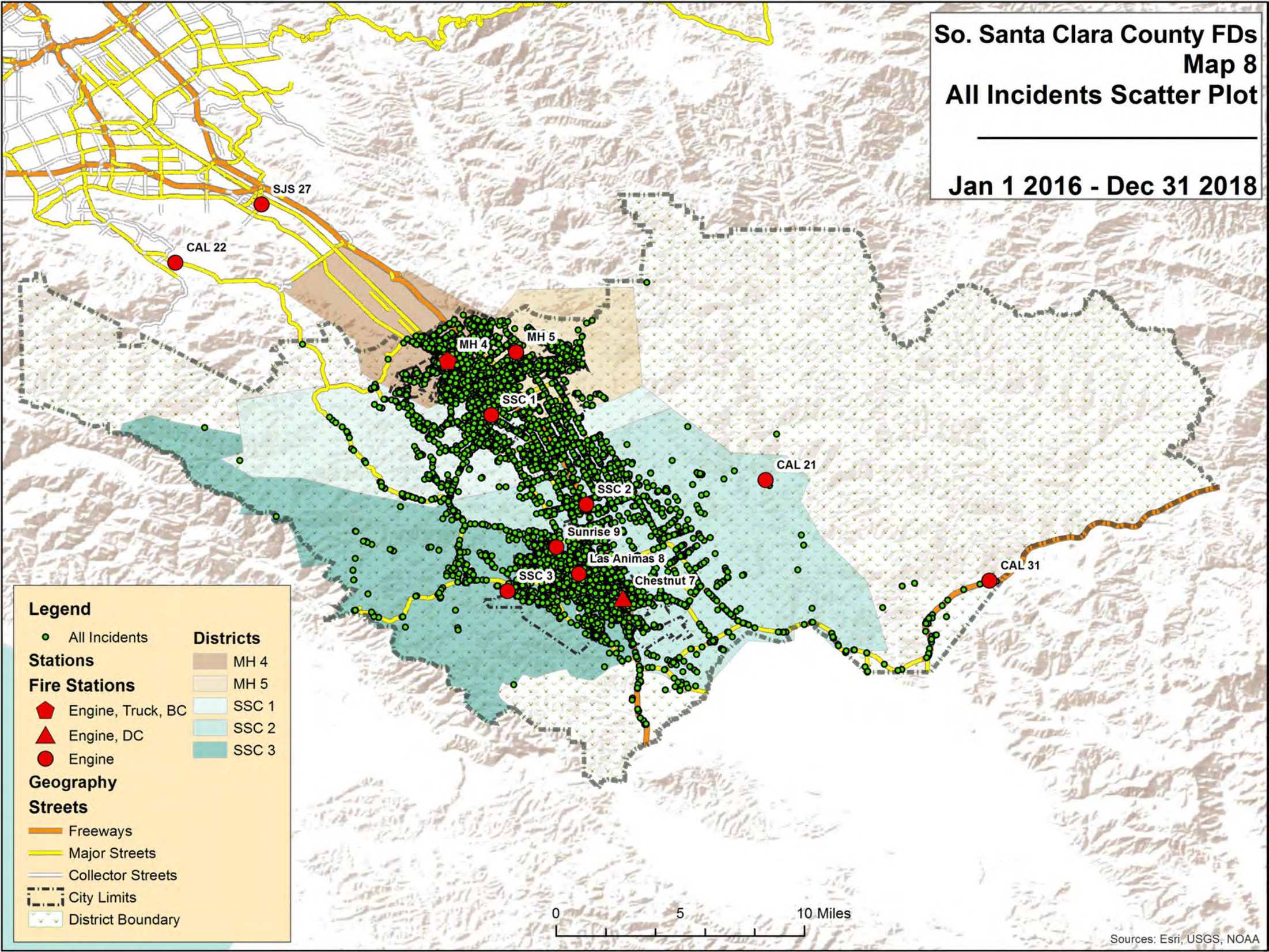

So. Santa Clara County FDs
Map 5c
Northern Extent
8 Min ERF Travel
3 Engines, 1 BC, 1 Truck
MH 4
MH 5
SSC 1
Legend
8 Min ERF
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1
2 Miles
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW

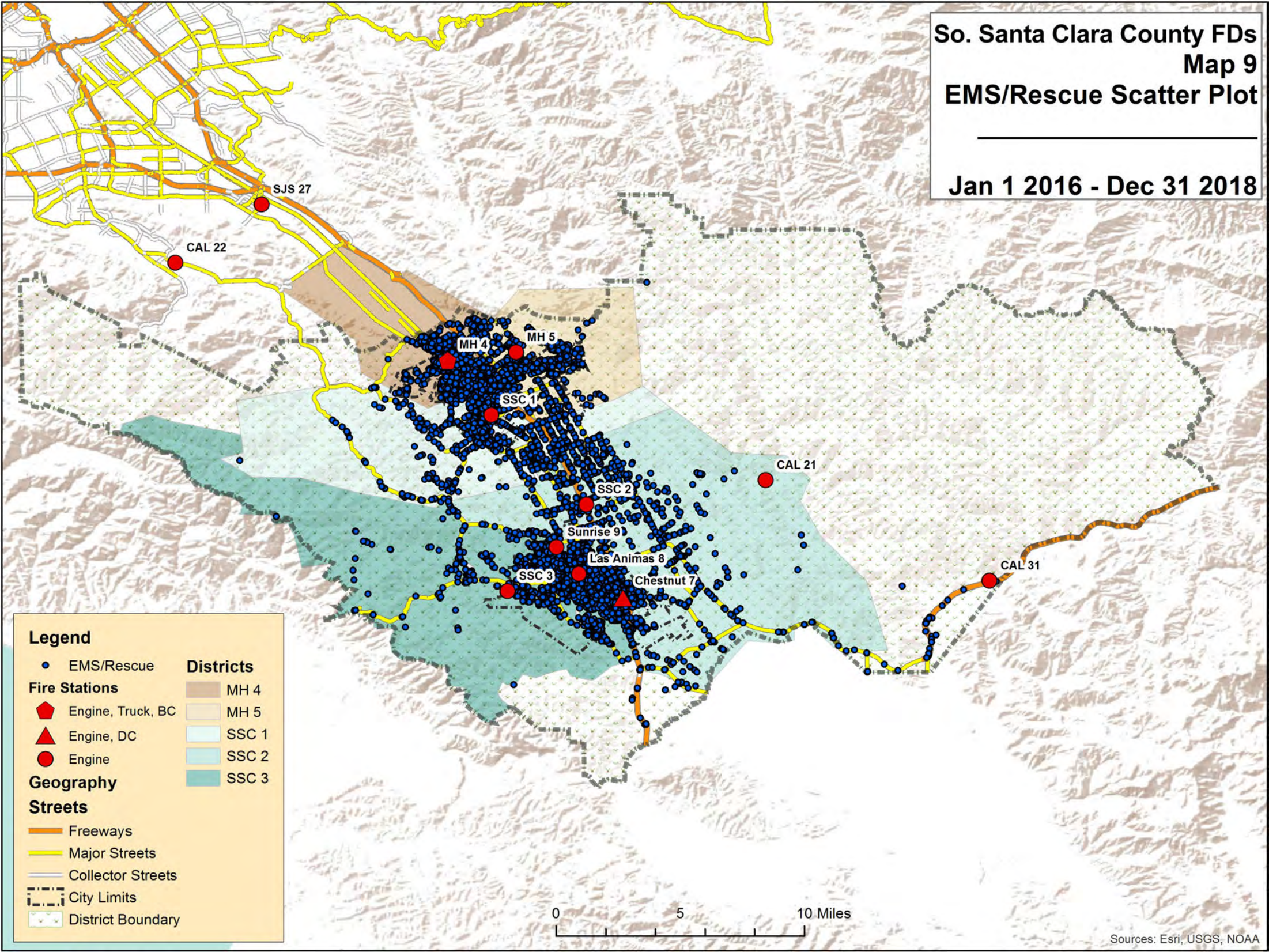

So. Santa Clara County FDs
Map 5d
8 Min ERF Travel
Northern Extent - Traffic Congestion
3 Engines, 1 BC, 1 Truck
MH 4
MH 5
SSC 1
Legend
8 Min ERF
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1
2 Miles
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW

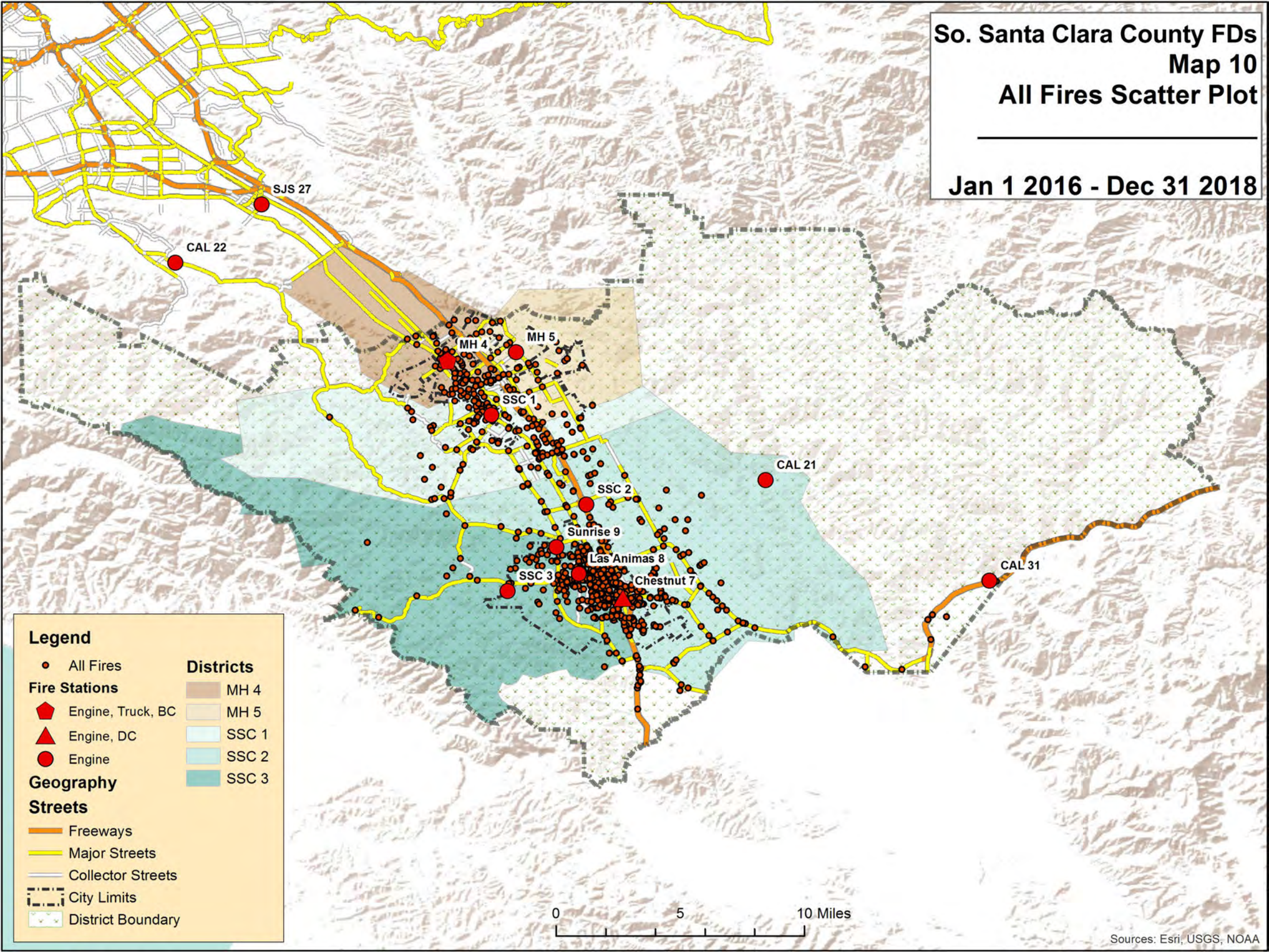

So. Santa Clara County FDs
Map 6a
8 Min First Due Travel
1 Truck
MH 4
MH 5
SSC 1
SSC 2
SSC 3
CAL 21
Sunrise 9
Las Animas 8
Chestnut 7
Legend
8 Min Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
SSC District
0
3.5
7 Miles
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW

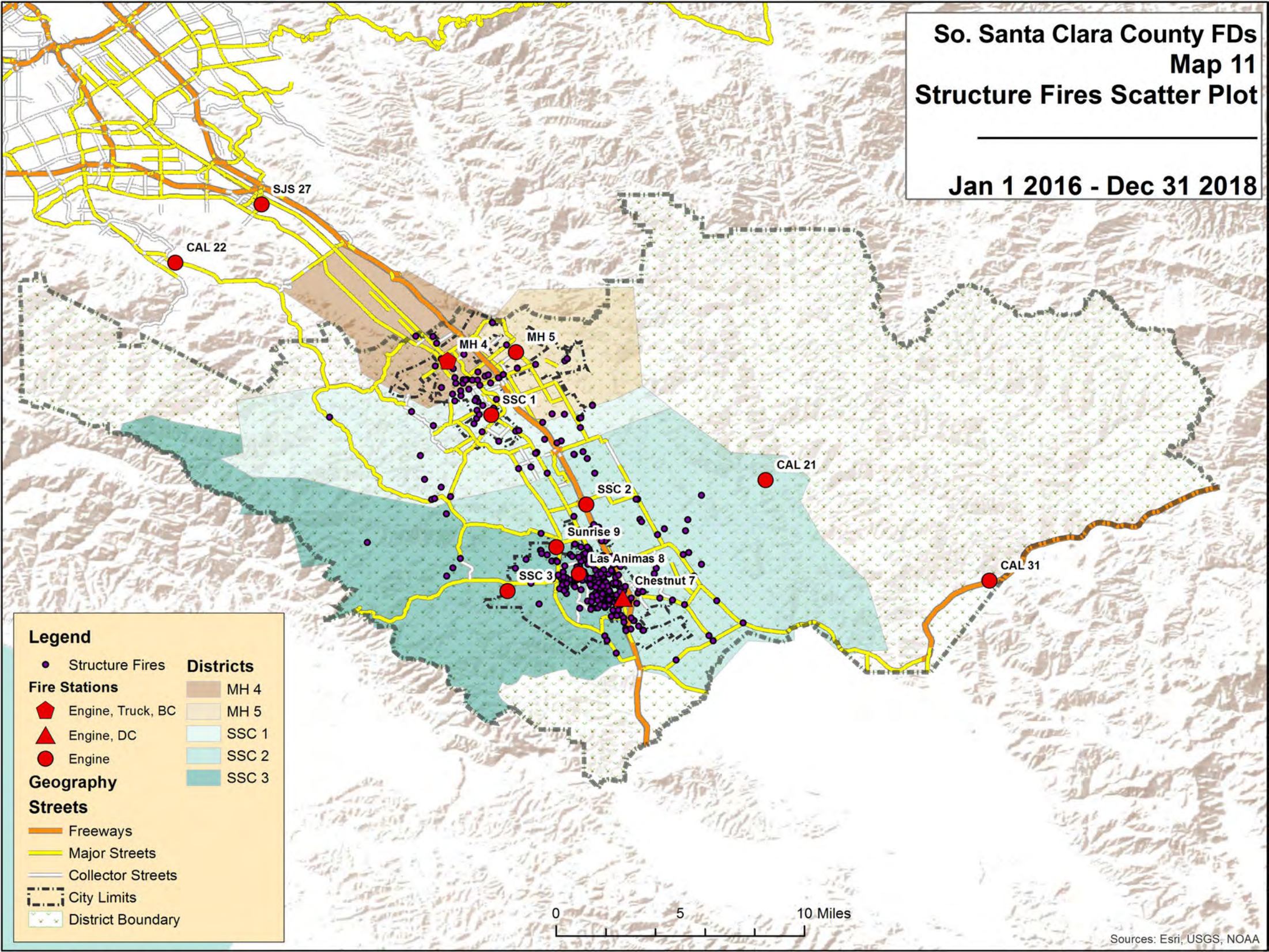

So. Santa Clara County FDs
Map 6b
8 Min First Due Travel
1 Truck
Congested Travel
MH 4
MH 5
SSC 1
SSC 2
SSC 3
CAL 21
Sunrise 9
Las Animas 8
Chestnut 7
Legend
8 Min Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
SSC District
0
3.5
7 Miles
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW

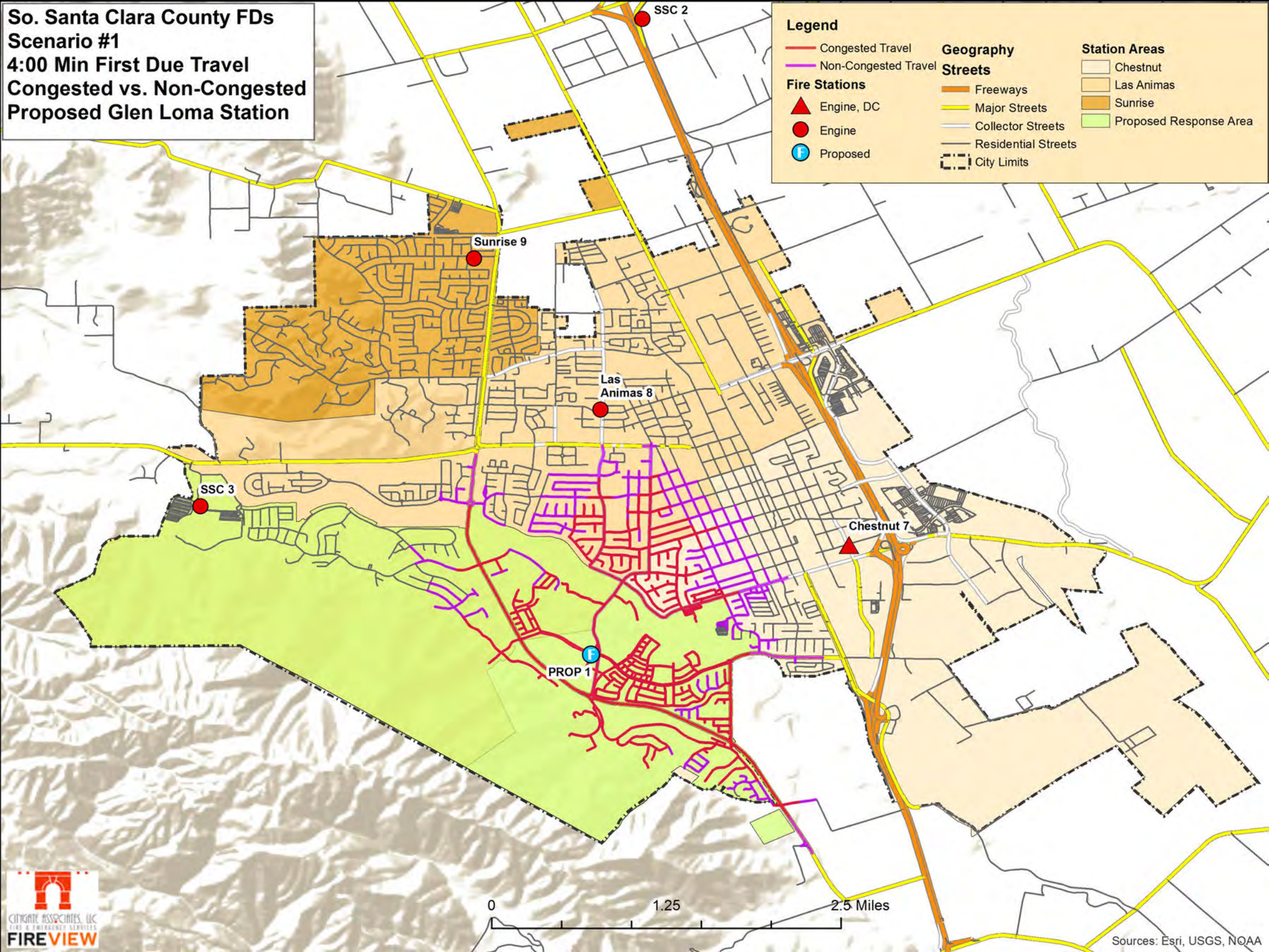

So. Santa Clara County FDs
Map 7
8 Min First Due Travel
1 BC
MH 4
MH 5
SSC 1
CAL 21
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
Legend
8 Min Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
SSC District
0
3.5
7 Miles
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW

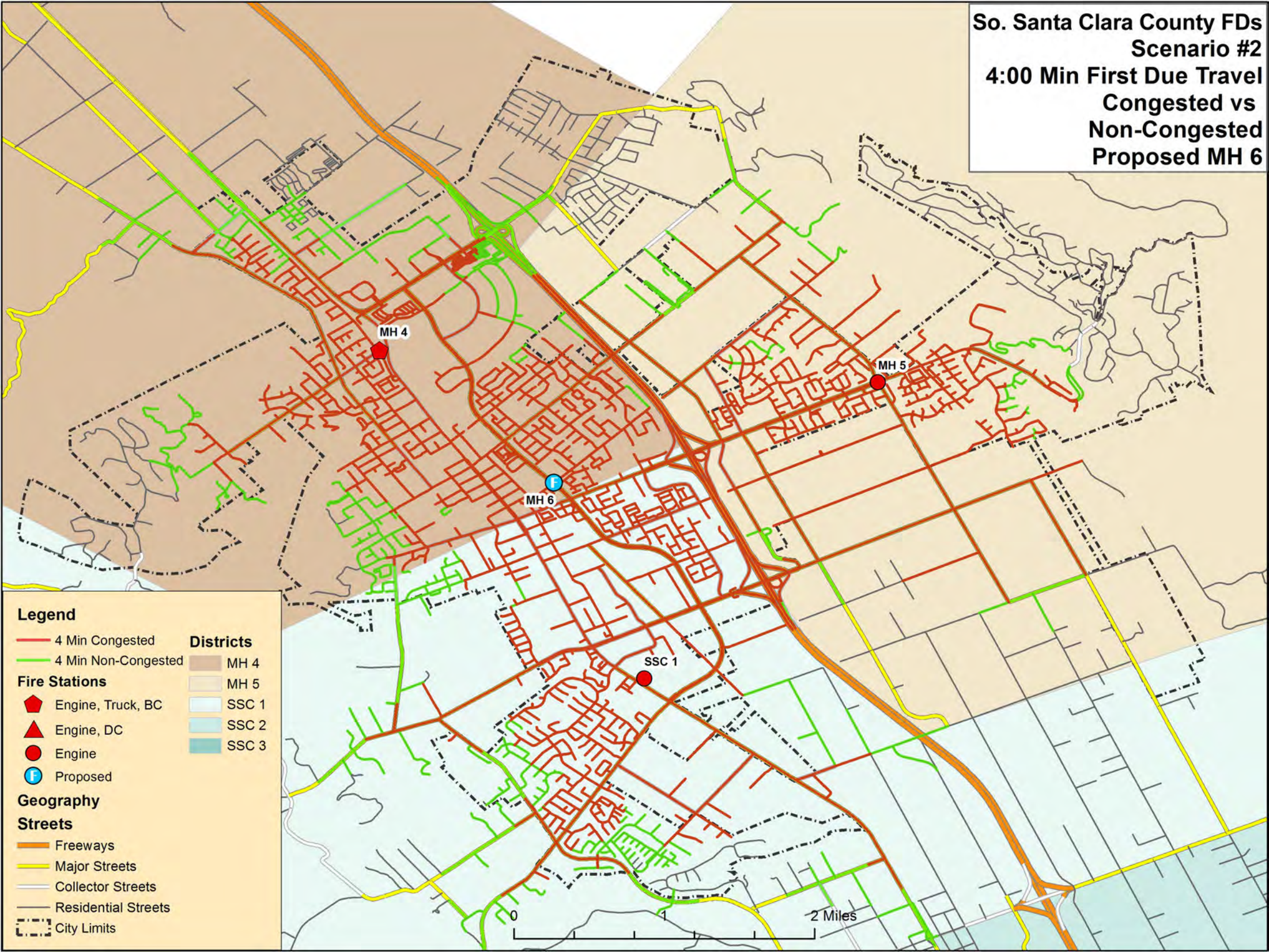

So. Santa Clara County FDs
Map 8
All Incidents Scatter Plot
Jan 1 2016 - Dec 31 2018
SJS 27
CAL 22
MH 4
MH 5
SSC 1
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
CAL 21
CAL 31
Legend
All Incidents
Stations
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
City Limits
District Boundary
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
5
10 Miles
Sources: Esri, USGS, NOAA


So. Santa Clara County FDs
Map 9
EMS/Rescue Scatter Plot
Jan 1 2016 - Dec 31 2018
SJS 27
CAL 22
MH 4
MH 5
SSC 1
CAL 21
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
CAL 31
Legend
EMS/Rescue
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
City Limits
District Boundary
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
5
10 Miles
Sources: Esri, USGS, NOAA


So. Santa Clara County FDs
Map 10
All Fires Scatter Plot
Jan 1 2016 - Dec 31 2018
SJS 27
CAL 22
MH 4
MH 5
SSC 1
CAL 21
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
CAL 31
Legend
All Fires
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
City Limits
District Boundary
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
5
10 Miles
Sources: Esri, USGS, NOAA


So. Santa Clara County FDs
Map 11
Structure Fires Scatter Plot
Jan 1 2016 - Dec 31 2018
SJS 27
CAL 22
MH 4
MH 5
SSC 1
CAL 21
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
CAL 31
Legend
Structure Fires
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Geography
Streets
Freeways
Major Streets
Collector Streets
City Limits
District Boundary
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
5
10 Miles
Sources: Esri, USGS, NOAA


So. Santa Clara County FDs
Scenario #1
4:00 Min First Due Travel
Congested vs. Non-Congested
Proposed Glen Loma Station
Legend
Congested Travel
Non-Congested Travel
Fire Stations
Engine, DC
Engine
Proposed
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Station Areas
Chestnut
Las Animas
Sunrise
Proposed Response Area
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
PROP 1
0
1.25
2.5 Miles
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
Sources: Esri, USGS, NOAA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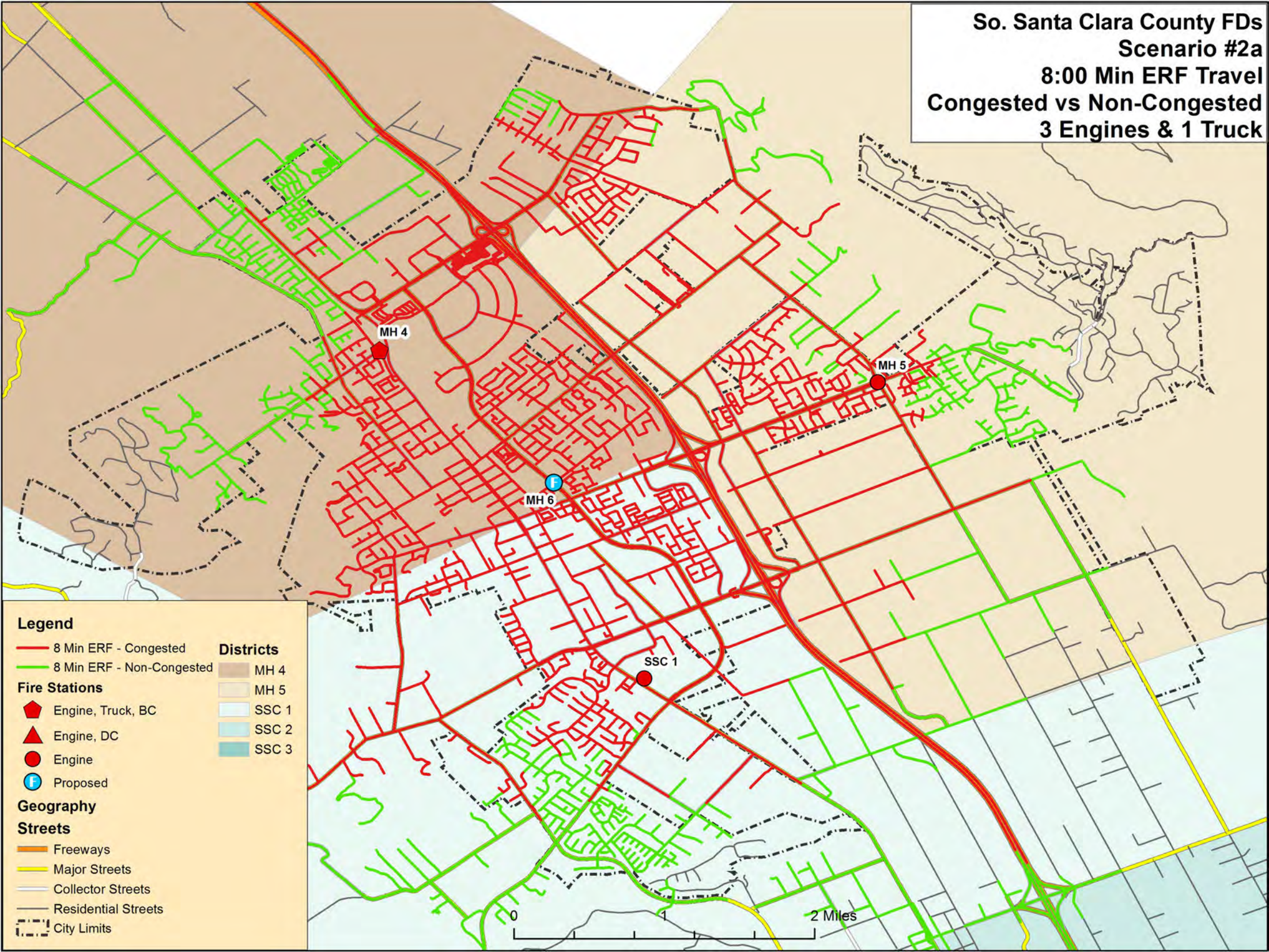
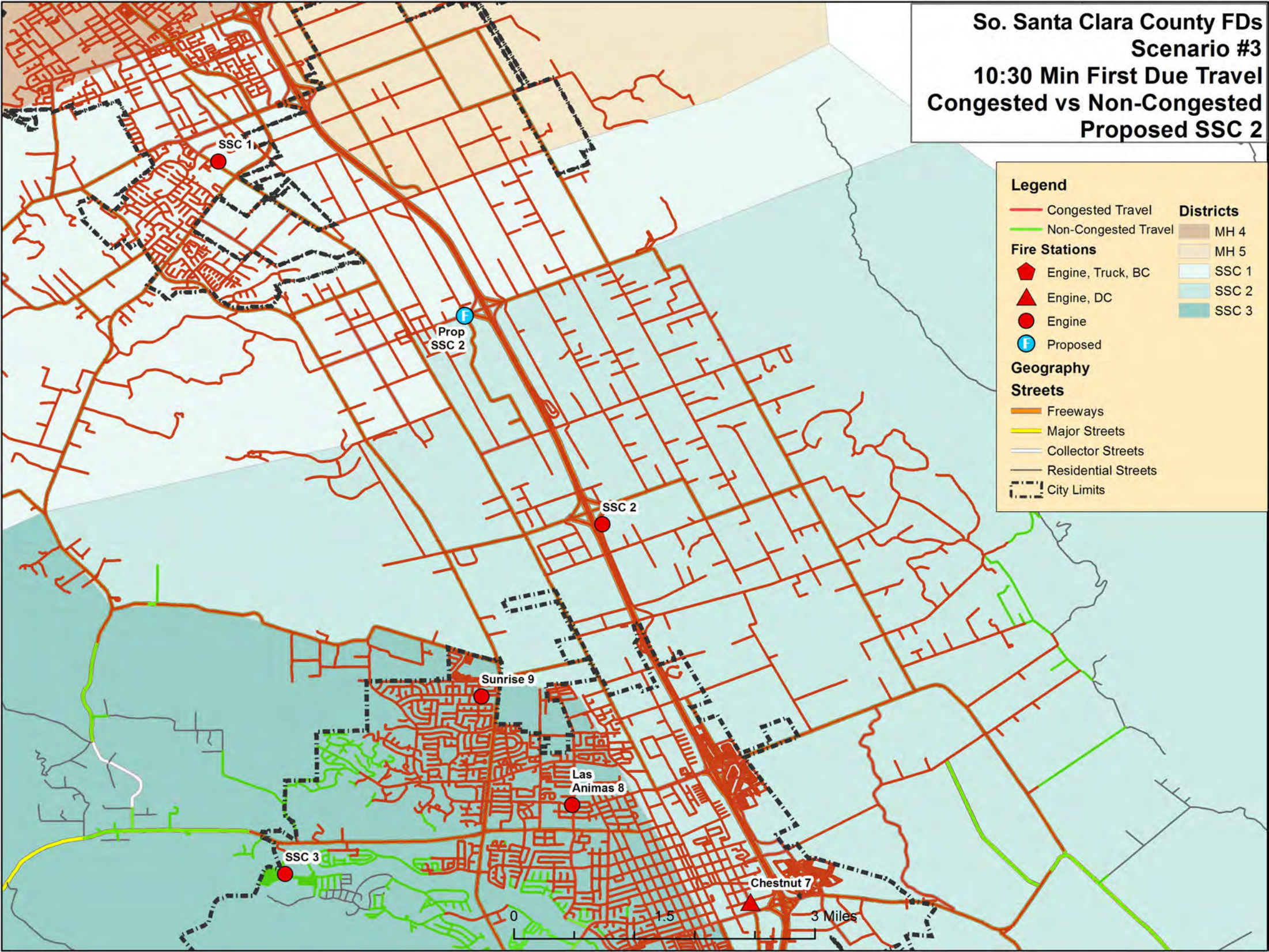
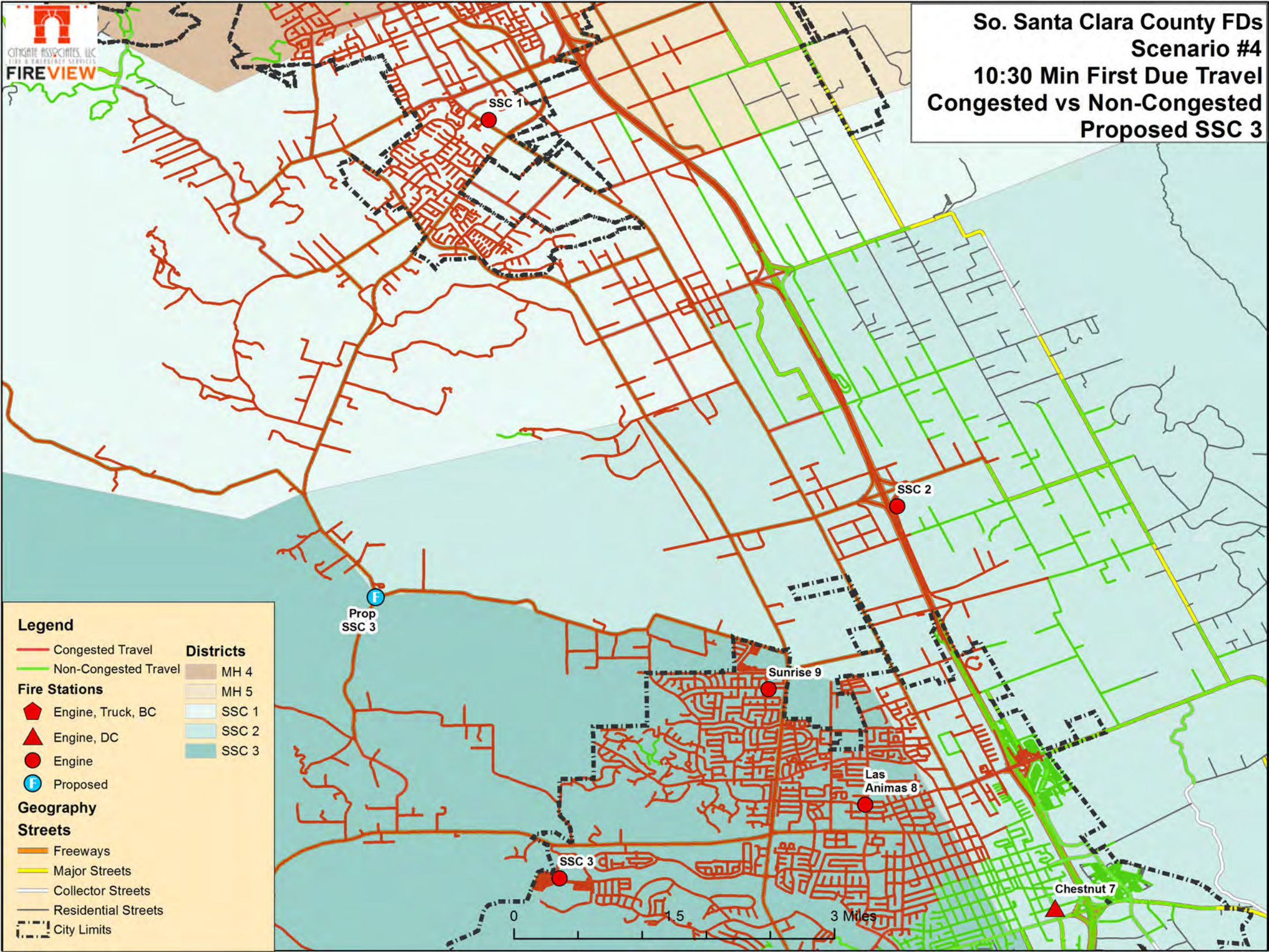
Scenario #2
4:00 Min First Due Travel
Congested vs
Non-Congested
Proposed MH 6
MH 4
MH 5
MH 6
SSC 1
Legend
4 Min Congested
4 Min Non-Congested
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Proposed
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1
2 Miles


So. Santa Clara County FDs
Scenario #2a
8:00 Min ERF Travel
Congested vs Non-Congested
3 Engines & 1 Truck
MH 4
MH 5
MH 6
SSC 1
Legend
8 Min ERF - Congested
8 Min ERF - Non-Congested
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Proposed
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1
2 Miles


So. Santa Clara County FDs
Scenario #3
10:30 Min First Due Travel
Congested vs Non-Congested
Proposed SSC 2
Legend
Congested Travel
Non-Congested Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Proposed
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
SSC 1
Prop SSC 2
SSC 2
Sunrise 9
Las Animas 8
SSC 3
Chestnut 7
0
1.5
3 Miles


So. Santa Clara County FDs
Scenario #4
10:30 Min First Due Travel
Congested vs Non-Congested
Proposed SSC 3
SSC 1
SSC 2
Prop
SSC 3
Sunrise 9
Las
Animas 8
SSC 3
Chestnut 7
Legend
Congested Travel
Non-Congested Travel
Fire Stations
Engine, Truck, BC
Engine, DC
Engine
Proposed
Geography
Streets
Freeways
Major Streets
Collector Streets
Residential Streets
City Limits
Districts
MH 4
MH 5
SSC 1
SSC 2
SSC 3
0
1.5
3 Miles

Attachment D:
Traffic Memo

Hexagon Transportation Consultants, Inc.

Memorandum

Date: May 22, 2020

To: Ms. Pooja Nagrath, David J. Powers & Associates, Inc.

From: Gary Black, Katie Riutta

Subject: High-Speed Rail EIR/EIS Review on Behalf of Morgan Hill

Hexagon Transportation Consultants, Inc. has reviewed the High-Speed Rail (HSR) EIR/EIS on behalf of the City of Morgan Hill, California. The HSR EIR/EIS identifies four project alignment alternatives. The four alignment alternatives are shown in the *San Jose to Merced Project Section, Draft Environmental Impact Report/Environmental Impact Statement*, prepared by the California High-Speed Rail Authority, dated April 2020. HSR Authority has identified Alternative 4 to be the preferred alternative. The four alignment alternatives are described below and shown on Figures 1, 2, and 3:

- **Alternative 1:** The proposed high-speed rail tracks would run on a viaduct adjacent to US 101 through Morgan Hill. This alternative has a station in downtown Gilroy.

- **Alternative 2:** The proposed high-speed rail tracks would run through downtown Morgan Hill on an embankment along the east side of the Union Pacific Railroad (UPRR) alignment. Monterey Road would need to be shifted to the east to make room for the HSR tracks north of Cochrane Road. Railroad Avenue would need to be shifted to the east to make room for the HSR tracks south of Barrett Avenue. The bridge at Butterfield Boulevard would be extended to cross an at-grade portion of HSR and the realigned Railroad Avenue. All streets that currently cross the Caltrain/UPPR tracks at-grade would be rebuilt as underpasses.

- **Alternative 3:** This alternative is the same as Alternative 1 within Morgan Hill. In this alternative the Gilroy station would be east of US 101.

- **Alternative 4 (Preferred Alternative):** The proposed high-speed rail tracks would run through downtown Morgan Hill at-grade in blended service with Caltrain in the existing UPRR right-of-way. All current at-grade crossings would be maintained but with four-quadrant barrier gates for added safety. A new pedestrian/bicycle underpass would be provided at the Morgan Hill Caltrain Station.

Hexagon previously evaluated two HSR design options and identified their land use impacts, transportation impacts, and construction impacts in a memorandum titled *Transportation, Land Use and Construction Impact Analysis of HSR*, dated August 29, 2017. Alternatives 1 and 3 are similar to the previously studied Option 2. Alternative 2 is similar to the previously studied Option 1. The memo is attached as Appendix A.

Analysis Conditions

The 2029 and 2040 conditions traffic volumes were estimated using city-specific growth factors obtained from the VTA travel demand model. To determine potential impacts generated by the project, a version of the VTA model developed for the *Caltrain Peninsula Corridor Electrification Project EIR* using inputs from *Projections 2013* and adjusted to incorporate HSR ridership.

Hexagon compared the HSR EIR 2029 and 2040 no project conditions with 2035 cumulative conditions from previous transportation studies conducted in Morgan Hill. Discrepancies were found for intersections along Butterfield Boulevard, between Main Avenue and Tennant Avenue. We believe these discrepancies could be explained by the different models used by HSR and the City of Morgan Hill. The City of Morgan Hill utilizes a city-specific model that focuses on intercity travel rather than regional travel. The HSR forecasts include more regional travel through Morgan Hill (unrelated to HSR) and are higher than the City's previous forecasts on Butterfield Boulevard.

Alternative 1: Viaduct to Downtown Gilroy

With Alternative 1, the proposed high-speed rail tracks would run along a viaduct on the west side of US 101 to an elevated Downtown Gilroy Station. The viaduct would cross over Burnett Avenue to US 101 and would cross over Cochrane Road and ramps, East Main Avenue, East Dunne Avenue and ramps, and Tennant Avenue and ramps (see Figure 1). The alignment for Alternative 1 would bypass downtown Morgan Hill. The speed of trains on the viaduct would be 150 mph in Morgan Hill. Changes to the Transportation System would be as follows:

- San Pedro Avenue cul-de-sac would be relocated to west of HSR
- Barrett Avenue access to Saint John Court would be realigned

Transportation Impacts

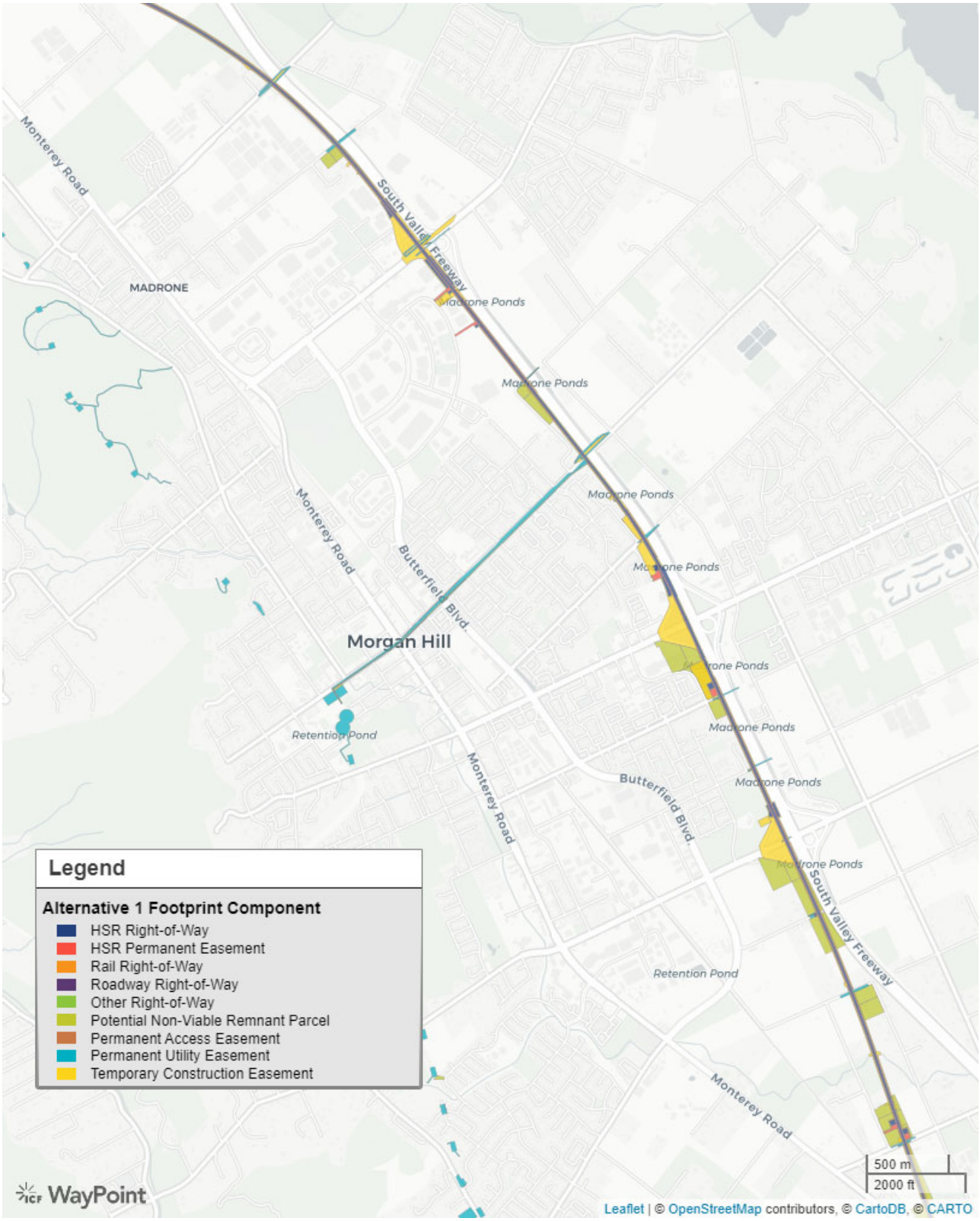
Under existing plus project conditions, two study intersections would operate at LOS E or F and one intersection would have a project impact. Under 2029 plus project conditions, seven intersections would operate at LOS E or F and two intersections would have a project impact. Under 2040 plus project conditions, eight intersections would operate at LOS E or F and two intersections would have a project impact. The following intersections would have a project impact under 2040 plus project conditions:

- Hale Avenue and Tilton Avenue (M19) – AM and PM Peak Hours (LOS E and LOS F, respectively)
- Monterey Road and Tilton Avenue (M46) – PM Peak Hour (LOS F)

Since the alignment would not be constructed near these intersections, it is not clear why these intersections would have project impacts. The additional intersection delay could be due to decreased capacity on Monterey Road north of Morgan Hill. However, the EIR should explain these impacts in detail and describe what the proposed mitigations would be.

Construction Impacts

With Alternative 1, the HSR tracks would bypass the downtown area so there would be limited construction impacts to the Morgan Hill roadway network. Roadways that intersect with Alternative 1 would be affected, but there would not be major reconstruction of the existing infrastructure. Further construction impacts are discussed in Appendix A.



Source: https://maphsrnorcal.org/sanjose-merced/

Figure 1
High-Speed Rail Alternatives 1 and 3 Alignment

Emergency Response Times

Since construction in the City of Morgan Hill would be limited under Alternative 1, there would be no impacts to emergency response times.

Bicycle, Pedestrian, and Transit Impacts

Roadway changes and construction on Monterey Road would be expected to cause delay for VTA Route 68 due to reduced travel lanes between Capitol Expressway and Blossom Hill Road in San Jose.

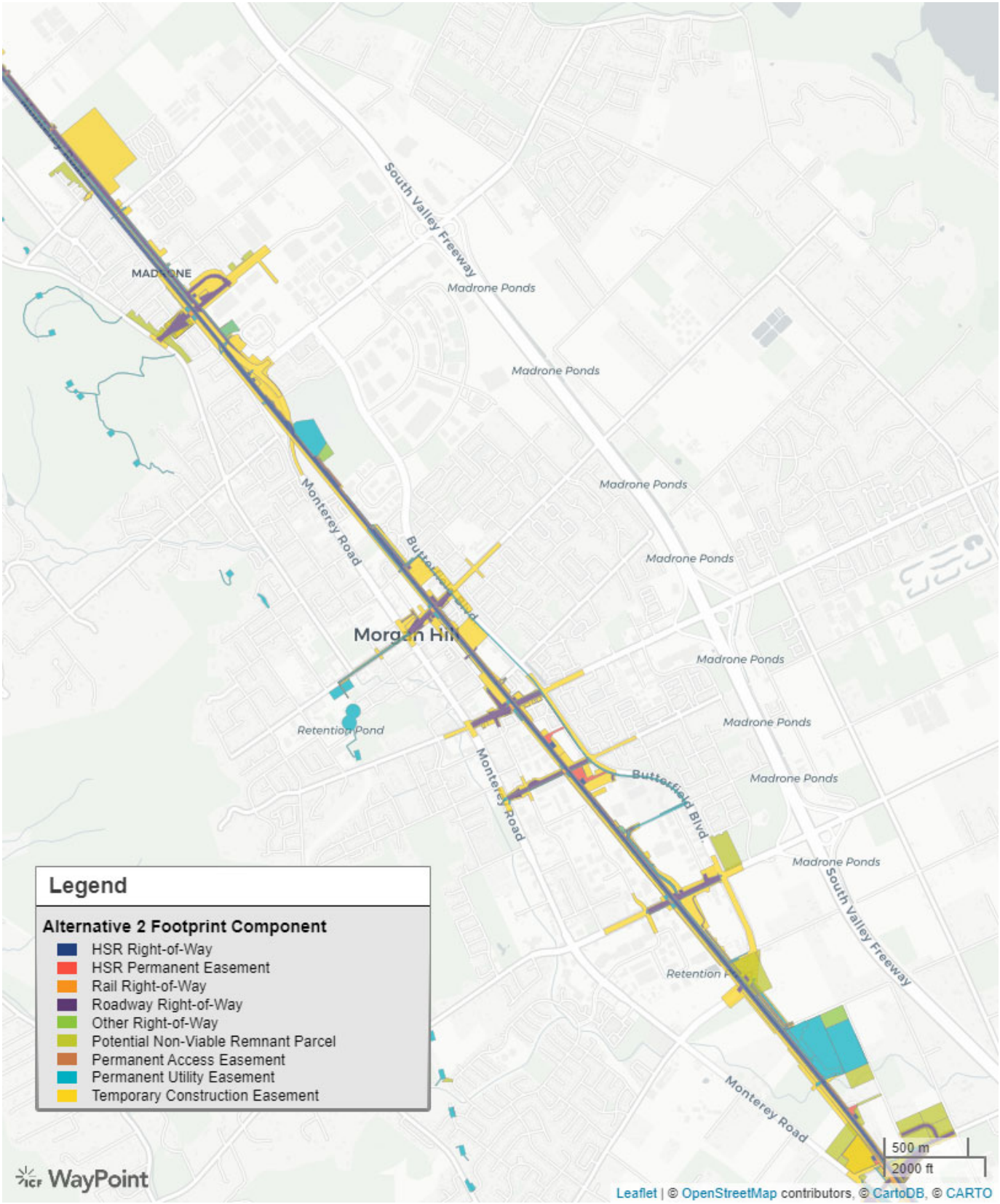
Property Access

The US 101 interchanges at Cochrane Road, Dunne Avenue, and Tennant Avenue would have temporary construction easements. Overall, properties that are not planned to be displaced would not have access issues under Alternative 1.

Alternative 2: Embankment to Downtown Gilroy

With Alternative 2, the proposed high-speed rail tracks would run through downtown Morgan Hill on an embankment along the east side of the Union Pacific Railroad (UPRR) alignment, outside of the existing rail right-of-way (see Figure 2). The embankment would begin north of Palm Avenue and would cross over Monterey Road south of Cochrane Road. Madrone Parkway, Monterey Road, Main Avenue, Dunne Avenue, San Pedro Avenue, and Tennant Avenue would be lowered and HSR and UPRR would cross over the roadways above grade. The HSR alignment would descend to an at-grade crossing under Butterfield Boulevard and East Middle Avenue, then return to embankment and continue south. The speed of trains along the embankment would be 185 to 195 mph in Morgan Hill. Additional changes to the transportation system would be as follows:

- Tilton Avenue would become a cul-de-sac
- Monterey Road would be realigned from Blanchard Road to Cochrane Road
- Madrone Parkway would be realigned to the west side of Monterey Road and extended to Hale Avenue. A new road would connect Madrone Parkway to Monterey Road east of the rail tracks.
- East Central Avenue cul-de-sac would be realigned eastward
- East Main Avenue would be widened to accommodate HSR grade separation
- Saint Agatha Lane would be removed
- Depot Street access to Main Avenue would be closed to accommodate a grade separation on Main Avenue
- Diana Avenue cul-de-sac would be relocated eastward
- East Dunne Avenue would be widened to accommodate HSR grade separation
- Railroad Avenue between San Pedro Avenue and Barrett Avenue would be closed. Railroad Avenue between Barrett Avenue and Maple Avenue would be realigned eastward
- Tennant Avenue would be realigned to accommodate HSR grade separation
- The bridge at Butterfield Boulevard would be extended to cross over an at-grade portion of HSR and the realigned Railroad Avenue



Source: https://maphsrnorcal.org/sanjose-merced/

Figure 2
High-Speed Rail Alternative 2 Alignment

Transportation Impacts

Under existing plus project conditions, five study intersections would operate at LOS E or F and four intersections would have a project impact. Under 2029 plus project conditions, nine intersections would operate at LOS E or F and four intersections would have a project impact. Under 2040 plus project conditions, 10 intersections would operate at LOS E or F and four intersections would have a project impact. The following intersections would have a project impact under 2040 plus project conditions:

- Hale Avenue and Tilton Avenue (M19) – AM and PM Peak Hours (LOS F)
- Monterey Road and Tilton Avenue (M46) – AM and PM Peak Hours (LOS F)
- Monterey Road and Madrone Parkway (M47) – AM and PM Peak Hours (LOS F)
- Railroad Avenue and Tennant Avenue (MH2) – AM and PM Peak Hours (LOS F)

Under Alternative 2, the intersection at Monterey Road and Tilton Avenue would become a cul-de-sac and the intersection at Monterey Road and Madrone Parkway would become grade separated. Therefore, project impacts would not be possible. The EIR should explain all impacts in detail and describe what the proposed mitigations would be.

Construction Impacts

Reconstruction of the roadways necessary for Alternative 2 would require either new temporary facilities or roadway closures. Both of these options would cause temporary increases in travel times and delay. Further construction impacts are discussed in Appendix A.

During construction of Alternative 2, the Morgan Hill Caltrain Station would be temporarily relocated. Relocation of the station and tracks would result in temporary disruptions of Caltrain, ACE, Capitol Corridor, and Amtrak transit services.

Emergency Response Times

Emergency response times could be increased during construction activities. To mitigate this, the contractor would provide temporary access roads during construction.

Bicycle, Pedestrian, and Transit Impacts

Roadway changes and construction on Monterey Road would be expected to cause delay for VTA Route 68 due to reduced travel lanes between Capitol Expressway and Blossom Hill Road in San Jose. Additional delay could be expected for transit in Morgan Hill as a result of higher overall intersection delays.

A new pedestrian/bicycle underpass would be provided at the Morgan Hill Caltrain Station to maintain access from the east side of the train tracks. However, the underpass as proposed requires further design development.

Property Access

Properties on Tilton Avenue would lose access to Monterey Road and would need to use Hale Avenue. Access to Monterey Road from Hale Avenue would be provided via Madrone Parkway and Live Oak Avenue. Residential units along Saint Agatha Lane would lose their parking. Properties along the planned slopes of grade separations would require alternate access routes. The grade separation at Dunne Avenue would impede access to the Morgan Hill Community Center and Gavilan College. Properties with driveways along Railroad Avenue between San Pedro Avenue and Barrett Avenue would require alternate access. Detours and alternative access points would be provided by the contractor to mitigate these access interruptions.

Recommendations

- At underpasses, the design speed of 45 mph is too high. The analysis should consider a slower speed which would enable the underpasses to be shorter and not affect as many properties.
- The closure of Depot Street at Main Avenue would not align with Morgan Hill circulation goals.
- The closure of Saint Agatha Lane should be noted in the EIR.
- The HSR bridge over Monterey Road should be built to accommodate future widening of Monterey Road as per the *Morgan Hill 2035 General Plan*.

Alternative 3: Viaduct to East Gilroy

Alternative 3 would have the same alignment as Alternative 1 within Morgan Hill.

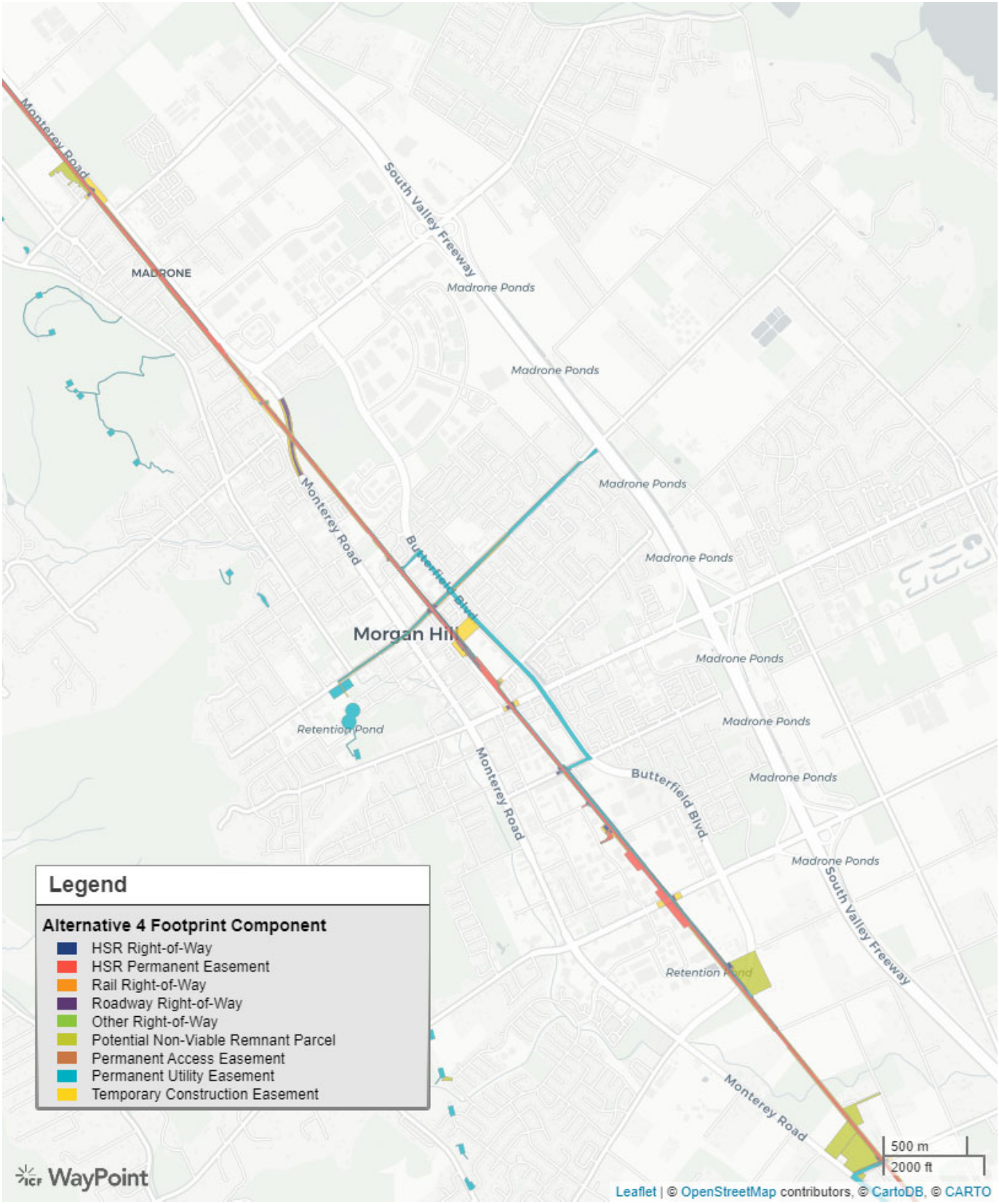
Alternative 4: Blended, At-Grade (Preferred Alternative)

With Alternative 4, the proposed high-speed rail tracks would run through downtown Morgan Hill at-grade in blended service with Caltrain in the existing UPRR right-of-way (see Figure 3). Four-quadrant barrier gates would be provided at Tilton Avenue, Main Avenue, Dunne Avenue, San Pedro Avenue, and Tennant Avenue. Additional changes to the transportation system would be as follows:

- Existing Monterey Road underpass would be rebuilt to accommodate future widening
- Diana Avenue cul-de-sac would be relocated slightly eastward

Four-Quadrant Barrier Gates

Commuter service trains operate at a maximum speed of 79 miles per hour. Since HSR trains would operate at a maximum speed of 110 miles per hour between San Jose and Gilroy, safety improvements at the at-grade crossings would be required. Two gate arms would extend across all lanes of travel, with one gate on each side of the roadway, on both sides of the tracks. This would prevent drivers from attempting to travel around the lowered gate arms, making the four-quadrant barrier gates safer than two-quadrant barrier gates. Gate arms would also be present across pedestrian pathways on both sides of the roadway and on both sides of the tracks. The 95th percentile gate-down time is estimated to be 54 seconds per single-train event.



Source: https://maphsrnorcal.org/sanjose-merced/

Figure 3
High-Speed Rail Alternative 4 Alignment

Transportation Impacts

Under existing plus project conditions, two study intersections would operate at LOS E or F and no intersections would have a project impact. Under 2029 plus project conditions, seven intersections would operate at LOS E or F and four intersections would have a project impact. Under 2040 plus project conditions, nine intersections would operate at LOS E or F and four intersections would have a project impact. The following intersections would have a project impact under 2040 plus project conditions:

- Monterey Road and Tilton Avenue (M46) – PM Peak Hour (LOS F)
- Monterey Road and Main Avenue (MH10) – AM Peak Hour (LOS F)
- Depot Street and E Main Avenue (MH11) – AM and PM Peak Hours (LOS F)
- Butterfield Boulevard and E Main Avenue (MH12) – AM and PM Peak Hours (LOS F)

Although the EIR doesn't say, it is assumed these impacts would be due to increased gate-down time at the study intersections. The EIR does not provide any specific mitigation for these impacts. However, these impacts could be mitigated with grade separations. Hexagon recommends a grade separation at Dunne Avenue for the impacts along Main Avenue and a grade separation at Tilton Avenue for the impacts at the Monterey Road/Tilton Avenue intersection. These mitigations are described in more detail below.

Queueing at At-Grade Crossings

The EIR analysis was based on an expected total of 18 trains passing through Morgan Hill per peak hour, with seven HSR trains traveling in each direction and four Caltrain trains traveling in one direction. However, the blended service tracks have the capacity to accommodate at most 24 trains per peak hour, with eight HSR trains and four Caltrain trains in each direction. That calculates to an average of one train every 2-1/2 minutes. The estimated 95th percentile gate-down time would be 54 seconds per single-train event. That means there would be roughly 1-1/2 minutes between gate down events, on average. Hexagon calculated the resulting queue at each crossing and the length of time to clear each queue based on 2035 traffic forecasts (see Table 1). Tilton Avenue would have an estimated queue length of 3 vehicles per lane which would take about 9 seconds to clear once the gates are lifted. Main Avenue would have an estimated queue length of 9 vehicles which would take about 25 seconds to clear. All queues would be expected to clear the crossings before the next gate down event.

Table 1
Queueing at At-Grade Crossings

At-Grade Crossing	2035 Peak Hour Volume[1]	Queue Length Per Lane	Seconds to Clear Queue[2]	Clear Before Next Train[3]
Tilton Avenue	407	3	9	Yes
Main Avenue	723	12	25	Yes
Dunne Avenue	723	6	15	Yes
San Pedro Avenue	272	5	13	Yes
Tennant Avenue	1,104	9	20	Yes

Notes

1. Volumes are from nearby intersections in the 2035 General Plan. Volumes at Tilton Avenue are factored to year 2035 from 2013 counts by a growth rate of 1% per year.

2. A typical saturation flow rate is assumed to be 2,000 vehicles per hour after the first four vehicles.

3. The maximum capacity of 24 single-train events per hour was assumed.

Construction Impacts

The construction of the four-quadrant barrier gates would require temporary roadway detours and relocations, resulting in temporary increases in travel time and delay.

The Morgan Hill Caltrain Station would be rebuilt. and service would be temporarily relocated during construction. Relocation of the station and tracks would result in temporary disruptions of Caltrain, ACE, Capitol Corridor, and Amtrak transit services.

Bicycle, Pedestrian, and Transit Impacts

Bus transit in Morgan Hill could expect delays as a result of increased gate-down time at the at-grade railroad crossings. A new pedestrian/bicycle underpass would be provided at the new Morgan Hill Caltrain Station to maintain access from the east side of the train tracks. However, the underpass as proposed requires further design development.

Since high-speed rail trains would operate faster than Caltrain and no siding tracks would be installed, Caltrain would need to maintain speeds by implementing a skip-stop pattern between Gilroy and the Tamien Station. A skip-stop pattern would mean that trains skip over more stations than originally scheduled so that HSR may operate efficiently. In an effort to maintain the same number of stops at each station, Caltrain would need to increase the number of trains from three to six trains traveling in the peak direction during the morning and evening. The blended operations would have the capacity to accommodate up to four trains per peak hour in the peak directions for Caltrain service. Based on the *Caltrain 2040 Long Range Service Vision,* Caltrain would provide two trains per hour per direction between the Gilroy and Blossom Hill Stations. Therefore, HSR would have the capacity to accommodate the increase in Caltrain service.

Emergency Response Times

Emergency response times on roadways along the rail alignment could be increased during construction activities. Emergency vehicles could also expect delays due to increased gate-down time on roadways with at-grade crossings. Response times for the fire station at 18300 Old Monterey Road could be increased by up to 30 seconds. Response times for the fire station at 15670 Monterey Road could be increased by up to 210 seconds, due to the at-grade crossing at East Middle Avenue and San Martin Avenue. The exact scope of the potential impact would be determined before HSR service begins. Mitigation is stated as requiring new vehicle detection equipment, new responder equipment installed at existing fire stations, new fire stations, and additional ambulance services, with funding from HSR Authority.

Mitigations

Hexagon recommends a grade separation at Dunne Avenue to mitigate project impacts at the study intersections along Main Avenue. A grade separation at Main Avenue, as proposed under Alternative 2, would require Depot Street to become a cul-de-sac and lose an important connection to Main Avenue. Therefore, a grade separation at Main Avenue would not be acceptable to Morgan Hill. A grade separation at Dunne Avenue would also address potential queuing problems. As shown in Table 1, queues at the at-grade crossing with Dunne Avenue would be expected to clear within 15 seconds per single-train event under optimal conditions. Therefore, emergency vehicles could experience delay beyond what was determined for the increased gate-down time. Dunne Avenue forms the southern boundary of the Downtown area and the Caltrain Station is located just north of the Dunne Avenue and Monterey Road intersection. Therefore, there will be significantly more multi-modal travel across the Dunne Avenue crossing. The City of Morgan Hill plans to connect Depot Street to Church Street near Dunne Avenue, which would provide enough room for an underpass.

Hexagon also recommends a grade separation at Tennant Avenue to mitigate project impacts to emergency response time. The Morgan Hill Police and Fire Departments utilize Tennant Avenue for faster response times to the eastern part of town because it has less traffic and signals. It provides the fastest route to respond to fires in the eastern hills. Tennant Avenue also provides quicker access to US 101 which is essential to reach areas near Cochrane Road and East Dunne Avenue. A grade separation at Tennant Avenue would also address potential queuing problems. As shown in Table 1, queues at the at-grade crossing with Tennant Avenue would be expected to clear within 20 seconds per single-train event under optimal conditions. Therefore, emergency vehicles could experience delay beyond what was determined for the increased gate-down time. The Morgan Hill Fire Department does not have existing capacity in their response times for any additional delay, therefore this grade separation is recommended.

A grade separation also should be considered at Tilton Avenue to mitigate project impacts at the Monterey Road/Tilton Avenue intersection. A grade separation at Tilton Avenue would require raising the rail tracks in that area. The City of Morgan Hill plans to connect Tilton Avenue to Burnette Avenue and to remove a proposed grade separation at Madrone Parkway in their upcoming transportation element update.

Property Access

Since Alternative 4 would operate in the existing UPRR right-of-way, there would be no access issues for properties in Morgan Hill.

Recommendations

- The EIR should explain all project impacts to study intersections in detail and describe what the proposed mitigations would be.
- The analysis should note the new planned intersection at Dunne Avenue and Depot Street/Church Avenue.
- At future grade separations, the analysis should consider a design speed lower than 45 mph to enable the underpasses to be shorter and not affect as many properties.
- The closure of Depot Street at Main Avenue would not align with Morgan Hill circulation goals.
- The closure of Saint Agatha Lane under Alternative 2 should be noted in the EIR.
- The HSR bridge over Monterey Road should be built to accommodate future widening of Monterey Road under Alternative 2 as per the *Morgan Hill 2035 General Plan.*
- Hexagon recommends a grade separation at Dunne Avenue to address potential queuing issues, project impacts along Main Avenue, and emergency response time delays due to increased gate-down time under Alternative 4.
- Hexagon recommends a grade separation at Tennant Avenue to address potential queuing issues and emergency response time delays due to increased gate-down time under Alternative 4.
- Hexagon also recommends a grade separation at Tilton Avenue to mitigate the project impact at Monterey Road and Tilton Avenue under Alternative 4.

Appendix A
Transportation, Land Use and Construction Impact Analysis of HSR

Hexagon Transportation Consultants, Inc.

Memorandum

Date: August 29, 2017

To: Tiffany Brown, City of Morgan Hill

From: Gary Black
Ollie Zhou

Subject: Transportation, Land Use and Construction Impact Analysis of HSR

Hexagon Transportation Consultants, Inc. has reviewed the proposed two alignment design options for the High-Speed Rail (HSR) project through Morgan Hill, California. The two alignment options are shown in the *San Jose to Merced Section: San Jose to Central Valley Wye, Draft Preliminary Engineering for Project* Definition, prepared by the California High-Speed Rail Authority (CA HSRA), dated May 2017. The two alignment options are described below and also shown on Figure 1:

- **Option 1:** The proposed high-speed rail tracks would run through the downtown area on an embankment. Monterey Road would need to be shifted to the east to make room for the HSR tracks north of Cochrane Road. Railroad Avenue also would be shifted to the east between Barret Avenue and Maple Avenue. Railroad Avenue north of Barret Avenue would be discontinued. All of the streets that currently cross the Caltrain/UP tracks at-grade would be rebuilt as underpasses.

- **Option 2:** The proposed high-speed rail tracks would run along a viaduct parallel to and just west of US 101.

Hexagon previously evaluated four HSR design options and identified their land use impacts, transportation impacts, and construction impacts in a memorandum titled *Transportation, Land Use and Construction Impact Analysis of HSR*, dated September 21, 2016. The two alignment options that the CA HSRA now proposes are almost identical to two of the HSR design options Hexagon previously studied. The now-proposed Option 1, which would run the tracks on an embankment through downtown Morgan Hill, is very similar to the at-grade option through downtown Morgan Hill Hexagon previously studied. The now-proposed Option 2, which would run the tracks on an aerial structure just west of US 101, is almost identical to Option 3 analyzed in the previously study. Therefore, most of the discussion below regarding the land use, transportation and construction impacts of the now-proposed alignment options is the same as the discussion in the previous study.

Land Use Impacts

Under each proposed alignment design option, different numbers of properties would need to be acquired for the right-of-way of the high-speed rail tracks. The draft plans prepared by the CA HSRA outline the areas affected by each alignment option. A detailed discussion of the land use impacts of each alignment option is provided below.

Option 1 – Embankment Through Downtown

With alignment Option 1, the high-speed rail (HSR) tracks would run through the Morgan Hill downtown area on an embankment 6 to 15 feet high. The HSR tracks would run parallel to and immediately east of the existing Union Pacific (UP) railroad tracks. Therefore, all existing properties along the east side of the UP tracks would be affected (see Figures 2A-2C).

As part of alignment Option 1, the CA HSRA proposes several roadway realignments and extensions, as well as new roadways within the City of Morgan Hill. These proposed roadway changes would require the acquisition of all affected properties (see Figures 2A-2C). A detailed description of the proposed roadway changes is provided below:

- **Monterey Road:** Monterey Road currently runs directly adjacent to and east of the UP railroad tracks north of Cochrane Road. With alignment Option 1, this section of Monterey Road would be acquired for the HSR tracks. Monterey Road north of Cochrane Road would be realigned to run just east of the proposed HSR tracks.

- **Madrone Parkway:** Madrone Parkway is an east-west roadway that currently terminates at Monterey Road. With alignment Option 1, Madrone Parkway would extend west of the railroad tracks and connect with Hale Avenue via a flyover. Madrone Parkway access to Monterey Road would be provided via a loop road connection in the northeast quadrant of the Monterey Road/Madrone Parkway interchange.

- **Railroad Avenue:** Railroad Avenue currently runs directly adjacent to and east of the UP railroad tracks between Maple Avenue and San Pedro Avenue. With alignment Option 1, this section of Railroad Avenue would be acquired for the HSR tracks. Railroad Avenue would be realigned to run just east of the proposed HSR tracks. However, Railroad Avenue north of Barret Avenue would be discontinued.

As part of alignment Option 1, the CA HSRA proposes to grade separate all existing at-grade rail crossings within the City of Morgan Hill. All roadways that would cross the railroad tracks would be depressed under the tracks. Other roadways that currently intersect the depressed roadway would also require depression to maintain the roadway access or have access discontinued with cul-de-sacs. As a result, properties with driveways along the depressed sections of all roadways would need to be either acquired or have their driveways regraded or moved (see Figures 2A-2C). The extent of the grade separation at each roadway crossing the railroad tracks is described below:

- **Main Avenue:** Main Avenue would be depressed between Monterey Road and Butterfield Boulevard. Main Avenue would be widened from a two-lane roadway (one through lane in each direction) to a four-lane roadway. The roadway widening would require property acquisitions along either side of the roadway. The existing intersection with Depot Street west of the railroad tracks would be discontinued. Depot Street would end in a cul-de-sac. Access to Main Avenue from Depot Street would be provided via Monterey Road and cross streets connecting Depot Street to Monterey Road. The existing intersection along Main Avenue with McLaughlin Avenue would be eliminated. Properties along McLaughlin Avenue would access the City's roadway network via Central Avenue.

- **Dunne Avenue:** Dunne Avenue would be depressed between Monterey Road and Butterfield Boulevard. The existing intersections with Church Street and with Depot Street would be maintained, with both roadways slightly depressed to maintain crossings. It is assumed that driveways along the depressed sections of Church Street and of Depot Street would be regraded. If not regraded, the properties associated with the driveways would also need to be acquired since there are no alternative roadways to use for access to the affected properties.

- **San Pedro Avenue:** San Pedro Avenue would be depressed between Monterey Road and Butterfield Boulevard. The existing intersection with Church Street would be grade-separated as an interchange. As discussed above, Railroad Avenue would be discontinued north of Barrett Avenue. Therefore, the existing intersection of Railroad Avenue and San Pedro Avenue would be eliminated.

- **Tennant Avenue:** Tennant Avenue would be depressed between Vineyard Boulevard and Butterfield Boulevard. The existing intersection with Caputo Drive would be eliminated, with Caputo Drive terminating in a cul-de-sac north of Tennant Avenue. Properties along Caputo Drive would access the roadway network via Barrett Avenue. The existing intersection along Tennant Avenue at Railroad Avenue would be maintained, with the realigned Railroad Avenue depressed to form an intersection with Tennant Avenue. All existing driveways along the depressed section of Tennant Avenue would be eliminated.

- **Middle Avenue:** Middle Avenue would be elevated over the railroad tracks on an aerial structure between Monterey Road and Llagas Avenue. The aerial structure would be aligned slightly south of the existing Middle Avenue alignment between Monterey Road and Llagas Avenue. A trumpet-shaped interchange would be constructed at the interchange of Monterey Road and Middle Avenue. Because the realigned Middle Avenue aerial structure would be located outside of Morgan Hill and there would be no land use impacts within the City, the land use impacts of the Middle Avenue aerial structure are not shown on Figure 2C.

Option 2 – Viaduct West of US 101

With alignment Option 2, the high-speed rail (HSR) tracks would run just west of US 101 on a viaduct approximately 30 to 60 feet high. This alignment option would allow the HSR tracks to mostly avoid developed land in Morgan Hill. There would be no modifications to the existing roadway network. The land use impacts of alignment option 2 are shown on Figures 3A-3C.

Transportation Impacts

Option 1 – Embankment Through Downtown

With alignment Option 1, the transportation system of Morgan Hill would benefit by the elimination of all at-grade crossings. However, the roadway network modifications proposed with alignment Option 1 have several inconsistencies with the City of Morgan Hill's 2035 General Plan:

- **Tilton Avenue:** Tilton Avenue currently terminates to the east at Monterey Road. Morgan Hill's 2035 General Plan does not show any change to Tilton Avenue. With alignment Option 1, Tilton Avenue would terminate west of the UP rail tracks and lose its access to Monterey Road. The proposed cul-de-sac on Tilton Avenue would not be in conformance with the 2035 General Plan. An overpass or underpass will be needed to maintain Tilton Avenue's connection with the realigned Monterey Road. With either an overpass or underpass, Tilton Avenue's roadway grade would be affected and it is unlikely that the eastern-most driveways along Tilton Avenue could be regraded to maintain access. Affected properties along Tilton Avenue would need to be acquired. Moreover, either an overpass or underpass would require the realigned Monterey Road to be raised or depressed to intersect with Tilton Avenue. It is likely that the intersection of the realigned Monterey Road with Burnett Avenue would also require depression/elevation.

  With alignment Option 1, Madrone Parkway would be extended west to Hale Avenue with a connection to the realigned Monterey Road. This extension would be in conformance with the City's General Plan.

- **Railroad Avenue:** With alignment Option 1, Railroad Avenue would be discontinued north of Barrett Avenue, which would not be in conformance with City's General Plan.

- **Restricted Accesses:** With alignment Option 1, all roadways crossing the railroad tracks would be depressed under the tracks. As the roadways regain grade to conform to existing grade on either side of the railroad tracks, some roadways that currently intersect the depressed roadways would no longer have access to the depressed roadways. These access restrictions are not in conformance with City's General Plan. The roadways that would lose access to the depressed roadways are listed below:

  - McLaughlin Avenue at Main Avenue
  - Depot Street at Main Avenue
  - Church Street at San Pedro Avenue

Maintaining these connections would require additional roadway depressions and loss of property access.

Option 2 – Viaduct West of US 101

Option 2 would not result in any changes to the Morgan Hill motor vehicle transportation system. The space under the elevated tracks would provide an opportunity for a multiple-use trail for pedestrians and bicyclists. The City would need to work with the CA HSRA to design the crossings of the possible trail at the interchanges. At-grade crossings would not be safe, so the crossings would need to be under- or over-passes.

Construction Impacts

Construction of the HSR tracks would impact the Morgan Hill transportation system including street closures, lane closures, sidewalk closures, railroad crossing closures, and detours. The main impacts under each design option are described as follows:

Option 1 – Embankment Through Downtown

With Option 1, Monterey Road north of Cochrane Road would need to be realigned, which might result in the closure of Monterey Road during construction. Currently, only Monterey Road and US 101 run directly through Morgan Hill. US 101 is already congested during peak times under existing conditions. No widening of US 101 is planned. Table 1 shows the forecasted average daily traffic (ADT) and corresponding roadway level of service (LOS) at several locations along Monterey Road under Year 2035 General Plan conditions. Three out of eight segments along Monterey Road are projected to serve ADT equivalent to unacceptable LOS F.

Table 1
Year 2035 General Plan Conditions Monterey Road Segment Analysis

	Roadway Segment	2035 General Plan Condition	
		ADT [1]	LOS [2]
1	Monterey Road between Kirby Avneue and Tilton Avenue	30,872	**F**
2	Monterey Road between Peebles Avenue and Madrone Parkway	33,269	**F**
3	Monterey Road between Cochrane Road and Old Monterey Road	19,584	D
4	Monterey Road between Wright Avenue and El Toro Street	17,164	C
5	Monterey Road between 3rd Street and 4th Street	13,503	C
6	Monterey Road between San Pedro Avenue and Cosmo Ln	26,140	D
7	Monterey Road between Vineyard Boulevard and Watsonville Rd	26,985	D
8	Monterey Road between Starswept Ln and East Middle Avenue	29,446	**F**

Note:
Source: Morgan Hill 2035 General Plan Update.
1. ADT = Average two-way daily traffic.
2. LOS = Level of service based on daily volume planning thresholds. Peak hour traffic operations may be worse than shown for daily conditions.

The 2035 General Plan includes improvements to enhance north-south connectivity and relieve some of the pressure off of Monterey Road. The following improvements should be provided if Monterey Road is to be partially or completely closed during certain periods of construction.

- Extension of Hale Avenue/Santa Teresa Boulevard as a 2-lane arterial between Main Avenue and Spring Avenue.
- Extension of Murphy Avenue/Mission View Drive as a 2-lane multi-modal arterial between Half Road and Dianna Avenue.
- Realignment of DeWitt Avenue as a 2-lane arterial with Sunnyside Avenue
- Extension of Hill Road/Peet Road as a 2-lane collector between Half Road and Main Avenue.

Before any partial or complete closure of Monterey Road during construction, a detour plan should be prepared and submitted to the City for approval. The detour plan should show the proposed times of closure, the proposed detour routes, and the capacity of the detour routes to accommodate increased traffic during the times of closure.

Building underpasses on the east-west street crossings of the HSR tracks would also result in street closures. Table 2 shows the forecasted average daily traffic (ADT) and corresponding roadway level of service (LOS) on these east-west streets under Year 2035 General Plan conditions. Based on the forecasted average daily traffic on these streets under Year 2035 General Plan conditions, all of the streets would operate at LOS C or D. Therefore, it would not be possible to close more than one east-west street at a time.

Table 2
Year 2035 General Plan Conditions East-West Street Segment Analysis

	Roadway Segment	2035 General Plan Condition	
		ADT [1]	LOS [2]
1	Cochrane Road between Adams Ct and Woodview Avenue	27,597	D
2	West Main Street between Hale Avenue and Del Monte Street	6,693	C
3	East Dunne Avenue between Depot Street and Butterfield Boulevard	19,838	D
4	Tennant Avenue between Vineyard Boulevard and Railroad Avenue	17,164	C

Note:
Source: Morgan Hill 2035 General Plan Update.
1. ADT = Average two-way daily traffic.
2. LOS = Level of service based on daily volume planning thresholds. Peak hour traffic operations may be worse than shown for daily conditions.

Option 2 – Viaduct West of US 101

With Option 2, the HSR tracks would bypass the downtown area so there would not be any construction impacts to Monterey Road or the east-west cross-streets. However, there could be construction impacts to the three US 101 freeway interchanges. Along US 101, the interchanges with Tennant Avenue, Dunne Avenue, and Cochrane Road provide access to most of the City of Morgan Hill. The level of service results under Year 2035 General Plan conditions show that the intersections at these three interchanges would operate at LOS D or better conditions (see Table 3). However, because of the importance of the interchanges for access to adjacent properties and the overall City of Morgan Hill, all three interchanges should be kept open during construction.

Table 3
Year 2035 General Plan Conditions Intersection Level of Services at US 101 Interchanges

	Roadway Segment	Peak Hour	2035 General Plan Condition	
			Delay (sec/veh)	LOS
1	US 101 SB Ramps and Dunne Avenue	AM	21.0	C
		PM	18.2	B
2	US 101 NB Ramps and Dunne Avenue	AM	12.9	B
		PM	14.7	B
3	US 101 SB Ramps and Tennant Avenue	AM	32.3	C
		PM	50.3	D
4	US 101 NB Ramps and Tennant Avenue	AM	12.9	B
		PM	11.3	B
5	US 101 SB Ramps and Cochrane Road	AM	14.4	B
		PM	21.1	C
6	US 101 NB Ramps and Cochrane Road	AM	13.6	B
		PM	13.1	B

Source: Morgan Hill 2035 General Plan Update.

Conclusions

As discussed above, with the build-out or during the construction process of the HSR tracks, both proposed alignment options would have different impacts on the Morgan Hill transportation system and on the surrounding properties. Table 4 summaries these impacts of each option.

Table 4
Impacts Summary of the Proposed HSR Alignment Options

Alignment Options	Land Use Impacts	Transporation Impacts	Construction Impacts
Option 1 (Downtown embankment)	- - - -	+ +	- - -
Options 2 (West of US 101 viaduct)	- -	o	-

Notes:
" - " represents negative impacts
" + " represents benefits
" o " represents no impacts

Figure 1
Alignment Options for the Proposed High Speed Rail Track

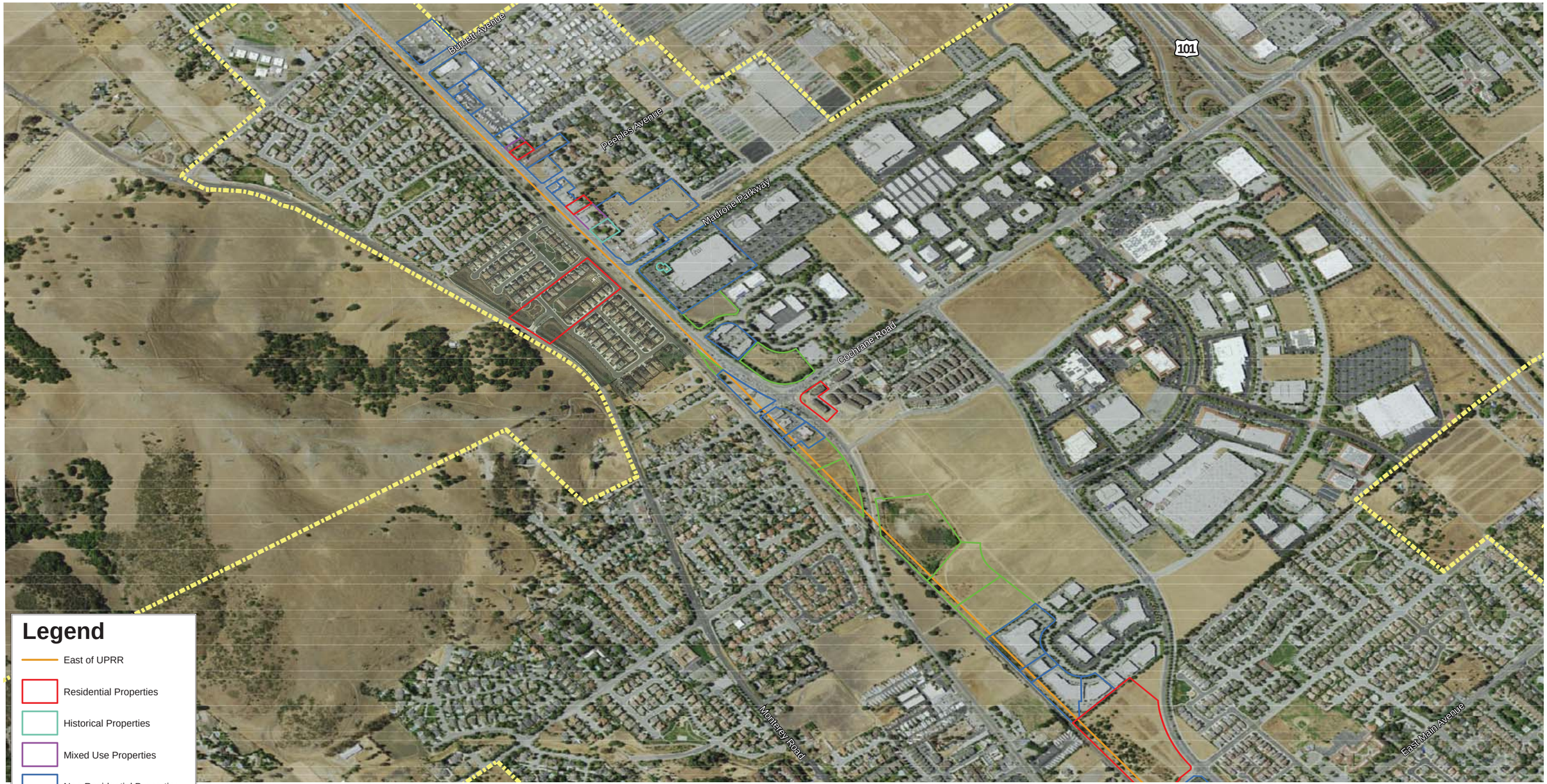


Figure 2a
Affected Properties by Option 1 - East of UPRR Alignment - Embankment

Figure 2b
Affected Properties by Option 1 - East of UPRR Alignment - Embankment

NORTH
Not to Scale

Figure 2c
Affected Properties by Option 1 - East of UPRR Alignment - Embankment

NORTH
Not to Scale

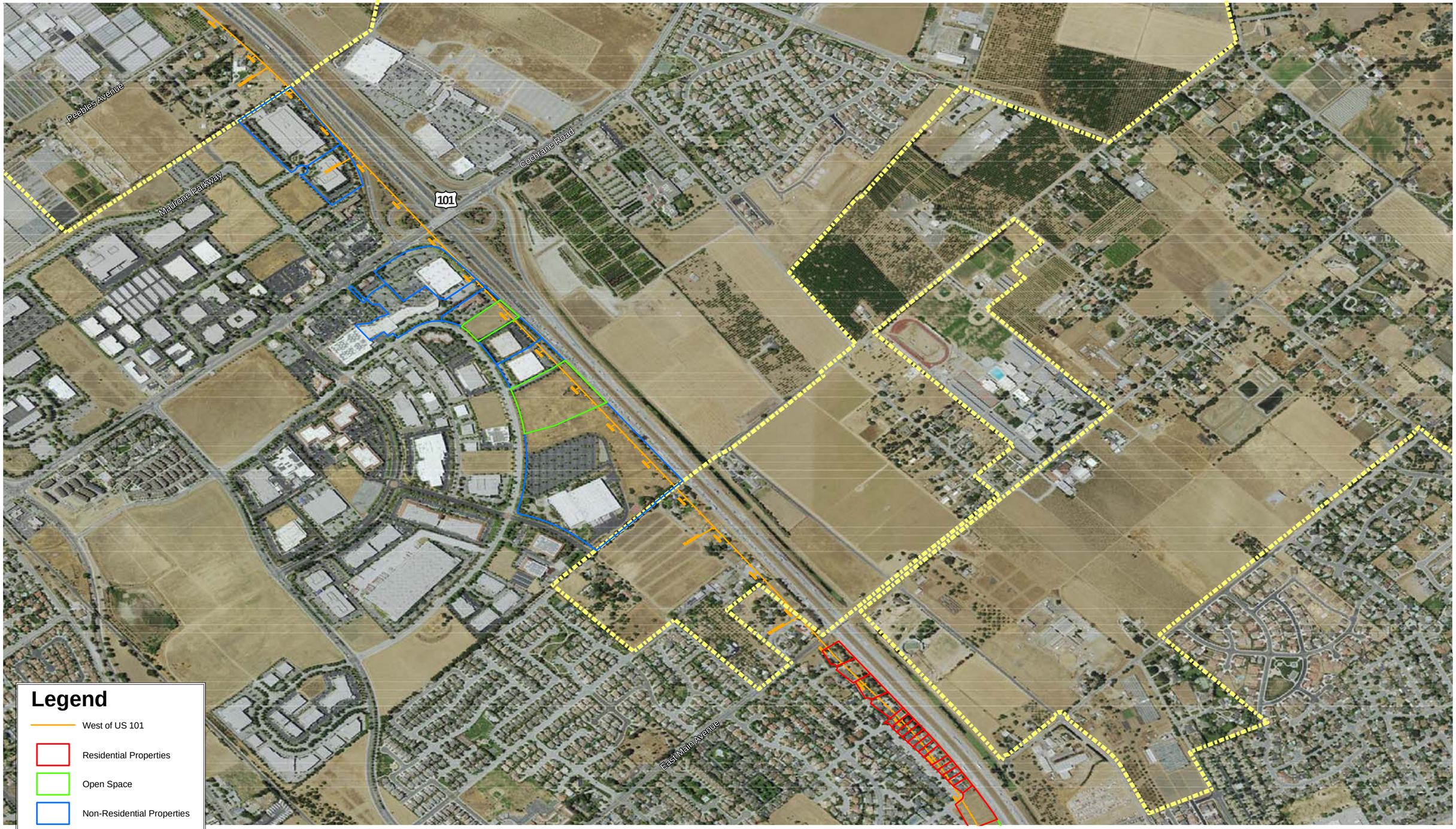


Figure 3a
Affected Properties by Option 2 - West of US 101 Alignment - Viaduct

HEXAGON

NORTH
Not to Scale

Figure 3b
Affected Properties by Option 2 - West of US 101 Alignment - Viaduct

Figure 3c
Affected Properties by Option 2 - West of US 101 Alignment - Viaduct

HEXAGON

NORTH
Not to Scale

Attachment E:
Noise Memo

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
429 E. Cotati Ave
Cotati, California 94931
Tel: 707-794-0400 *Fax: 707-794-0405*
www.Illingworthrodkin.com *illro@illingworthrodkin.com*

May 21, 2020

Pooja Nagrath
David J. Powers & Associates, Inc.
1871 The Alameda, Suite 200
San José, CA 95126

VIA E-Mail: apnagrath@davidjpowers.com

Subject: Review of the California High-Speed Rail Noise and Vibration Assessment for the City of Morgan Hill

Dear Ms. Nagrath:

We have completed our review of the California High Speed Rail (HSR) Draft Environmental Impact Report/Environmental Impact Statement Section 3.4 on Noise and Vibration, as it relates to the City of Morgan Hill. The documents reviewed included the overall report in Section 3.4, the Noise and Vibration Technical Report and its Appendices A, B, and C. These documents are generally thorough and follow the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) and adhere to the guidance of the Federal Railroad Administration (FRA) for HSR[1] and the Federal Transit Administration Noise and Vibration Impact Assessment Manual.[2] One challenge for the City of Morgan Hill is that given the length of the analysis from San Jose to Merced, the analysis is broken up into corridors, which include multiple jurisdictions of cities and unincorporated areas. As a result, the sections do not quite align with city limits so that additional information is needed to more precisely assess the impacts in the City of Morgan Hill. However, given the information provided, the impacts can be estimated with an indication that actual impacts in the City may be slightly more or less. Similarly, of the existing noise data identified as being in the Morgan Hill to Gilroy section, only a portion is in Morgan Hill. Properly quantifying the existing noise levels is an important aspect of the assessment as impact is defined on the basis of increases in level over the existing conditions.

[1] High-Speed Ground Transportation Noise and Vibration Impact Assessment, U.S. Department of Transportation Federal Railway Administration, Final Report DOT/FRA/ORD-12/15, September 2012.
[2] Transit Noise and Vibration Impact Assessment Manual, U.S. Department of Transportation Federal Transit Administration, FTA Report No. 0123, September 2018.

There are four proposed rail alignments considered in the assessment. Alternative 1 uses a viaduct east of downtown Morgan Hill. Alternate 2 brings the HSR through downtown Morgan Hill on an embankment parallel to the existing low speed rail line. Alternative 3 is similar to Alternative 1 in Morgan Hill. Alternative 4 is the preferred option, which brings the HSR through downtown Morgan Hill at grade in the existing railroad right-of-way.

To estimate the number of impacts in the City of Morgan Hill, the impacts due to HSR operation included in the Noise and Vibration Technical Report were used, as determined using FRA guidance. In the Table 1, the number of moderate and severe noise impacts are identified within the limits of roadways identified. Moderate impacts may or may not trigger the need for noise mitigation, as described in Section 3.4 Noise and Vibration of the EIR/EIS document, while Severe impacts do generate the need for noise mitigation. The number of impacts in both cases are included in Table 1. The impacts are also broken down by the following land use categories: Category 1 areas where quiet is an essential element to the land use; Category 2 are Residential; and Category 3 are Institutional use and passive-use parks. Vibration impacts are also identified in Table 1. From this table, the greatest number of noise and vibration impacts for the City of Morgan Hill occurs in the downtown HSR options, with the highest being for Alternative 2 due to the elevated railway on the embankment, followed by the at grade Alternative 4. In order to

Table 1: Summary of Noise and Vibrations Impacts for the City of Morgan Hill

Location		Noise				Vibration
		Moderate		Severe		
		Cat 2	Cat 1, 3	Cat 2	Cat 1, 3	
Alt 1	Burnett Ave to Tennant Ave	68 SF 2 MF 1 Hotel	0	1 SF	0	0
	Tennant Ave to California	31 SF	0	0	0	0
	Total	102	0	1	0	0
Alt 2	Palm Ave to Tilton Ave	36 SF 1 MF 1 Hotel	0	0	0	1 Vib Sen
	Tilton Ave to Tennant Ave	304 SF 131 MF 1 Hotel	3 Inst 1 Micro 1 Amp	225 SF 79 MF	0	0
	Tennant Ave to California Ave	26 SF 101 MF	0	6 SF 100 MF	0	0
	Total	563	5	410	0	1

Table 1 (cont): Summary of Noise and Vibrations Impacts for the City of Morgan Hill

Location		Noise				Vibration
		Moderate		Severe		
		Cat 2	Cat 1, 3	Cat 2	Cat 1, 3	
Alt 3	Burnett Ave to Tennant Ave	70 SF 2 MF 1 Hotel	1 SF	1 SF	0	0
	Tennant Ave to California	31 SF	0	6 SF	0	0
	Total	104	1	7	0	0
Alt 4	Palm Ave to Tilton Ave	9 SF	0	1 SF 1 MF	0	0
	Tilton Ave to Tennant Ave	224 SF 67 MF 2 Hotel	3 Inst 1 POW 1 Amp	158 SF 107 MF	0	1 SF 3 MF
	Tennant Ave to California Ave	11 SF 100 MF		17 SF 100 MF	0	11 SF 100 MF
	Total	413	5	384	0	111

Note: SF=single residences, MF=multi family residences, Inst=institutions, POW=places of Worship, Amp=amphitheaters

evaluate these impacts, the City of Morgan Hill should request the location of the impacted places along with the specific mitigation measurements that will be applied to each.

Another consequence of the EIR/EIS analysis being done by sections rather than by jurisdictions is the determination of the existing noise levels. The exact locations of these measurements were determined from the addresses provided and the photographs of the sites supplied in Appendix A. Eleven locations were identified as being applicable to the City of Morgan Hill. Of these, only eight are actually in the City: N101 through N108. Two are problematic for assessing the existing levels: N100 and N109. Location N100 indicated considerably higher levels than the others, 81 dBA L_{dn}, compared to the range of 68 to 73 L_{dn} for the other measurement locations. N100 is approximately 3.7 miles from the City of Morgan Hill northwest boundary. Location N109, which was southeast of the city boundary and east of US 101, indicated considerably lower levels, 57 dBA, compared to the range. From the Noise and Vibration Technical Report, it cannot be determined if these data effected the estimation of the existing levels within the City of Morgan Hill. In order to determine this, the City should request the results of existing noise level modeling done within Morgan Hill.

The EIR/EIS documents approach the noise and vibration assessment from a high level view, breaking up the City of Morgan Hill into two sections for Alternatives 1 and 3 and three sections for Alternatives 2 and 4. This high level view does not facilitate a more detailed analysis for the City, with regard to how effective the mitigation measures will be. For construction noise, mitigation measures are cited that are typical and can be effective for construction projects. Their effectiveness, however, will vary by location of the work and the receptors and the equipment and operations. The impact of construction noise will have to be assessed in more detail once the individual projects in the City are defined by the contractor. At this point in the project, the assessment of the Construction Noise and Vibration appears to be thorough, in terms of assessment and mitigation measurements but should be considered as significant and unavoidable for the time being until detailed, site specific construction plans and equipment operations are specified are provided and actual planned mitigation measures can be evaluated to determine if the impact is unavoidable.

For operational noise, the primary mitigation strategy is the use of sound walls at various locations for Alternative 2 and 4. These reduce the number of moderate impacts of Alternative 2 to zero and the number of severe impacts to 26 in Morgan Hill. For Alternative 4, the moderate impacts are also zero and with only two severe impacts. There is insufficient detail to determine if the impacts in Alternatives 2 and 4 could be lowered by increasing wall height, using absorptive facings, or more novel barrier designs. For Alternative 4, the two severe impacts are eliminated with the use of an unspecified number of quiet zones (mitigation measure NV-MM#3). The use of these quiet zones would reduce the usage of barriers that are identified in NV-MM#2), however, implementing the quiet zones would be the responsibility of the City. Under NV-MM#2 or #3, it should be noted that the feasibility and reasonableness of these barriers have only been initially evaluated and that these need to be re-evaluated in more detail before they are actually included in the project. Other possible mitigation measures involve reducing the sources of noise from the vehicles and the track, however, the impact of such reductions are not quantified. Concerns about HSR passenger stations and maintenance facilities are not applicable to the City of Morgan Hill.

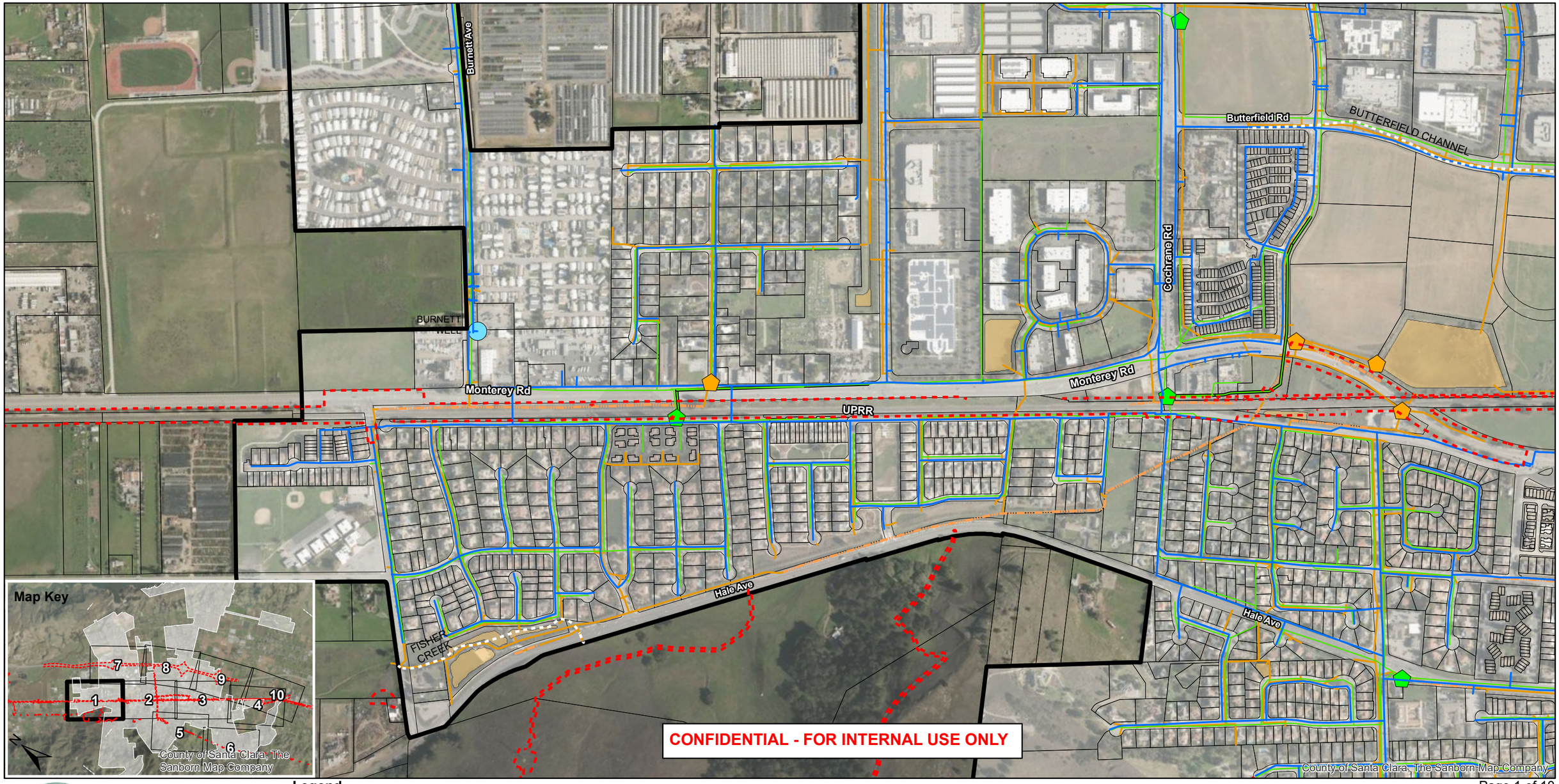
Traffic noise would increase by 2 dB at two locations in the City for all four Alternatives by the year 2029 and would not be considered significant impacts. By 2040, one location in all of the Alternatives would be exposed to a traffic noise increase of 3 dB. This is the ¼ mile segment on Llagas Road between Hale Avenue and Old Monterey Road. This section has a posted speed limit of 35 mph, lined with subdivision walls and is one lane in each direction. Under CEQA, this would be a significant increase; however, the street has significant cracking and wear and possibly would be rehabilitated with a quieter pavement by 2040. If not, the City may want to consider requesting that this be done as part of the HSR noise mitigation.

In Table 1, operational vibration impacts are noted in Alternatives 2 and 4. Mitigations are to be designed and implemented during the final design. The City of Morgan Hill should request the location of these impacts and specific mitigation would be applied. In several places in the documents, the EIR/EIS implies further analysis will be done for vibration as well as noise. The timing and extent of these evaluations should be clarified to the City.

Sincerely,

Paul R. Donavan, Sc.D.
Principle, Illingworth & Rodkin, Inc.

Attachment F:
Mapping of City Utilities



CITY OF MORGAN HILL
City of Morgan Hill GIS
10/19/2018

Legend

- City Boundary
- Existing and Proposed Right-of-Ways and Temporary Construction Easements
- Creek

City Utilities

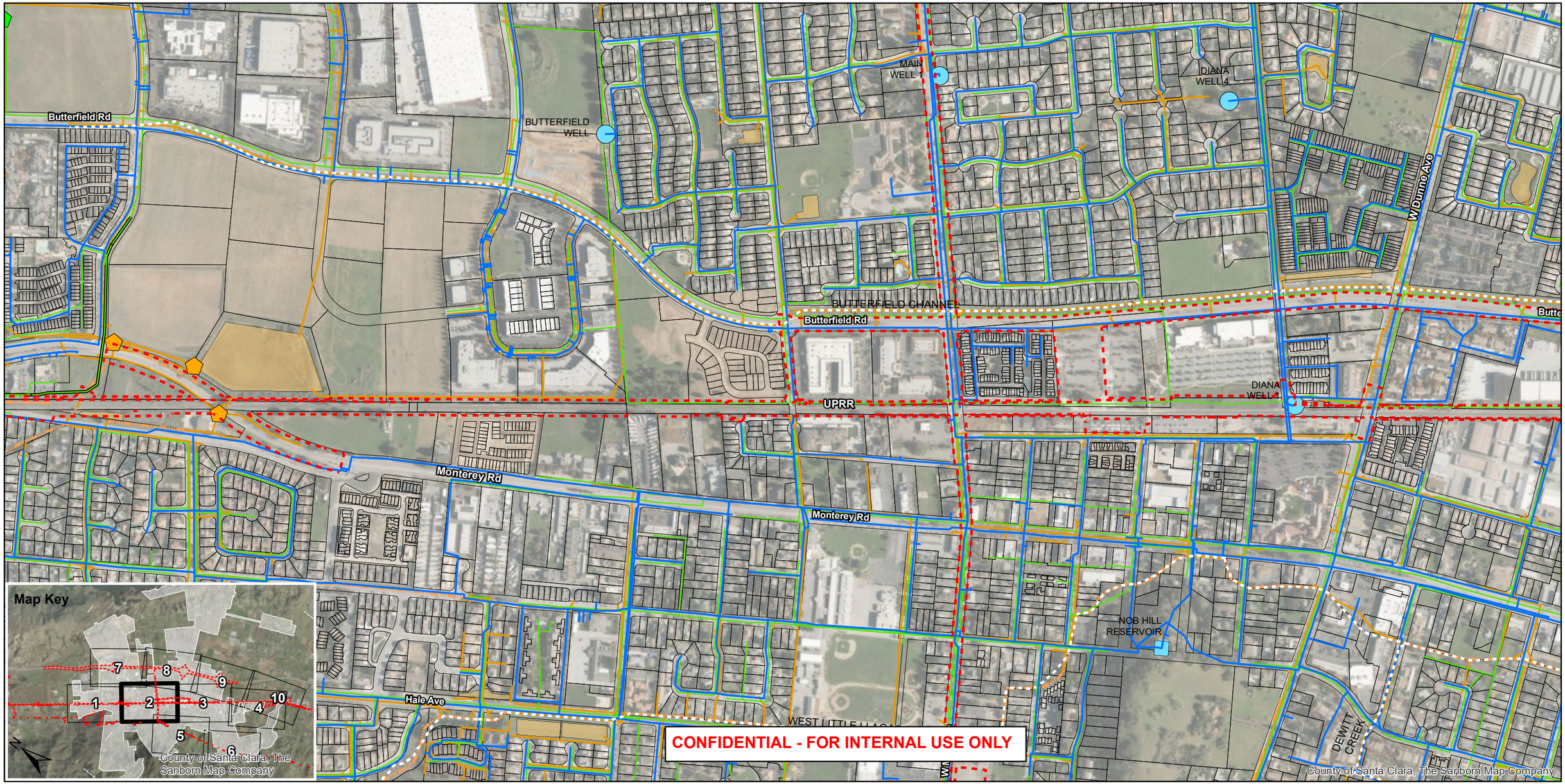
- Drinking Water Well
- Water Booster Station
- Water Storage Tank
- Water Pressurized Main
- Water Lateral Line
- Storm Water Pump Station
- Storm Water Structure
- Storm Water Gravity Main
- Storm Water Lateral Line
- Sewer Lift Station
- Sewer Force Main
- Sewer Gravity Main

0 500 1,000 Feet

Source: ROW and TCE from HNTB (Draft 15% PEPD Drawings); Aerial imagery County of Santa Clara (2017).
Document Path: \\MHFILE\pvanderleeden$\Projects\Planning\GIS\Maps\HighSpeedRail\Working\MorganHill_HSR_ALT4_Utilities_2018-10-19_draft.mxd

City of Morgan Hill

High Speed Rail Alternative 4 and City Utilities:
Approximate Environmental Footprint derived from Existing and Proposed Right-of-Ways and Temporary Construction Easements



CITY OF MORGAN HILL
City of Morgan Hill GIS
10/19/2018

0 500 1,000 Feet

Legend

- City Boundary
- Existing and Proposed Right-of-Ways and Temporary Construction Easements
- Creek

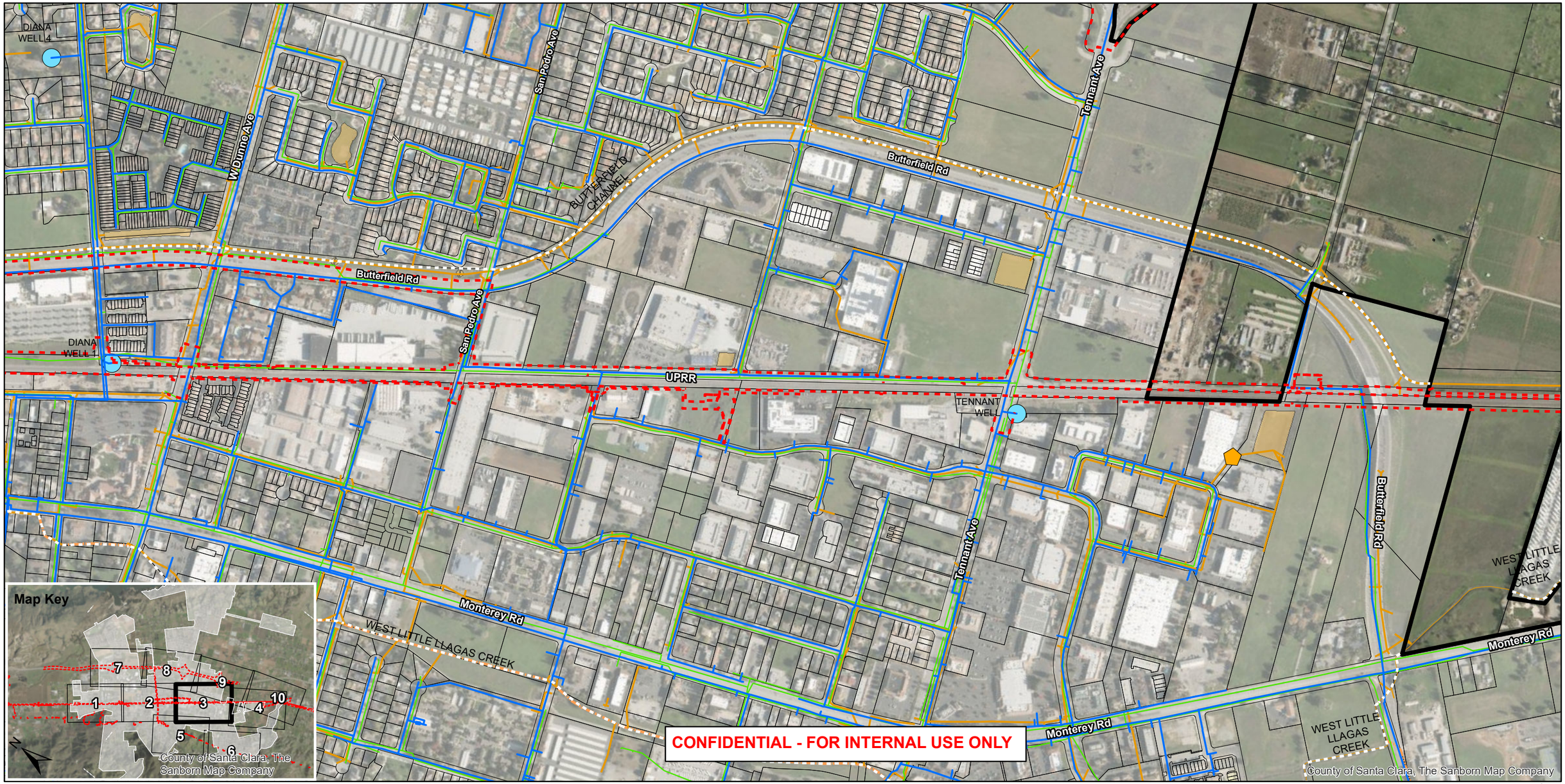
City Utilities

- Drinking Water Well
- Water Booster Station
- Water Storage Tank
- Water Pressurized Main
- Water Lateral Line
- Storm Water Pump Station
- Storm Water Structure
- Storm Water Gravity Main
- Storm Water Lateral Line
- Sewer Lift Station
- Sewer Force Main
- Sewer Gravity Main

Source: ROW and TCE from HNTB (Draft 15% PEPD Drawings); Aerial imagery County of Santa Clara (2017).
Document Path: \\MHFILE\pvanderleeden$\Projects\Planning\GIS\Maps\HighSpeedRail\Working\MorganHill_HSR_ALT4_Utilities_2018-10-19_draft.mxd

City of Morgan Hill

High Speed Rail Alternative 4 and City Utilities:
Approximate Environmental Footprint derived from Existing and Proposed Right-of-Ways and Temporary Construction Easements



CITY OF MORGAN HILL
City of Morgan Hill GIS
10/19/2018

0 500 1,000 Feet

Legend

- City Boundary
- Existing and Proposed Right-of-Ways and Temporary Construction Easements
- Creek

City Utilities

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City of Morgan Hill

High Speed Rail Alternative 4 and City Utilities:
Approximate Environmental Footprint derived from Existing and Proposed Right-of-Ways and Temporary Construction Easements

Source: ROW and TCE from HNTB (Draft 15% PEPD Drawings); Aerial imagery County of Santa Clara (2017).
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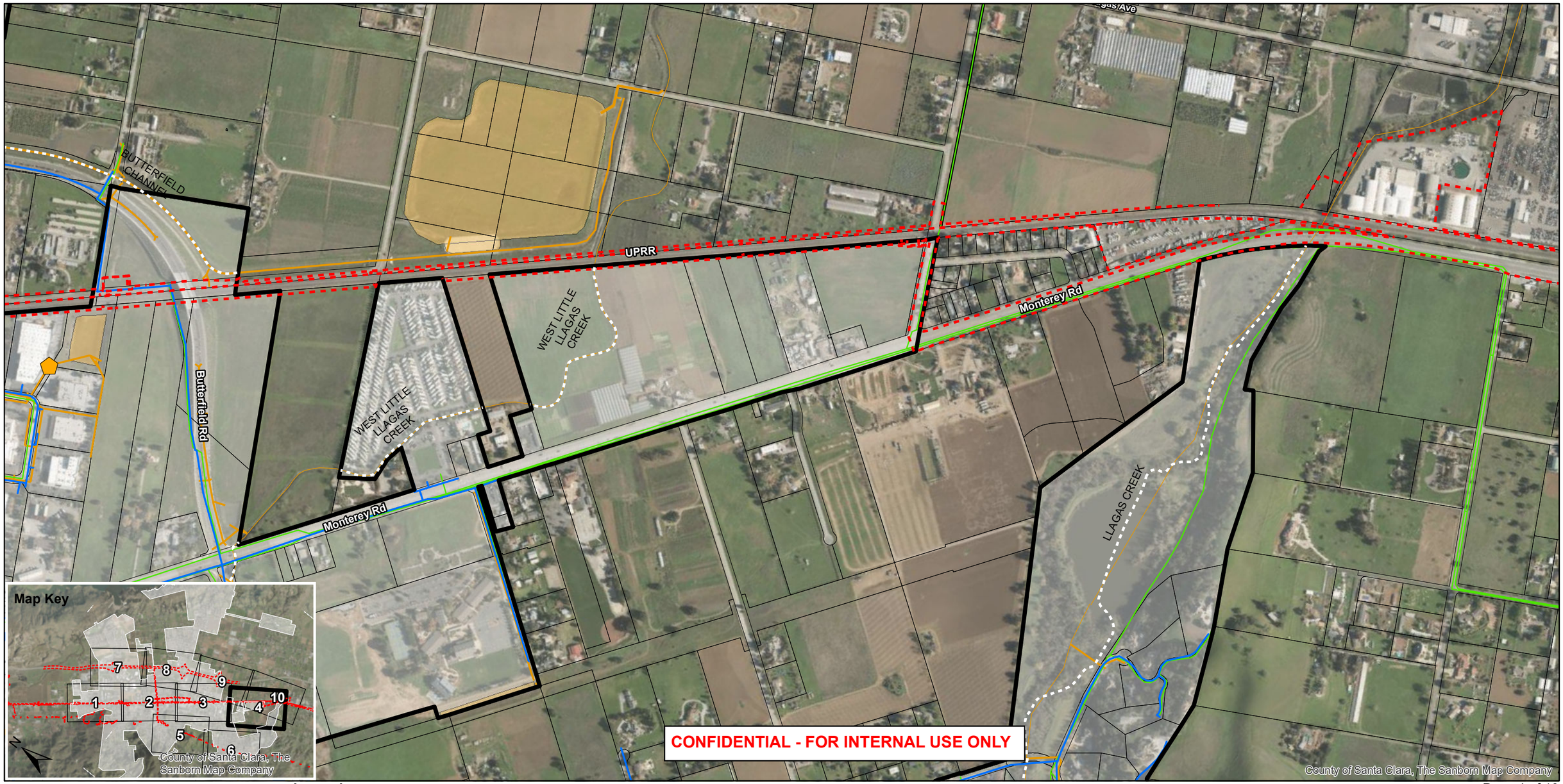

CITY OF MORGAN HILL
City of Morgan Hill GIS
10/19/2018

Legend

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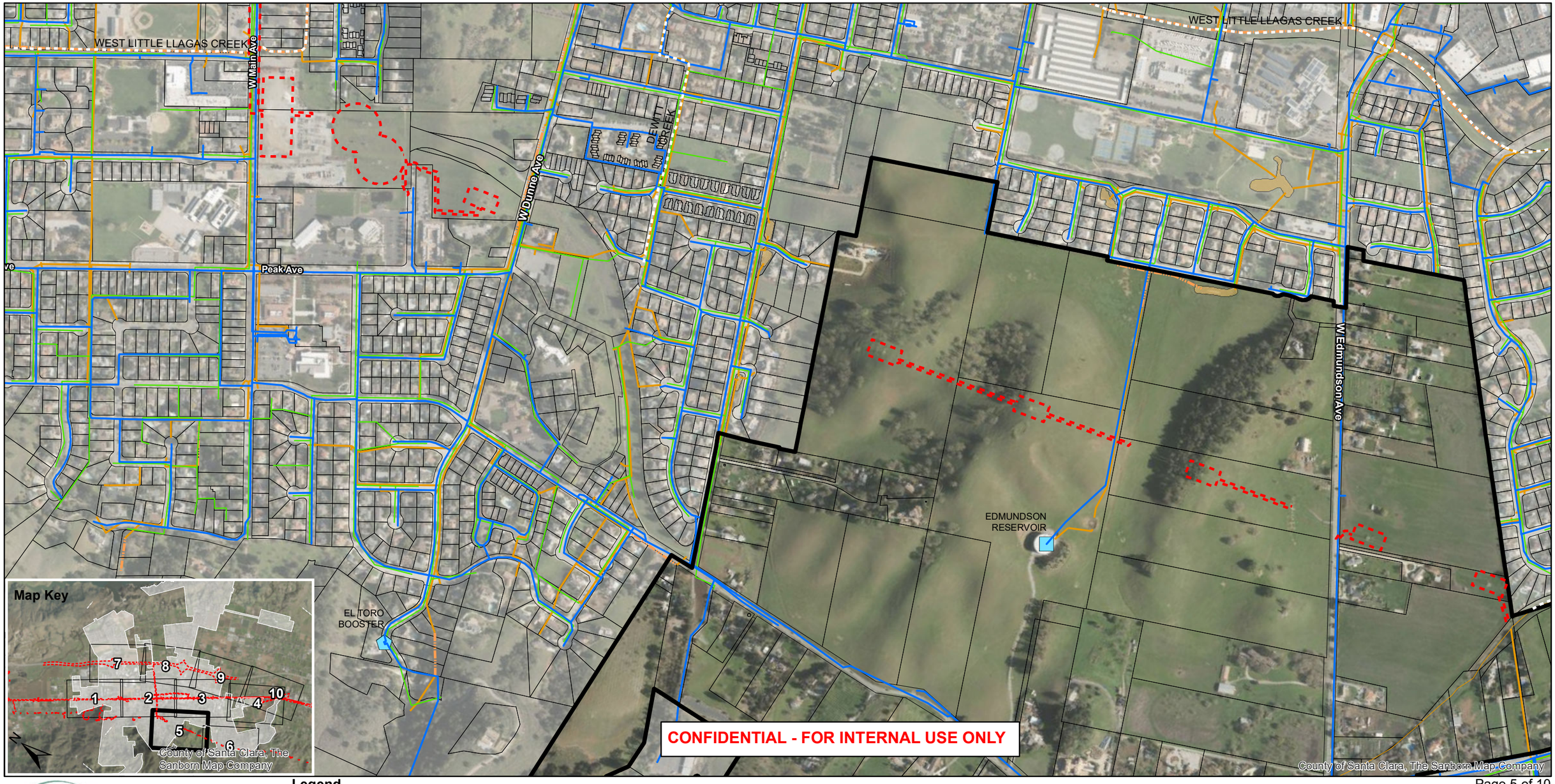

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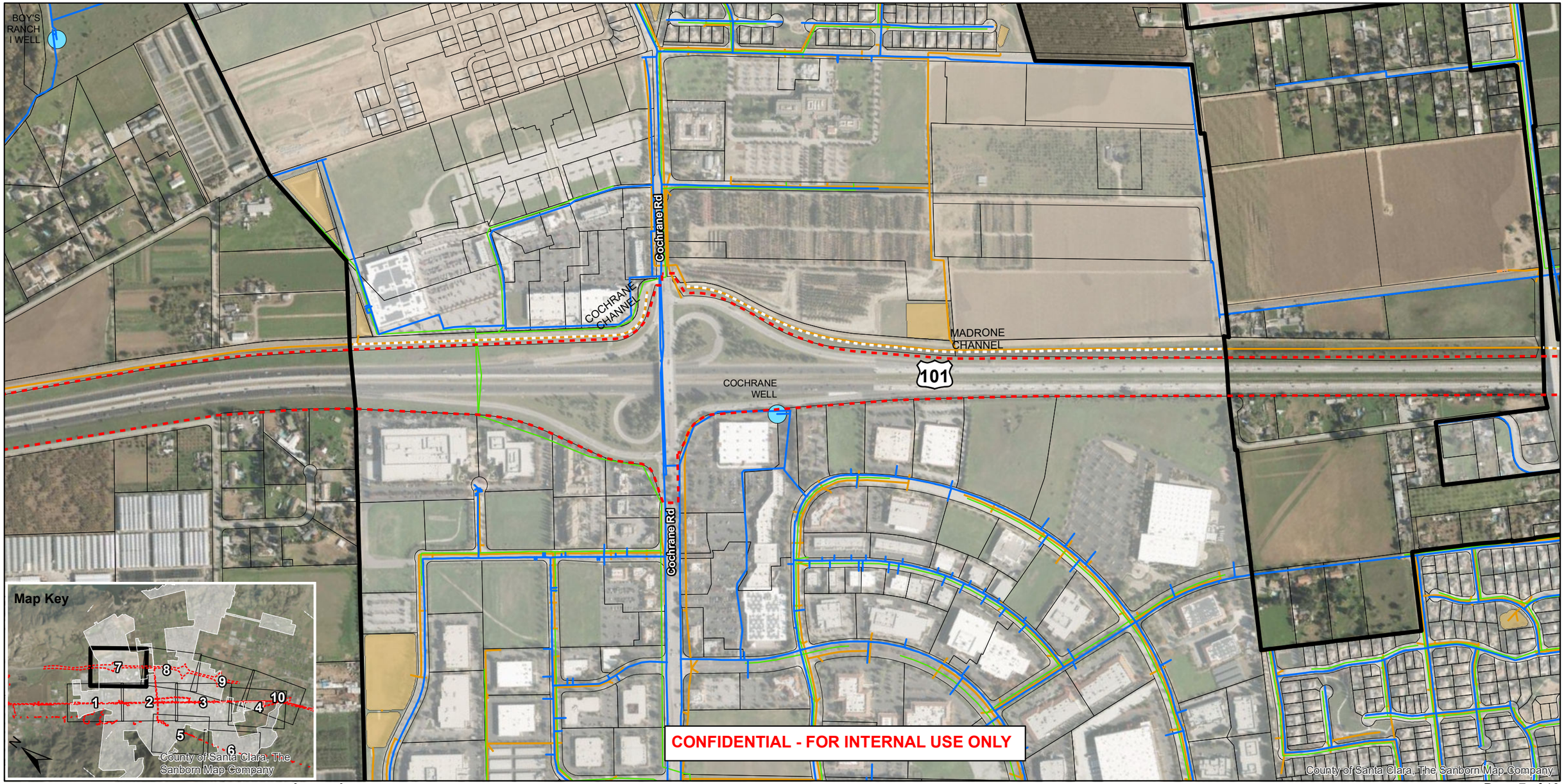

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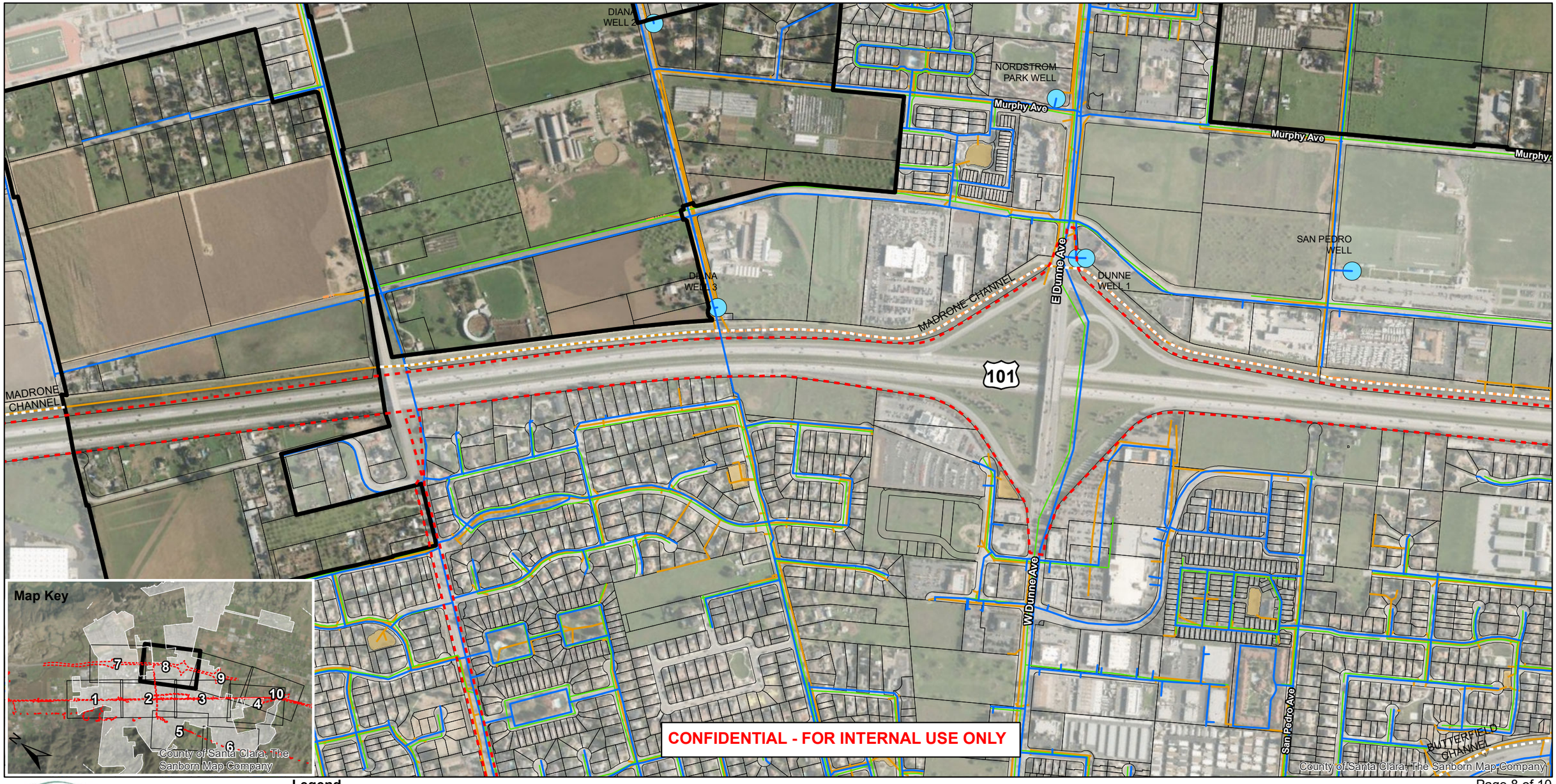

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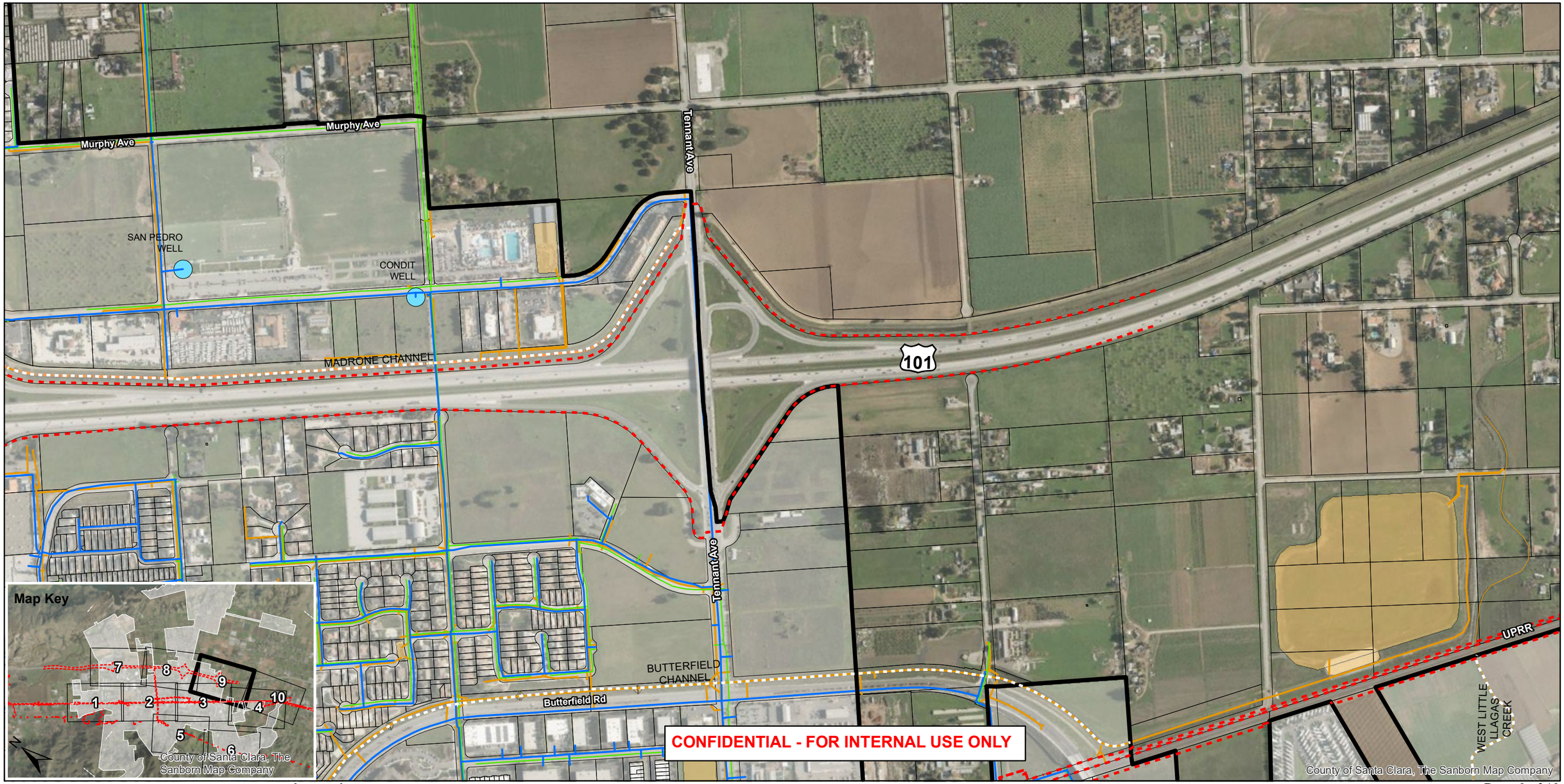

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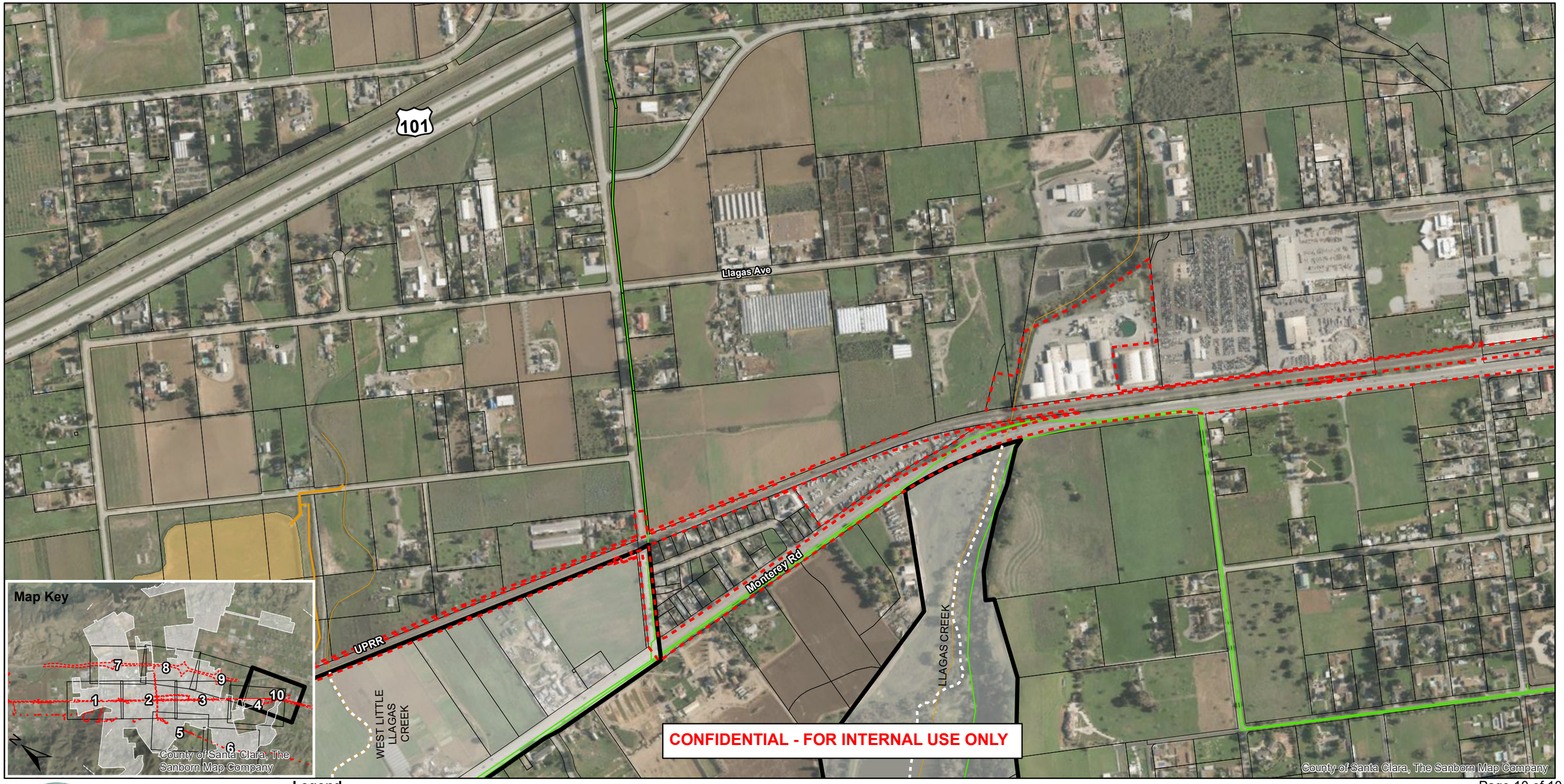

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